



Published in final edited form as:

Dev Psychol. 2010 November ; 46(6): 1677–1693. doi:10.1037/a0020677.

Parenting Knowledge: Experiential and Sociodemographic Factors in European American Mothers of Young Children

Marc H. Bornstein, Linda R. Cote, O. Maurice Haynes, Chun-Shin Hahn, and Yoonjung Park
Child and Family Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Public Health Service

Abstract

Knowledge of childrearing and child development is relevant to parenting and the well-being of children. In a sociodemographically heterogeneous sample of 268 European American mothers of 2-year-olds, we assessed the state of mothers' parenting knowledge, compared parenting knowledge in groups of mothers who varied in terms of parenthood and social status, and identified principal sources of mothers' parenting knowledge in terms of social factors, parenting supports, and formal classes. On the whole, European American mothers demonstrated a fair but less than complete basic parenting knowledge, and mothers' age, education, and rated helpfulness of written materials each uniquely contributed to their knowledge. Adult mothers scored higher than adolescent mothers, and mothers improved in their knowledge of parenting from their first to their second child (and were stable across time). No differences were found between mothers of girls and boys, mothers who varied in employment status, or between birth and adoptive mothers. The implications of variation in parenting knowledge and its sources for parenting education and clinical interactions with parents are discussed.

Trust yourself. ... You know more than you think you do.

Benjamin Spock, *Baby and Child Care* (1946, p. 3)

A major focus of contemporary parenting studies is cognitions, broadly construed to include parents' values, goals, beliefs, and attitudes as well as actual parenting knowledge of childrearing and child development. Whereas values, goals, beliefs, attitudes, and other like cognitions may or may not be factual, in addition to its social construction, parenting knowledge is thought to draw on the science base and to be valid and reliable by members of the clinical and research communities. The present study concerns itself with what European American mothers of young children in different walks of life know substantively about childrearing and child development, the varying levels of parenting knowledge among mothers of different parenthood and social statuses, and which factors relate to variation in parenting knowledge.

Parenting Knowledge and its Significance¹

Parenting knowledge of childrearing and child development encompasses many domains: parents' cognitions about various approaches appropriate to fulfilling the biological and

Address correspondence to: Dr. Marc H. Bornstein, Child and Family Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Suite 8030, 6705 Rockledge Drive, Bethesda, MD 20892-7971 USA, TEL: 301-496-6832 FAX: 301-480-4039, Marc_H_Bornstein@nih.gov WWW: <http://www.cfr.nichd.nih.gov>.

Developmental Psychology, in press.

¹The literature in parenting knowledge is largely based on studies that include participation of varying ethnicities and children of varying ages. These factors moderate their results. In this study (as we point out), we sampled from the European American population of mothers with young children. Most of the studies we review (but not all) had a similar sample composition.

physical as well as socioemotional and cognitive needs of children as they develop; parents' understanding of normative child development, that is both developmental processes and the abilities and accomplishments of children as they grow; and parents' awareness of practices and strategies for maintaining and promoting children's health and coping effectively with children's illness (Bornstein, 2006; Goodnow & Collins, 1990; MacPhee, 1981). In turn, parenting knowledge about such topics as proper parenting, norms and milestones, and health and safety are believed to shape parents' other cognitions and their practices, to influence child development, and to portend consequences for children's health and well-being.

First, insights into the patterns and processes of childrearing and child development are thought to shape parenting. For example, parenting knowledge is associated with enhanced parental self-perceptions of competence, satisfaction, and investment in parenting (Bornstein, Hendricks, et al., 2003). The relation between parental self-efficacy and parenting competence is also moderated by parenting knowledge: Parental self-efficacy and parenting competence are positively associated when parenting knowledge is high; by contrast, self-efficacy and competence are inversely associated when knowledge is low (Hess, Teti, & Hussey-Gardner, 2004). Parenting knowledge has also been implicated in parents' more accurate interpretations of their children's behaviors (Bugental & Happaney, 2002). In these senses, parenting knowledge may underpin parents' global cognitive organization for adapting to or anticipating developmental changes in their children (Stoiber & Houghton, 1993).

Beyond cognitions, parenting knowledge may inform parenting practices. It has been argued that acting appropriately as a parent depends, in part at least, on knowledge of principles related to child development (Donahue, Pearl, & Herzog, 1997). Mothers who know more about child development report more positive interactions with and give more positive descriptions of their children (Chamberlin, Szumowski, & Zastowny, 1979; Grusec & Goodnow, 1994), and they score higher in parenting skills, even controlling for income and education (Booth, Mitchell, Barnard, & Spieker, 1989; Conrad, Gross, Fogg, & Ruchala, 1992; Reis, Barbera-Stein, & Bennett, 1986; Stevens, 1984). Concretely, variation in maternal knowledge about child play relates to mothers' style of play with their children (Damast, Tamis-LeMonda, & Bornstein, 1996; Tamis-LeMonda, Damast, & Bornstein, 1994; see also Gross, Conrad, Fogg, Willis, & Garvey, 1993) and to children's positive development (Benasich & Brooks-Gunn, 1996; Goodnow, 1988; Miller, 1988; Sigel, 1992); knowledge of developmental milestones also relates to when parents introduce new experiences, such as telling stories or reading to their child (Frankel & Roer-Bornstein, 1982; Hess, Kashiwagi, Azuma, Price, & Dickson, 1980; Ninio, 1979).

Because parents are the main caregivers of young children, the extent and quality of their parenting knowledge is often considered vital to improving children's development and health. Mothers' parenting knowledge is related to their children's performance on the Bayley Scales of Infant Development (Dichtelmiller et al., 1992), and mothers with greater parenting knowledge have children who display fewer behavior problems (Benasich & Brooks-Gunn, 1996; Huang, Caughy, Genevro, & Miller, 2005; McGillicuddy-DeLisi, 1982a, 1982b; Stevens, 1984); reciprocally, parents' inaccurate beliefs and misconceptions are thought to undermine child development (T. Miller, 1989; Miller, Manhal, & Mee, 1991; Stoiber, 1992). Better informed parents might recognize earlier and more effectively address developmental problems, which is important because early intervention is key to preventing long-term adverse outcomes in children. Moreover, parenting knowledge is thought to guide parents' decisions about how to maintain child health, how to prevent illness, when to seek health care for children, and how to use medical services effectively (Hickson & Clayton, 2002; Melamed, 2002). Finally, parenting knowledge is relevant to clinical practice with

children (Bornstein & Cote, 2004; Pachter & Dworkin, 1997). The Institute of Medicine (1994) formally recognized the importance of children's primary care physicians "developing a *sustained partnership* with *patients* and practicing in the *context of family and community*" (emphasis in original). During child health visits, clinicians ask about and must interpret parents' (typically mothers') observations, expectations, concerns, and opinions about children's health and development. Accurate and complete developmental anamnesis and surveillance thus depend in large measure on parents' knowledge base. Parents have the most experience with their child, are believed to know their child best, and are routinely the clinician's primary source of outside information about the child.

Two Questions about Parenting Knowledge

These global considerations about the significance of parenting knowledge to parenting cognitions and practices, children's development and well-being, as well as clinical decision making and health gave rise to the two general questions that motivated this research. Past small- and large-scale surveys have pointed descriptively to substantial variation in parenting knowledge (e.g., Civitas Initiative, Zero to Three, & Brio Corporation, 2000; Clarke-Stewart, 1978, 1998; Oldershaw, 2002; Young, 1991). However, empirical studies of parenting knowledge have largely concentrated on non-normative risk samples (e.g., mothers of low birth weight and preterm infants), and most studies have been limited to knowledge of developmental milestones or parents' perceptions of relations between caregiving practices and developmental outcomes (Parks & Smeriglio, 1983; Sistler & Gottfried, 1990; Smeriglio & Parks, 1983; Stevens, 1984). We attempted to extend this tradition by exploring parenting knowledge in a wide variety of mothers in different walks of life. Our first question asked, How does parenting knowledge vary with family sociodemographic characteristics, specifically gender of the child and maternal age, education, socioeconomic and employment status, parity, and birth versus adoptive status as a parent? For this study, we recruited and tested a large sociodemographically heterogeneous sample of mothers in the United States to discern how these prominent characteristics relate to parenting knowledge. Here we review briefly relevant literature on how parenting knowledge varies with each characteristic.

Is there reason to believe that rearing a child of one or the other *gender* is regularly associated with parenting knowledge? Little is known about whether mothers of girls know more or less about childrearing and child development than mothers of boys, but there is evidence that child gender systematically moderates other parenting cognitions and decision making. For example, Mondschein, Adolph, and Tamis-LeMonda (2000) found that mothers of 11-month-old male infants tended to overestimate how well their babies would crawl down a sloped pathway, whereas mothers of 11-month-old female infants tended to underestimate how well their babies would do (when subsequent objective tests of crawling ability on the slope revealed no gender differences in infant crawling). Similarly, girls with language delays are 60% more likely to be referred for audiological assessment than boys with the same diagnosis (Sices, Feudtner, McLaughlin, Drotar, & Williams, 2004). Findings like these suggest that it is compelling and important to separate empirical and scientific knowledge about childrearing and child development from social constructions.

How does *maternal age* relate to parenting knowledge? Teenage motherhood is epidemic in the United States (Martin et al., 2009; Singh & Darroch, 2000; see also Williams & Decouflé, 1999) as approximately 34% of all girls become pregnant by the end of their 19th year (National Campaign to Prevent Teen Pregnancy, 2004). At the same time increasing numbers of adult women are delaying conception (Martin et al., 2009; Mirowsky, 2002; Paulsen & Sachs, 1998). These twin demographics expand the age range for pregnancy and birth and raise questions about what associations might obtain between mothers' age and

their parenting knowledge. To date, individual studies have suggested that adult mothers possess more parenting knowledge than adolescent mothers (Benasich & Brooks-Gunn, 1996; de Lissovoy, 1973; Dichtelmiller et al., 1992; Field, Widmayer, Stringer, & Ignatoff, 1980; Hammond-Ratzlaff & Fulton, 2001; Karraker & Evans, 1996; McGillicuddy-DeLisi, 1982a, 1982b; Roosa & Vaughn, 1984; Ruchala & James, 1997; Stevens, 1984) as have most reviews (e.g., Brooks-Gunn & Furstenberg, 1986; Moore & Brooks-Gunn, 2002; Whitman, Borkowski, Schellenbach, & Nath, 1987). However, other studies have failed to uncover systematic relations between parenting knowledge and age amongst adult mothers (Conrad et al., 1992; Schilmoeller & Baranowski, 1985). Is the critical difference between teens and adults? Unfortunately, many adolescent- vs. adult-mother group comparisons confound socioeconomic status as well as ethnicity, focus on low-income inner-city minority women, and treat age dichotomously (e.g., Bavolek, 1989; Parks & Smeriglio, 1983; Stern & Alvarez, 1992; Tamis-LeMonda, Shannon, & Spellman, 2002). In the present design and analyses, we disentangle socioeconomic status and ethnicity from age by controlling SES and focusing on parenting knowledge in a single (European American) ethnic group (practically significant, too, because European Americans are also numerically and proportionately the most populous group of adolescent mothers; Martin et al., 2009). We address the age question in two ways: comparing adolescent and adult mothers residing in the same ecological geographic context and correlating age as a continuous variable with parenting knowledge in a larger sociodemographically heterogeneous sample.

The “knowledge gap hypothesis” proposes that, as information flows into a social system, higher-SES groups are more likely to acquire it at a faster rate than lower-SES groups (Tichenor, Donohue, & Olien, 1970). SES is generally influential in parenting: SES orders the home environment and other practices of parents such as the likelihood that parents read books on childcare and serve their children healthy food (Bornstein & Bradley, 2003; Hoff, Laursen, & Tardif, 2002). Parents in higher socioeconomic strata change more flexibly and more rapidly in response to changes in developmental theory than do parents in lower socioeconomic strata (Alwin, 1990; Bronfenbrenner, 1958). Parental knowledge of childrearing and child development has been found to moderate the relation between SES and parent behavior (Rowe, 2008), and low SES is associated with lower levels of maternal knowledge (Benasich & Brooks-Gunn, 1996; Conrad et al., 1992; Stevens, 1984). Education is an integral component of SES (Bornstein & Bradley, 2003), and educational achievement is related to parenting knowledge (Conrad et al., 1992; McGillicuddy-DeLisi, 1982a, 1982b; Reich, 2005; Richman, Miller, & LeVine, 1992). When mothers of preschool-age children were asked to estimate the ages at which their child would acquire a variety of perceptual-motor, cognitive, and psychosocial skills (Williams, Williams, Lopez, & Tayko, 2000), mothers with higher educational attainment voiced earlier expectations. Accurate information about infant development correlates with amounts of formal experience with young children: MacPhee (1981) reported that parenting knowledge relates to degree of practical and professional experience. In short, parents higher in *SES* and those with more *education* may possess more knowledge of childrearing and child development (Gross et al., 1993; Palacios, 1990; Parks & Smeriglio, 1986).

We could find no research that compares parenting knowledge per se in mothers who are *employed* full-time outside the home with full-time *homemakers*. However, more mothers participate in the labor force than ever before, relations between employment status and parenting are of increasing moment, and studies comparing parenting principles and practices relative to employment status point to mixed results that invite additional research (e.g., Gottfried, Gottfried, & Bathurst, 2002; Waldfogel, 2006).

Extant investigations comparing primiparous and multiparous parents suggest (surprisingly) that neither *parity* (number of children) nor birth order (position of child) is strictly

associated with parenting knowledge (Conrad et al., 1992; Dichtelmiller et al., 1992; MacPhee, 1981, 1983; McGillicuddy-DeLisi, 1982a, 1982b), even though firstborns are reared by presumably less experienced parents who may be less at ease in their new role and laterborns are reared by parents who are more experienced and, presumably, more competent (Kreppner, 1992). Other aspects of primiparous and multiparous parenting differ. For example, parents with one child tend to underestimate the age at which children begin to speak a complete sentence or sleep through the night (Waddell & Ball, 1980); parents with two children reportedly have higher achievement expectations for their firstborns in comparison to their laterborns (Kammeyer, 1967). Unfortunately, studies of parenting first-versus laterborns are often plagued by methodological shortcomings (Michalski & Shackelford, 2001; Price & Hare, 1969): Not only is the ordinal position of laterborns often heterogeneous or not specified, but most studies compare firstborns and laterborns from different families. For these reasons, we utilized a rarer but more refined within-family design asking about parenting knowledge in the same mothers of two children born into the same family, and we limited our comparison to first- versus secondborns.

No studies comparing the parenting knowledge of parents who give *birth* versus those who *adopt* have been reported to date. A few studies that have compared other aspects of parenting and child development in these groups suggest that, if any differences exist in the early years, they may be small: For example, microanalysis of interactions shows that birth and adoptive mothers behave similarly with their young infants (Suwalsky, Hendricks, & Bornstein, 2008a, 2008b), and attachment relationships of adoptive mothers with their children appear not to differ from those of birth mothers with their children (Juffer & Rosenboom, 1997). Nonetheless, some nonbiological mothers are thought to struggle in identifying with the maternal role, which birth mothers may embrace more readily (Gabb, 2005). Here, we asked whether biological connection to a young child moderates mothers' parenting knowledge.

Our second question asked, What are the primary sources of parenting knowledge? This study investigated maternal parenting knowledge in U.S. groups varying in sociodemographic status as well as the selective contributions of various sources of support to maternal parenting knowledge. Research has identified multiple antecedents of parenting knowledge (Goodnow & Collins 1990; MacPhee, 1981). Parenting information and advice vary in types of sources, frequency of use, reasons for use, and perceived benefit, and mothers commonly rely on their own experiences as well as lay and professional resources for information (Civitas Initiative et al., 2000; McKim, 1987; Vukelich & Kliman, 1985; Wolf, 1998).

By contrast with formal, objective sources -- books and classes about childrearing and child development -- informal or subjective experiences with children (through, e.g., babysitting) have been found to correlate not at all or negatively with parenting knowledge (Frankel & Roer-Bornstein, 1982; MacPhee, 1981). Cochran's (1990; Cochran & Niego, 2002) model of parenting and personal social networks suggests that parents generally rely on familiar and proximal sources for parenting information, turning initially to family and friends (Belsky, Youngblade, & Penskey, 1989; Sparling & Lowman, 1983). For example, in the Civitas Initiative et al. (2000) national survey 70% of mothers of children under 3 reported that they relied on their spouse and 66% on their mothers. Mothers' parenting knowledge relates to their own mother's knowledge, even when contact between the two is minimal (Sistler & Gottfried, 1990). New parents less frequently mention childcare advice from in-laws (Belsky & Kelly, 1994; Civitas Initiative et al., 2000).

When faced with a need for special information, parents supplement advice from their personal social networks with additional sources, such as a written materials, education

programs, or professionals (Geboy, 1981). Clarke-Stewart (1978, 1998) reported that books and magazines were popular sources of information about general child development, but their most frequent users were first-time and middle-class parents (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988); in the Civitas Initiative et al. (2000) survey, only 34% of mothers reported relying frequently on books and 15-22% on the news and magazines. Mothers with greater amounts of formal education normally express a preference for education materials (Vukelich & Kliman, 1985). Newsletters have proved effective in improving parenting among mothers who are younger, less experienced, have less education, and are more socially isolated (Riley, Salisbury, Walker, & Steinberg, 1996). Parenting books have long had mass appeal (Spock, 1946), and in contemporary times parents have turned to other related media sources, such as CDs, TV, and the WWW (Wolf, 1998). Friends and neighbors are another common source of information cited by parents (Clarke-Stewart, 1978; Ninio, 1979), including 23% of mothers in the Civitas Initiative et al. (2000) survey. In a comparative evaluation of 10 sources of information, mothers reported an average of 4 very useful sources, with the baby's grandparent the most used informal source and newsletters the most used professional source (Walker, 2007).

Formal education programs offer yet another way for parents to improve their parenting knowledge. Although health care professionals are less immediately accessible, they constitute an important reserve for all ages and social classes of parent and are the most often consulted about emergent or specific medical problems (Hickson & Clayton, 2002; Hulbert, 2003). In the Civitas Initiative et al. (2000) survey, 54% of mothers reported that they relied frequently on their child's doctor/pediatrician, 25% on nurses, and 20% on childcare providers for information and advice. At the same time, parents report that many anticipatory guidance topics are not covered in well-child visits, and that, even after such visits, they can still use more information (Sanghavi, 2005). When parents were asked whether they had any developmental, behavioral, or health concerns about their child, and whether they shared those concerns with a professional, 29% of parents reported at least one serious concern, and more than 20% had not shared that concern (Golan et al., 2008).

Overview

We assessed the state of mothers' parenting knowledge in groups of mothers who varied in terms of parenthood and sociodemographic status, and we identified principal sources of mothers' parenting knowledge in terms of sociodemographics, diverse parenting supports, and formal classes. We addressed these questions in a large sociodemographically diverse sample of U.S. European American mothers of 2-year-olds.

Method

Participants

Altogether, 269 European American mothers of 20-month-olds, 123 mothers of girls and 146 mothers of boys, participated (one mother's KIDI score was more than 3 *SDs* away from the mean, and so she was omitted from all analyses). Sociodemographic information on the participating 268 mothers and their families appears in Table 1. Mothers ranged in age from 15.13 to 47.26 years. Twenty-three mothers had not completed high school, 30 had completed high school, 53 partial college, 84 completed college, and 79 enrolled in or completed university graduate programs. A total of 168 mothers were employed part-time to full-time outside of the home, and their occupational statuses ranged from menial labor to higher executives or major professionals. Families were of low to high SES (Hollingshead, 1975; *range* = 14 to 66). All mothers were living with the baby's father (whether they were married or not). As childrearing and child development are known to vary with ethnicity and culture (Bornstein, 1991; Garcia Coll & Pachter, 2002), we recruited an ethnically

homogenous community sample as a first step in understanding the matrix of associations surrounding maternal parenting knowledge before embarking on more complex studies and analyses with ethnically diverse samples. Approximately 75% of the population of the United States self-identifies as European American (Schmidley, 2001; Tilton-Weaver & Kakihara, 2008; U.S. Census Bureau Population Division, 2004). By including only European American mothers, we intentionally avoided an ethnicity confound that has plagued the existing literature and would also cloud our findings with respect to parenting knowledge. Children averaged 20.09 months ($SD = .23$, $range = 19.45$ to 20.93), were healthy, term, weighed at least 2500g at birth, and firstborn (with the exception of the $n = 45$ within-family firstborn-secondborn comparison). Approximately equal numbers of mothers of girls and boys participated. Mothers were recruited from the Washington, DC, metropolitan area, including Maryland and Virginia, and from West Virginia using methods common to developmental research with young children, including mass mailings, hospital birth notifications, patient lists of medical groups, and newspapers.

We collected data about parenting knowledge and its sources directly from mothers. Research on parenting attitudes and activities has historically concentrated on mothers, acknowledging that they have traditionally (and across cultures) assumed primary -- if not exclusive -- responsibility for early childcare; that they participate in childrearing activities at significantly higher rates, and garner more experience and knowledge, than fathers or other caregivers; and that, beginning prenatally, mothering is unequivocally principal for the health and development of infants and young children (Barnard & Solchany, 2002; Geary, 2000; Leiderman, Tulkin, & Rosenfeld, 1977; Parke, 2002; Weisner & Gallimore, 1977). Given societal dictates that it is mothers who are ultimately responsible for their very young children's lives and health, women have normally become more expert than men and actively seek child-relevant information during the early stages of childrearing (Stern, 1995). Not unexpectedly, maternal parenting is most consistently associated with developmental and health outcomes in children (e.g., Crouter, Helms-Erickson, Updegraff, & McHale, 1999; Rothbaum & Weisz, 1994).

We studied mothers' parenting knowledge toward the end of the child's second year (at 20 months), first, because the instrument we used to assess parenting knowledge covered the child's first 2 years (so mothers would have had recent or current experience with the items on the measure). Second, the samples almost exclusively consisted of first-time mothers, and soon after parturition many women experience fluctuations in mood (Cooper & Murray, 1998) and marital satisfaction (Belsky, Hertzog, & Rovine, 1986; Cowan et al., 1985) as well as stresses associated with caring for a very young infant (Copeland & Harbaugh, 2005; Paris & Dubus, 2005). Because we wanted information from mothers who were settled in the maternal role and whose cognitions about parenting had had time (since parturition) to stabilize, we scheduled data collection on parenting knowledge to avoid these transient and temporal vicissitudes.

Instruments

Parenting knowledge—The Knowledge of Infant Development Inventory (KIDI; MacPhee, 1981; see also Miller, 1988) is a 75-item criteria-referenced questionnaire that assesses evidence-based knowledge of parental practices, developmental processes, health and safety guidelines, and norms and milestones relevant to children's growth from birth to 2 years of age. Each KIDI item targets information that pediatric professionals believe all mothers should know. Thus, the instrument measures a professional-based criterion of knowledge, minimizing subjectivity and social construction, instead of comparing a sample's knowledge to that of other respondents (as a normative assessment would; Nunnally & Bernstein, 1994). The KIDI contains 48 items that ask respondents to indicate

whether they *agree, disagree, or are unsure* about a series of statements; for example, “Baby girls are fragile and sick more often, so they need to be treated more carefully than boys.” An additional 20 items ask parents to choose among four responses -- *agree, younger, older, or unsure* -- in relation to statements about when a child should be able to achieve particular milestones; for example: “Most infants are ready to be toilet trained by one year of age.” The remaining 7 items are either questions or sentence completions with 5 possible answers; for example: “Select the most appropriate game for a one-year-old: (a) stringing small beads, (b) cutting out shapes with scissors, (c) rolling a ball back and forth with an adult, (d) sorting things by shape and color, (e) not sure.” All items are worded to be accessible to individuals with no more than a 6th grade education and to be free of sociocultural biases (MacPhee, 1981). Responses were scored as 1 if the respondent agreed with the dominant response of clinicians and developmental scientists in the standardization sample and 0 if the respondent did not agree. We used proportion correct of total items as our primary dependent measure.

As reported in MacPhee’s (1981) technical manual, the KIDI was standardized on four groups: college students, mothers, doctoral level psychologists, and pediatricians. The proportion of total items that were correct was positively and monotonically related to the degree of practical and professional experience with children: Mean proportions correct = .62, .72, .86, and .87, for college students, mothers, developmental psychologists, and pediatricians, respectively (MacPhee, 1981). The split-half reliability coefficient of the KIDI for mothers is .85; the two-week retest coefficient is $r(58) = .92$; and the KIDI is also highly stable ($r = .61$ from 12 to 24 months; Benasich & Brooks-Gunn, 1996). Among our total sample of mothers, α was .67.

The KIDI is arguably the most widely used measure of parenting knowledge (see, e.g., Conrad et al., 1992; Dichtelmiller et al., 1992; Gross et al., 1993; MacPhee, 1984; Pachter & Dworkin, 1997; Roggman, Benson, & Boyce, 1999; Ruchala & James, 1997; Thompson, Gustafson, Bonner, & Ware, 2002; Wacharasin, 2001). It is a principal measure used in the Early Head Start Research and Evaluation Project conducted by the Administration for Children and Families, U.S. Department of Health and Human Services (<http://www.acf.hhs.gov/>), as well as the Infant Health and Development Program (Gordon, Chase-Lansdale, & Brooks-Gunn, 2004) and Healthy Steps for Young Children (<http://www.healthysteps.org>), a national 15-site pediatric-based parent program designed to prospectively address behavioral and developmental support needs of young families in pediatric clinical care settings (Caughy, Miller, Genevro, Huang, & Nautiyal, 2003; Guyer, Hughart, Strobino, Jones, & Scharfstein, 2000; Johnston, Huebner, Tyll, Barlow, & Thompson, 2004; Minkovitz et al., 2003). The KIDI has demonstrated construct validity: It is related to other measures of mothers’ knowledge of children’s development (the Concepts of Development Questionnaire; Benasich & Brooks-Gunn, 1996) and to children’s actual development (e.g., Dichtelmiller et al., 1992).

Sociodemographic information—A Family Description Questionnaire (FDQ; Bornstein et al., 1991) was used to gather maternal education and occupation and family SES data that were used to calculate the Four-Factor Index of Social Status (Hollingshead, 1975; see Bornstein, Hahn, Suwalsky, & Haynes, 2003).

Parenting support—Mothers rated on a Parenting Support Measure (PSM; Suwalsky & Bornstein, 1991) the helpfulness of 9 different parenting resources, including the child’s father, books or other written materials, mother’s mother, spouse’s mother, other relatives, pediatrician, friends or neighbors, another significant person, or an organized group. Parenting support was measured on a Likert-type 5-point scale from 0 = *Of little or no help or not applicable* to 4 = *Very helpful*. This information was collected when children were 5

months of age because the demands of an infant on a new mother at home are compelling and the mother's early parenting support has been shown to be critical both to child development and to parenting (Crockenberg, 1981). In addition, in the FDQ mothers were asked about their pregnancy and childbirth experiences, including whether or not they had taken a childbirth class ("Did you prepare for labor and delivery by attending a prepared childbirth course (for example, LaMaze, etc.)?") or parenting class ("Have you taken a formal class or course dealing with parenting issues and skills?"). Mothers responded to each of these questions by circling either *yes* or *no*.

Preliminary Data Analysis

All data were examined for univariate and influential bivariate outliers using scatter plots and numeric statistics -- the studentized deleted residual, leverage, and Cook's D. Initial estimates of optimal transformations were sought by evaluating inverse fitted-value plots and output from Box-Cox methods (Cook & Weisberg, 1999). The KIDI proportion correct score was raised to the third power to approximate normality and reduce the number and influence of outliers (Cook & Weisberg, 1999; Fox, 1997; Tabachnick & Fidell, 2001). Transformed variables were used in all analyses; however, untransformed values are reported to facilitate interpretation. Not all mothers provided complete data on measures of parenting support; in all the analyses, the maximum available *n* was used.

Analytic Strategy

Analyses of variance (ANOVA) and covariance (ANCOVA) were used to test group differences. Mothers' age and education level were screened as covariates; they were used only if they correlated significantly ($p < .05$) with parenting knowledge and the effects of the covariates were significant. For each covariate, the assumption of homogeneity of regression slopes was checked, but the assumption was never violated. Partial eta squared (η^2_p) was used as an effect size, where $\eta^2_p \approx .01$ is interpreted as a small effect, $\eta^2_p \approx .06$ as a medium effect, and $\eta^2_p \approx .14$ as a large effect (Cohen, 1988).

Differences in parenting knowledge were investigated in two ways relative to maternal sociodemographic characteristics. First, mothers were compared to see whether differences in parenting knowledge emerged based on grouping variables of child gender (mothers of girls vs. mothers of boys), maternal age (adolescent vs. adult), employment (full-time employed vs. part-time employed vs. homemakers), parity (primiparas vs. multiparas), and parenthood genesis (adoptive vs. birth). Second, relations between mothers' sociodemographic characteristics and sources of parenting supports for parenting knowledge were analyzed. The predictive validity of mothers' sociodemographic characteristics and mothers' supports to KIDI scores was then investigated in a three-step process: First, zero-order correlations of KIDI scores with mothers' sociodemographic characteristics and supports were evaluated, where $r \approx .10$ is interpreted as a small effect, $r \approx .25$ as a medium effect, and $r \approx .40$ as a large effect (Cohen, 1988). Because mothers' knowledge was expected to be correlated with their age and education, and because, as expected, mothers' age and education were highly correlated, $r(266) = .68, p < .001$, correlations of the KIDI with the other sociodemographic measures and supports were evaluated using residuals of the KIDI partialled for mothers' age and separately for mothers' education. Finally, if significant relations between mothers' sociodemographic characteristics or supports and KIDI scores were found, their unique predictive ability was assessed using hierarchical regression analyses.

Results

Whole Sample

On average, in the total U.S. sample mothers answered .81 of the KIDI items correctly ($SD = .07$, $range = .52$ to $.95$).

Parenting Knowledge by Parenting and Social Status Groups

As shown in Table 1, significant and meaningful correlations between mothers' KIDI scores and their age, education, and SES emerged. Mothers' age and education (but not SES) were therefore used as covariates for comparisons involving all participating mothers (between mothers of girls and mothers of boys, and among mothers of varying employment status). Mothers' education level, rather than family SES, was used as a covariate because mothers' education level is a weighted component of SES, and education is a better predictor of parenting (Bornstein et al., 2003). In comparisons that involved only subgroups of mothers (between adoptive and birth mothers, and for mothers when primiparous then multiparous), mothers' age and/or education were evaluated as covariates by examining their correlations with KIDI scores in the relevant subgroup.

Mothers of girls and mothers of boys—Mothers of girls ($EMM = .54$, $SE = .01$) and mothers of boys ($EMM = .54$, $SE = .01$) did not differ in their KIDI scores controlling for mother age and education, $F(1, 264) = .24$, ns .

Adolescent and adult mothers—There were 33 adolescent mothers ($M = 19.84$ years, $SD = 1.49$) in the original sample. A randomly selected subsample of 32 adult mothers ($M = 28.63$ years, $SD = 4.65$) who lived in the same cultural and geographic contexts as the adolescent mothers served as the comparison group. Adult mothers ($M = .82$, $SD = .06$) scored higher than adolescent mothers ($M = .70$, $SD = .08$) on the KIDI, $F(1, 63) = 47.13$, $p < .001$, $\eta^2_p = .43$. Mothers' education was correlated with KIDI scores in these 65 mothers, $r(63) = .49$, $p < .001$, but the group difference in KIDI scores held after controlling for maternal education (adult mothers, $EMM = .53$, $SE = .03$; adolescent mothers, $EMM = .37$, $SE = .02$), $F(1, 62) = 18.43$, $p < .001$, $\eta^2_p = .23$.

Full-time and part-time employed mothers and homemakers—Of the 268 participating mothers, 87 were employed outside the home on a full-time basis (working 40 hours/week, $M = 42.67$, $SD = 6.1$), 80 were employed part-time ($M = 22.03$, $SD = 10.18$), and 101 were full-time homemakers. No group differences in KIDI scores emerged controlling for mother age and education (full-time employed mothers' $EMM = .53$, $SE = .01$; part-time employed mothers' $EMM = .54$, $SE = .01$; homemakers' $EMM = .54$, $SE = .01$), $F(2, 263) = .45$, ns .

Primiparous, multiparous mothers—A subsample of 45 mothers completed the KIDI twice, when their first child was 20 months old and again approximately 3 years later when their second child was 20 months old. A repeated-measures ANOVA showed that mothers scored slightly but significantly higher the second time ($M = .84$, $SD = .06$) than they did the first time ($M = .82$, $SD = .05$), $F(1, 44) = 7.67$, $p = .008$, $\eta^2_p = .15$, and so as a group mothers improved in parenting knowledge between their first and second child. Mothers' KIDI scores were also highly stable between their two children, $r(43) = .52$, $p < .001$, and so individually mothers tended to maintain their rank order over time.

Adoptive and birth mothers—A subsample of 28 birth mothers was selected to compare with the 28 adoptive mothers. Birth mothers were the closest individual matches in the whole sample based on child gender, maternal age and education, family SES, and maternal

hours of employment, considered in that order. A repeated-measures ANOVA showed no difference on KIDI between adoptive ($M = .83$, $SD = .07$) and birth mothers ($M = .83$, $SD = .04$), $F(1, 27) = .01$, *ns*.

Relations between Sociodemographic Characteristics and Parenting Knowledge

At the zero-order level, mothers' age, education, and occupational status, and family SES were significantly positively related to their KIDI scores (Table 1). Older mothers, mothers with more education or higher occupational status, and mothers from higher-SES families generally scored higher on the KIDI. In addition, mothers' education and family SES were positively correlated with residual KIDI scores controlling for mothers' age: Mothers with more education and mothers from higher-SES families scored higher on the KIDI when the variance in KIDI scores that was associated with mothers' age was removed. The significant correlation between mothers' occupational status and their KIDI scores attenuated to nonsignificance when the variance in KIDI scores that was associated with mothers' age was removed. Finally, mothers' age was positively correlated with residual KIDI scores controlling for mothers' education: Older mothers scored higher on the KIDI when the variance in KIDI scores that was associated with mothers' education was removed. The significant correlations of KIDI score with mothers' occupational status and family SES attenuated to nonsignificance, however, when the variance in KIDI score that was associated with mothers' education was removed (see Bornstein et al., 2003).

Relations between Sources of Parenting Supports and Parenting Knowledge

Descriptive statistics for mothers' reported sources of parenting support are shown in Table 2 ordered by prominence of the reported sources. Altogether, 89.92% (214 of the 238 mothers who answered the question) indicated having attended childbirth classes, whereas only 28.46% (76 mothers out of the 267 who answered the question) reported having taken a parenting class. Table 2 also presents correlations between various sources of parenting support and mothers' KIDI scores. At the zero-order level, written materials and having taken childbirth classes were positively related to mothers' accuracy on the KIDI: Mothers who reported that written materials were helpful in their role as parent during the first half-year of their child's life, and mothers who took a childbirth class during pregnancy, scored higher on the KIDI when their children were almost 2 years of age. Correlations of written materials and attendance at childbirth classes with residual KIDI scores controlling for mothers' age remained significant. Only written materials were significantly correlated with residual KIDI scores controlling for mothers' education, however. At the zero-order level, mothers' reliance on her own mother, other relatives, or mother-in-law as sources for support were negatively related to their KIDI scores. A moment's speculation on this counterintuitive result is in order. Perhaps mothers' own mothers, other relatives, and mothers-in-law provide support, but they also constitute stresses, contribute criticism, and compete for authority in parenting, and so relate negatively to mothers' KIDI scores. Or, perhaps mothers rely on others for parenting knowledge because they themselves lack knowledge either intentionally (they do not believe that women need to mother independently and perceive advice-seeking as positive) or unintentionally (they never took the time to learn about children's development and age-appropriate parenting strategies). Investigating the cause of this finding merits future research attention. No other significant correlations emerged between any of the other sources of parenting support (including pediatricians) and residual KIDI scores controlling for mothers' age or education.

Predictive Ability of Mothers' Sociodemographic Characteristics and Parenting Supports for Parenting Knowledge

The foregoing analyses indicated significant associations of mothers' age, education, access to books and other written materials, and attendance at childbirth classes with their

knowledge of child development and childrearing. The overall regression with all four predictor variables in the model was significant, total adjusted $R^2 = .34$, $F(4, 234) = 30.22$, $p < .001$. To evaluate the unique predictive validity of each factor, we conducted four sets of hierarchical regression analyses (see Table 3). In each, three of the four variables were entered first as a block and then the fourth variable was entered alone; the fourth variable could then predict parenting knowledge after controlling for the other three variables in the model. Mothers' age, education, and access to books and other written materials all uniquely contributed to their parenting knowledge, whereas attendance at childbirth classes did not, controlling for all other variables in the model. Given concerns expressed that parenting knowledge may be a proxy for educational attainment, we tested a mediational model to discern if formal experience (i.e., written materials) explained the association between education and parenting knowledge. Results of a Sobel Test (Sobel, 1982) indicated that both direct and indirect (mediated by written materials; $z = 3.26$, $p = .001$) effects of maternal education on parenting knowledge were significant (Figure 1), suggesting that formal experience (i.e., written materials) partially explained the association between education and parenting knowledge.

Discussion

Parenting knowledge -- understanding the substance and processes of childrearing and child development -- is vital to the well-being of children, parents, and society. For this reason, advice to parents dates back in printed form more than 20 centuries to the Code of Hammurabi (Dangel & Polster, 1984; French, 2002). Moreover, a majority of U.S. Americans feel that it is more difficult to be a parent today than in the past and express a pressing need to know more about childrearing and child development (Civitas Initiative et al., 2000). In this study, we compared parenting knowledge in a large sample of European American mothers who varied sociodemographically, and we also analyzed the relative contributions of a variety of sociodemographic factors and parenting supports and classes to parenting knowledge. The discussion of what mothers know, which mothers are in the know, and how mothers know that ensues needs to be understood in the context of this referent sample.

What Mothers Know

Knowledge is one key component of parents' general instrumental cognitive system. The items from the KIDI battery were developed for parents of children through 2 years, and the mothers we tested all had children approximately that age. Maternal knowledge in some developmental domains has been shown to be quite good (see Bornstein & Haynes, 1998). Here we found that on the whole European American mothers demonstrated a fair (81%) but not complete understanding of basic parenting knowledge. The 5 individual items on which mothers in the current study scored the highest (at or near 100%) cover child health and well-being, safety, language abilities, gender differences, and socioemotional development, but the 5 at the bottom (all ~50%) likewise included physical growth, socioemotional development, language abilities, and perception. MacPhee (1981) divided the KIDI conceptually into 4 domains, and looked at from that vantage mothers scored highest on Parenting items (instrumental beliefs, strategies, management, responsibilities; 92.5%) then Health & Safety (nutrition, health care, accident prevention, treatment of ailments; 88.5%) and Principles (developmental processes, general child abilities; 80.5%), and lowest on Norms & Milestones (child behavior at a particular point in time; 72.8%).

What mothers know is important. To understand parenting, it is vital to consider, not only observations of caregiving, but also internal processes thought to underlie caregiving. Thus, a positive cascade is hypothesized to obtain from parenting knowledge to parenting behaviors to children's development. Some evidence supports this view. Parks and

Smeriglio (1986) reported that parenting knowledge was positively related to quality of stimulation in the home, which in turn was associated with children's scores on a developmental scale. In the prospective longitudinal data set of a low-birth-weight preterm cohort from the multisite Infant Health and Development Program, maternal parenting knowledge (of the kind we measured here) was found to affect the quality and structure of the home environment mothers provided which in turn affected child cognitive and behavioral outcomes (Benasich & Brooks-Gunn, 1996). (For similar patterns of findings, see McGillicuddy-DeLisi, 1982a, 1982b; Seefeldt, Denton, Galper, & Younoszai, 1999.) Reciprocally, mothers lacking parenting knowledge demonstrate poor parenting competence (Conrad et al., 1992; Hess, Teti, & Hussey-Gardner, 2004) and may fail to encourage their children's development and perceive them as less competent (de Lissovoy, 1973; Jarrett, 1982; Linde & Engelhardt, 1979; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). A dearth of parenting knowledge is also believed to play itself out in unrealistic developmental expectations, and mothers who harbor unrealistic expectations tend to experience greater stress possibly as a result of mismatches between expectations and behaviors (Crnic & Low, 2002), and their interactions with their children are often marked by greater discord and conflict (Teti & Gelfand, 1991).

Why is mothers' parenting knowledge sometimes lacking or incorrect? It could be that experiences surrounding child development do not automatically lead to parenting knowledge, or, if they do, mothers may forget what they know about early child development by the time their children reach toddlerhood. Thus, with each new phase of development, the onrush of novel requirements supplants those of past developmental phases (retroactive inhibition). Alternatively, modifications to parental cognitions may be temporary, and parents revert to preconceptions once their experiences with a child have passed (DeGrada & Ponzio, 1971). In other words, when parents are involved with a child of a particular age, their knowledge about children at that age may be accurate; however, once their children move beyond the ages they are asked to judge, parents fall back on generalized stereotypes. That said, the items in the KIDI are generic and general and evidence-based and do not rely on specific memories of specific children, and so many problems thought to be associated with parental retrospective reporting (Yarrow, Campbell, & Burton, 1968) and inaccurate estimation of milestones of their own children's distant past (Tamis-LeMonda, Chen, & Bornstein, 1998) are not at issue. For this reason we looked at group membership and the role of parenting resources and supports to understand variation in parenting knowledge.

Which Mothers Are in the Know

This study provides converging evidence that older mothers and more educated mothers possess more parenting knowledge, results that comport with other findings (e.g., Karraker & Evans, 1996). Berlin, Brady-Smith, and Brooks-Gunn (2002) speculated that adolescent mothers lack cognitive readiness to parent, and adolescent parents' gaps in parenting knowledge have led service providers to recommend programs in parent education for pregnant and parenting teens. Although (as we discuss below) attendance at parenting classes was unrelated to parenting knowledge, attendance at childbirth classes was related (at the zero-order level). Adolescent mothers should minimally attend these. Parenting information is also typically less available to less educated than to more educated mothers (see also Viswanath, Kahn, Finnegan, Hertog, & Potter, 1993). Although most between-family studies have failed to unearth parity effects (Conrad et al., 1992; Dichtelmiller et al., 1992; MacPhee, 1981), using a more sensitive within-family design we found that being a mother for the second time appeared to (marginally) improve mothers' parenting knowledge vis-à-vis their first time. Mothers may learn on the job and remember or they may prepare better the second time around. Apparently, first-hand experience or having been through the

first 2 years of life with a previous child appears to profit parenting knowledge, if only marginally.

By contrast, mothers of girls and boys, homemaker and employed mothers, and mothers by birth and adoption did not systematically differ in their parenting knowledge. Separating social constructions of knowledge about children's development from evidence-based knowledge, if mothers treat their young girls and boys differently (Leaper, 2002) it is apparently not because their knowledge about parenting or development differs, and so gender attitudes or stereotypes seem to be distinct from objective knowledge per se. At least for parenting knowledge as we assessed it, working outside the home does not on average augment or undermine a mother's knowing how to care for her young child, and reciprocally staying at home with a child does not necessarily ensure or enhance greater knowledge vis-à-vis being employed outside the home. Homemaker and employed mothers (who averaged half-time) scored equivalently in terms of their knowledge base. That parenting knowledge is equivalent among adoptive and birth mothers also suggests that a biological bond with one's child does not automatically confer, motivate, or foster greater parenting knowledge (Leon, 2002).

How Mothers Know

Resources and supports to parenting can have meaningful consequences. Parents with high levels of resources and supports tend to display more sensitive and responsive parenting (Cutrona, 1984) and greater parental efficacy (Izzo, Weiss, Shanahan, & Rodriguez-Brown, 2000). Nonetheless, we could identify no single source that all parents trust and want information from that affected mothers parenting knowledge; mothers varied in their sources of parenting knowledge. These findings too accord with the extant literature (Golan et al., 2008). Cochran's (1990; Cochran & Niego, 2002) model of parenting and personal social networks attempts to explain how parents use and evaluate various informational sources in childrearing. This model suggests that parents generally rely on familiar and proximal sources to provide needed parenting information, childcare, and other support; that is, parents turn first and most often to family and friends. Then, they supplement advice from personal social networks with additional formal sources of information, such as professionals or educational programs. Of course, the nature and breadth of parents' social networks must condition access to information inside and outside this framework. Parents belonging to tightly knit smaller networks, for example, will have less exposure to novel, outside information and may be more influenced by the opinions of those close by. As geographic mobility and age segregation have increased, the availability of grandparents, other relatives, and close neighbors -- traditional sources of guidance to young parents -- has decreased. Another potential explanation for a lack of knowledge of development may be diminishing and curtailed interactions with health care providers.

In this study, mothers' age and education and their access to books and other written materials related to greater parenting knowledge. The significant association between maternal age and parenting knowledge might underscore the importance of general life experience or the fact that mature mothers treat information relevant to parenting with more gravitas than do younger mothers. The teenage mother is very likely to have been a poorer student than the older mother (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989; Hofferth & Hayes, 1987; Moore et al., 1993), making it less likely that she will turn to books and other such materials very readily. Education generally improves parents' perspectives on their lives, enhances their cognitive and literacy skills, and likely engenders feelings of mastery and competence (Michael, 1972; Reich, 2005). Maternal education bears a close and pervasive relation to individual variation in parenting (Alwin, 1984; Bornstein, Hendricks, et al., 2003; Kelly, Sanchez-Hucles, & Walker, 1993; Wright & Wright, 1976) and, through this relation, may exert an impact on child development, health, and well-being

(Dollaghan et al., 1999; Green, 1970; Hitchcock & Oliver, 1976; Hoff et al., 2002) across a wide range of child age and ethnic group membership (Ramey & Ramey, 1999; Sandqvist, 1995; Sonnander & Claesson, 1999; Terrisse, Roberts, Palacio-Quintin, & MacDonald, 1998). Youth and poor education are risk factors for parental limited knowledge of child development (Pickett, Marlenga, & Berg, 2003; Reich, 2005). Higher-SES, more than lower-SES, parents also have access to, seek out, and absorb expert advice about childrearing and child development (Lightfoot & Valsiner, 1992). Print materials are convenient to more educated mothers who also rate media influence as important (Bonichini, Axia, & Bornstein, 2009). Although educational attainment predicted parenting knowledge, mothers' access to and use of written materials partially explained the association so that education generically does not guarantee parenting knowledge.

Science is dynamic, and scientific knowledge concerning childrearing and child development is constantly changing and expanding (Alwin, 1990; Bronfenbrenner, 1958; Elder, 1974; French, 2002). As developmental science, pediatrics, and related fields continue to advance, we become increasingly aware, on the one hand, that children possess abilities more advanced and more diverse than formerly believed and, on the other, that parents interact with and influence children's growth and development in sophisticated and subtle ways (Bornstein, 2006; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Consequently, parenting knowledge of one generation of parents will differ for the next generation, and media of books and other written materials which store, convey, and disseminate that knowledge will remain key to acquisition of parenting knowledge.

Limitations and Future Directions

This study addresses some basic questions about mothers' parenting knowledge. Nonetheless, it also has limitations that raise additional questions. Mothers were surveyed about their parenting knowledge at one point in time: when the mother had a child 20 months of age. What do mothers know about childrearing and child development before they have their first child? or immediately afterward? or by the time their children are adolescents? Although we studied a number of sociodemographically varied groups of mothers, additional research with more diverse samples, fathers, and other child caregivers is needed to determine the full scope of parenting knowledge surrounding young children as well as whether other individuals in the child's life rely on similar or different sources of childrearing information. Multiple sources of information are available to parents today: physicians, books, nurses, phone advice services, internet websites, community health centers, news reports, magazines, childcare providers, TV shows, religious groups, classes, and social workers. How will new sources of information influence parents? What do adults who are responsible for child health and well-being do in the face of conflicting information? Rapid social changes, including distance from kin and friends, and scarcity of time, fuel greater reliance on the WWW for childrearing information. As suggested by Rothbaum, Martland, and Janssen (2008), the WWW is attractive to parents seeking childrearing information because it is "always available, it is up to date, and it is fast" (p. 119). Future studies should explore parents' use of all media as they grow in popularity. Furthermore, received support is less strongly associated with a variety of psychological phenomena than is perceived support (Wethington & Kessler, 1986). Parents' perceptions of the value of different resources, therefore, may be a better predictor than actual support; parents who receive a lot of support from a given source may still perceive this support to be inadequate to their knowledge needs. We only evaluated parenting knowledge. Finally, future research needs to attend more to assessing relations between parenting knowledge, other parenting cognitions, parenting practices, and child development.

Implications for Parenting Education and Clinical Practice

Some aspects of parenting are “learned” and some parenting skills can be “taught,” and lack of knowledge of basic childcare can be detrimental (Feldman, 1998). Thus, our findings have explicit implications, first, for parenting education. “Parenting education describes a range of teaching and support programmes which focus on the skills, feelings, and tasks of being a parent” (Einzig, 1996, p. 222); parent education aims to enhance or change parental role performance (Smith, Perou, & Lesesne, 2002), and parenting educators are concerned, among other topics, with knowledge of child development and childrearing (e.g., DeBord, Smith, Mulroy, Tanner, & Silliman, 1997). Parent education is therefore positioned opportunistically to enhance the satisfaction and functioning of families and development of children by communicating knowledge about childrearing and child development that increases understanding and by providing alternative models of parenting that widen parents’ choices, teaching new skills, and facilitating access to community services. There is much information about child development and childrearing available today, but it is often poorly explained, frequently unusable, and commonly delivered in confidence-undermining ways. Our data show that childbirth, and not parenting, classes relate to mothers’ parenting knowledge (at least at the zero-order level). Moreover, many more mothers reported attending childbirth than parenting classes (3:1). The need for readily accessible information that will both teach parents about their child’s development and help parents cope with the challenges of parenting cannot be overstated. To improve this record, what may be required is to promote attendance at childbirth and parenting classes and to revisit their curricula to refine and specify more exactly the areas of parenting knowledge that need to be taught and learned.

In this connection, second is the role of parenting knowledge vis-à-vis clinical practice, a consideration that itself has twin reciprocal aspects: how parents inform, and what parents want to know from, their children’s healthcare providers. Parent participation in decision-making and information sharing, two elements of family-centered health care, are widely promulgated as desirable and beneficial. However, “health literacy” generally is remarkably poor, and poor health literacy applied to parenting and might have far-reaching psychological and medical consequences. Children’s caregivers determine whether to bring them for acute, as well as preventive, care appointments, and they bear the responsibility of following through with treatment plans. One study assessed the association between caregiver health literacy and the use and cost of child health services in children aged 12 months to 12 years presenting to the pediatric emergency department of an urban, public hospital (Sanders, Thompson, & Wilkinson, 2007). One in 5 caregivers had low health literacy, and (in accord with the results we report here) caregivers with low health literacy were more likely to have less than a high school education. Mothers who bring their children to clinics differ in knowledge of child development norms from mothers who do not (Rickard, Graziano, & Forehand, 1984).

For their part, physicians regularly draw the information they need to treat their child patients from multiple sources, parents (normally mothers) in particular. Child health supervision visits are central to the work of primary health care providers who see virtually all U.S. children in the first few years of life. Young children average more than 2 visits per year to office-based clinicians (Williams, Whitlock, Edgerton, Smith, & Bell, 2007), and practitioners routinely rely on parents during interviews, and so they need to be aware that parents’ replies to their questions are moderated by parents’ knowledge about childrearing and children’s development (Cheng, DeWitt, Savageau, & O’Connor, 1999; Cheng, Savageau, Bigelow, et al., 1996; Cheng, Savageau, DeWitt, Bigelow & Charney, 1996). This kind of information may facilitate or critically handicap attempts to advise parents and treat child patients (Civitas Initiative et al., 2000). As health care professionals cope with deciding, in the diminishing time available in office visits, which health supervision issues

to cover from the growing list of useful topics (Cheng et al., 1999; Galuska et al., 2002; Olson et al., 2004; Reisinger & Bires, 1980; Schuster, Duan, Regalado, & Klein, 2000; Stevens et al., 2003; Young, Davis, Schoen, & Parker, 1998), reports from parents set priorities and might improve practice delivery.

Conclusions

Parents have the job of absorbing and understanding novel, complex, and rapidly changing uncertain information. At the same time they are called on to parent consistently, appropriately, and effectively. In other words, what parents need to know about parenting, children, and childhood is complicated and has real-life consequences every day. The findings about parenting knowledge from this study have implications for parenthood and for children's well-being. Insofar as parents are more knowledgeable about childrearing and child development, they are likely to act and respond more positively, skillfully, and effectively in executing their childrearing roles and responsibilities, feel more competent in their parenting (Bornstein, 2003; Bornstein, Hendricks, et al., 2003), have more positive interactions with their children (Conrad et al., 1992; Reis et al., 1986), and behave in developmentally more appropriate ways with them (Grusec & Goodnow, 1994; Putnam, Sanson, & Rothbart, 2002).

The construct of "cognitive readiness" to parent has been proposed as an influential factor in the transition and adjustment to parenting (Miller, Miceli, Whitman, & Borkowski, 1996; O'Callaghan, Borkowski, Whitman, Maxwell, & Keogh, 1999; Sommer et al., 1993). Broadly, cognitive readiness represents parents' knowledge of childrearing and child development from formal and informal sources and their ability to synthesize information and apply it. Cognitive readiness to parent predicts parenting and children's developmental outcomes. In contrast to adult mothers, adolescent mothers exhibit lower levels of cognitive readiness, and in a sample of adolescent mothers cognitive readiness to parent measured during pregnancy predicted children's attachment status at 12 months as well as the quality of mother-child interactions when children were 3 years of age (Whitman, Borkowski, Weed, & Keogh, 2001). Thus, inadequate knowledge and expectations about children's development and behaviors infect problematic parenting and have been associated with nonoptimal caregiving even among already at-risk parents (Azar & Rohrbeck, 1986; Chance & Scannapieco, 2002; Miller et al., 1996; Twentyman & Plotkin, 1982).

The motto for our paper opened Benjamin Spock's *Baby and Child Care*, first published in 1946. For decades, Dr. Spock's advice on childrearing was gospel for mostly middle-class European American parents. But common sense alone—that mixture of folk wisdom, gut feelings or intuitions, counsel by relatives and strangers, and vague memories of one's own upbringing—can be mistaken or misguided or outmoded, and does not always constitute a sound basis for decisions and actions that affect children's lives. Parents need and are entitled to information based on evidence not merely belief, presented in a manner reflecting an understanding of the significance of their task and with respect for their capabilities. To be fair, when Dr. Spock wrote "Trust yourself" the science of child development was in its infancy. Neither pediatricians like Spock nor parents had the body of concrete, reliable developmental science we more fortunately possess today. It behooves thinking parents to take full advantage of this newfound evidence-based knowledge on how to parent and why children develop as they do.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

We thank J.T.D. Suwalsky, M. Sandoval, and T. Taylor. Correspondence to Marc H. Bornstein, Child and Family Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Suite 8030, 6705 Rockledge Drive, Bethesda MD 20892-7971, U.S.A. Marc_H_Bornstein@nih.gov.

References

- Alwin DF. Trends in parental socialization values: Detroit, 1958-1983. *American Journal of Sociology*. 1984; 90:359-381.
- Alwin DF. Historical changes in parental orientations to children. *Sociological Studies of Child Development*. 1990; 3:65-86.
- Azar ST, Rohrbeck CA. Child abuse and unrealistic expectations: Further validation of the Parent Opinion Questionnaire. *Journal of Consulting and Clinical Psychology*. 1986; 54:867-868. [PubMed: 3794037]
- Barnard, KE.; Solchany, JE. Handbook of parenting: Vol. 3. Status and social conditions of parenting. 2nd ed.. Bornstein, MH., editor. Erlbaum; Mahwah, NJ: 2002. p. 3-25.
- Bavolek S. Assessing and treating high-risk parenting attitudes. *Early Child Development and Care*. 1989; 42:99-112.
- Belsky, J.; Hertzog, C.; Rovine, M. Casual analyses of multiple determinants of parenting: Empirical and methodological advances. In: Lamb, ME.; Brown, AL.; Rogoff, B., editors. *Advances in developmental psychology*. Vol. 4. Erlbaum; Hillsdale, NJ: 1986. p. 153-202.
- Belsky, J.; Kelly, J. *The transition to parenthood: How a first child changes a marriage*. Bantam Doubleday Dell; New York: 1994.
- Belsky J, Youngblade L, Pensky E. Child-rearing history, marital quality, and maternal affect: Intergenerational transmission in a low-risk sample. *Development and Psychopathology*. 1989; 1:291-304.
- Benasich AA, Brooks-Gunn J. Maternal attitudes and knowledge of child-rearing: Associations with family and child outcomes. *Child Development*. 1996; 67:1186-1205. [PubMed: 8706517]
- Berlin LJ, Brady-Smith C, Brooks-Gunn J. Links between childbearing age and observed maternal behaviors with 14-month-olds in the Early Head Start Research and Evaluation Project. *Infant Mental Health Journal*. 2002; 23:104-129.
- Bonichini S, Axia G, Bornstein MH. Validation of the parent health locus of control scales in an Italian sample. *Italian Journal of Pediatrics*. 2009; 35:1-5. [PubMed: 19490658]
- Booth CL, Mitchell SK, Barnard KE, Spieker SJ. Development of maternal social skills in multiproblem families: Effects on the mother-child relationship. *Developmental Psychology*. 1989; 25:403-412.
- Bornstein, MH., editor. *Cultural approaches to parenting*. Erlbaum; Hillsdale, NJ: 1991.
- Bornstein, MH. Positive parenting and positive development in children. In: Lerner, RM.; Jacobs, F.; Wertlieb, D., editors. *Handbook of applied developmental science: Promoting positive child, adolescent, and family development through research, policies, and programs: Vol. 1. Applying developmental science for youth and families: Historical and theoretical foundations*. Sage; Thousand Oaks, CA: 2003. p. 187-209.
- Bornstein, MH. Parenting science and practice. In: Renninger, KA.; Sigel, IE.; Damon, W.; Lerner, RM., editors. *Handbook of child psychology*.; Vol. 4. *Child psychology in practice*. 6th ed.. John Wiley & Sons Inc.; Hoboken, NJ: 2006. p. 893-949.
- Bornstein, MH.; Bradley, RH., editors. *Socioeconomic status, parenting, and child development*. Erlbaum; Mahwah, NJ: 2003.
- Bornstein MH, Cote LR. Mothers' parenting cognitions in cultures of origin, acculturating cultures, and cultures of destination. *Child Development*. 2004; 75:221-235. [PubMed: 15015686]
- Bornstein, MH.; Hahn, CS.; Suwalsky, J.; Haynes, OM. Socioeconomic status, parenting, and child development: The Hollingshead Four-Factor Index of Social Status and The Socioeconomic Index of Occupations. In: Bornstein, MH.; Bradley, RH., editors. *Socioeconomic status, parenting, and child development*. Erlbaum; Mahwah, NJ: 2003. p. 29-82.

- Bornstein MH, Haynes OM. Vocabulary competence in early childhood: Measurement, latent construct, and predictive validity. *Child Development*. 1998; 69:654–671. [PubMed: 9680678]
- Bornstein, MH.; Tamis-LeMonda, CS.; Suwalsky, JTD.; Haynes, OM. Family description questionnaire. National Institute of Child Health and Human Development; 1991. Unpublished manuscript
- Bronfenbrenner, U. Socialization and social class through time and space. Holt; New York: 1958.
- Brooks-Gunn J, Furstenberg FF. The children of adolescent mothers: Physical, academic, and psychological outcomes. *Developmental Review*. 1986; 6:224–251.
- Bugental, DB.; Happaney, K. Parental attributions. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 3. Status and social conditions of parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 509-535.
- Caughy MO, Miller TL, Genevro JL, Huang K, Nautiyal C. The effects of Healthy Steps on disciplines strategies of parents with toddlers. *Journal of Applied Developmental Psychology*. 2003; 24:517–534.
- Chamberlin RW, Szumowski EK, Zastowny TR. An evaluation of efforts to educate mothers about childhood development in pediatric office practices. *American Journal of Public Health*. 1979; 69:875–886. [PubMed: 474843]
- Chance T, Scannapieco M. Ecological correlates of child maltreatment: Similarities and differences between child fatality and nonfatality cases. *Child and Adolescent Social Work Journal*. 2002; 19:139–161.
- Cheng TL, DeWitt TG, Savageau JA, O'Connor KG. Determinants of counseling in primary care pediatric practice. *Archives of Pediatrics and Adolescent Medicine*. 1999; 153:629–35. [PubMed: 10357306]
- Cheng TL, Savageau JA, Bigelow C, Charney E, Kumar S, DeWitt TG. Assessing mother's attitudes about the physician's role in child health promotion. *American Journal of Public Health*. 1996; 86:1809–1812. [PubMed: 9003144]
- Cheng TL, Savageau JA, DeWitt TG, Bigelow C, Charney E. Expectations, goals, and perceived effectiveness of child health supervision: A study of mothers in a pediatric practice. *Clinical Pediatrics*. 1996; 35:129–137. [PubMed: 8904486]
- Civitas Initiative, Zero to Three, & Brio Corporation. What grown-ups understand about child development: A national benchmark survey. Zero to Three, National Center for Infants, Toddlers, and Families; Washington, DC: 2000.
- Clarke-Stewart KA. Popular primers for parents. *American Psychologist*. 1978; 33:359–369.
- Clarke-Stewart KA. Historical shifts and underlying themes in ideas about rearing young children in the United States: Where have we been? Where are we going? *Early Development and Parenting*. 1998; 7:101–117.
- Cochran M. Personal social networks as a focus of support. *Prevention in Human Services*. 1990; 9:45–67.
- Cochran, M.; Niego, S. Parenting and social networks. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 4. Applied Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 123-148.
- Cohen, J. *Statistical power analysis for the behavioral sciences*. 2nd ed.. Erlbaum; Hillsdale, NJ: 1988.
- Collins WA, Maccoby EE, Steinberg L, Hetherington EM, Bornstein MH. Contemporary research on parenting: The case for nature *and* nurture. *American Psychologist*. 2000; 55:218–232. [PubMed: 10717969]
- Conrad B, Gross D, Fogg L, Ruchala P. Maternal confidence, knowledge, and quality of mother-toddler interactions: A preliminary study. *Infant Mental Health Journal*. 1992; 13:353–362.
- Cook, RD.; Weisberg, S. *Applied regression including computing and graphics*. Wiley; New York: 1999.
- Cooper PJ, Murray L. Postnatal depression. *British Medical Journal*. 1998; 316:1884–1886. [PubMed: 9632411]
- Copeland D, Harbaugh BL. Differences in parenting stress between married and single first time mothers at six to eight weeks after birth. *Issues in Comprehensive Pediatric Nursing*. 2005; 28:139–152. [PubMed: 16251160]

- Cowan CP, Cowan PA, Heming G, Garrett E, Coysh WS, Curtis-Boles H, Boles AJ. Transitions to parenthood: His, hers, and theirs. *Journal of Family Issues*. 1985; 6:451–481. [PubMed: 12340558]
- Crnic, K.; Low, C. Everyday stresses and parenting. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 5. Practical Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 243-267.
- Crockenberg SB. Infant irritability, mother responsiveness, and social support influences on the security of infant-mother attachment. *Child Development*. 1981; 52:857–865. [PubMed: 7285658]
- Crouter AC, Helms-Erickson H, Updegraff K, McHale SM. Conditions underlying parents' knowledge about children's daily lives in middle childhood: Between- and within-family comparisons. *Child Development*. 1999; 70:246–259. [PubMed: 10191526]
- Cutrona C. Social support and stress in the transition to parenthood. *Journal of Abnormal Psychology*. 1984; 93:378–390. [PubMed: 6512084]
- Damast AM, Tamis-LeMonda CS, Bornstein MH. Mother-child play: Sequential interactions and the relation between maternal beliefs and behaviors. *Child Development*. 1996; 67:1752–1766. [PubMed: 8890505]
- Dangel, RE.; Polster, RA., editors. *Parent training*. Guilford Press; New York: 1984.
- DeBord, K.; Smith, C.; Mulroy, M.; Tanner, P.; Silliman, B. *The emergence of the parenting profession*. National Council for Family Relations; Arlington, VA: 1997.
- DeGrada, E.; Ponzio, E. *La normalita del bambino come pregiudizio dell'adulto [Adult prejudices about infant normality]*. Bulzoni; Rome: 1971.
- de Lissoyov V. Child care by adolescent parents. *Children Today*. 1973; 2:22–25. [PubMed: 4779837]
- Deutsch FM, Ruble DN, Fleming A, Brooks-Gunn J, Stangor C. Information-seeking and self-definition during the transition to motherhood. *Journal of Personality and Social Psychology*. 1988; 55:420–431. [PubMed: 3171914]
- Dichtelmiller M, Meisels SJ, Plunkett JW, Bozynski MA, Claflin C, Mangelsdorf SC. The relationship of parental knowledge to the development of extremely low birth weight infants. *Journal of Early Intervention*. 1992; 16:210–220.
- Dollaghan CA, Campbell TF, Paradise JL, Feldman HM, Janosky JE, Pitcairn DN, Kurs-Lasky M. Maternal education and measures of early speech and language. *Journal of Speech Language and Hearing Research*. 1999; 42:1432–1443.
- Donahue ML, Pearl R, Herzog A. Mothers' referential communication with preschoolers: Effects of children's syntax and mothers' beliefs. *Journal of Applied Developmental Psychology*. 1997; 18:133–147.
- Einzig, H. Parenting education and support. In: Bayne, R.; Horton, I., editors. *New directions in counseling*. Routledge; London, England: 1996. p. 220-234.
- Elder, GH. *Children of the Great Depression: Social change in life experience*. University of Chicago; Chicago, IL: 1974.
- Feldman, MA. Parents with intellectual disabilities. In: Jutzker, JR., editor. *Handbook of child abuse research and treatment*. Plenum Press; New York: 1998. p. 401-420.
- Field TM, Widmayer SM, Stringer S, Ignatoff E. Teenage, low-class, Black mothers and their preterm infants: An intervention and developmental follow-up. *Child Development*. 1980; 51:426–436. [PubMed: 7398450]
- Fox, J. *Applied regression analysis, linear models and related methods*. Sage; Thousand Oaks, CA: 1997.
- Frankel DG, Roer-Bornstein D. Traditional and modern contributions to changing infant-rearing ideologies of two ethnic communities. *Monographs of the Society for Research in Child Development*. 1982; 47(4):1–51.
- French, V. History of parenting: The ancient Mediterranean world. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 2. Biology and Ecology of Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 345-376.
- Furstenberg FF, Brooks-Gunn J, Chase-Lansdale L. Teenaged pregnancy and childbearing. *American Psychologist*. 1989; 44:313–320. [PubMed: 2653141]

- Gabb J. Lesbian M/Otherhood: Strategies of familial-linguistic management in lesbian parent families. *Sociology*. 2005; 39:585–603.
- Galuska DA, Fulton JE, Powell KE, Burgeson CR, Pratt M, Elster A, Griesemer BA. Pediatrician counseling about preventive health topics: Results from the Physicians' Practices Survey, 1998–1999. *Pediatrics*. 2002; 109:e83. [PubMed: 11986489]
- Garcia Coll, CT.; Pachter, LM. Ethnic and minority parenting. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 4. Applied Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 1-20.
- Geary DC. Evolution and proximate expression of human paternal investment. *Psychological Bulletin*. 2000; 126:55–57. [PubMed: 10668350]
- Geboy MJ. Who is listening to the experts? The use of child care material by parents. *Family Relations*. 1981; 30:205–10.
- Golan, S.; Spiker, D.; Peterson, D.; Mercier, B.; Snow, M.; Williamson, C. Washington State Department of Early Learning Parent Needs Assessment: Phone survey (SRI Project 18252). SRI International; Menlo Park, CA: Jun. 2008 Parent voices: A statewide look.
- Goodnow JJ. Parents' ideas, actions, and feelings: Models for developmental and social psychology. *Child Development*. 1988; 59:286–320.
- Goodnow, JJ.; Collins, WA. *Development according to parents: The nature, sources, and consequences of parents' ideas*. Erlbaum; London, England: 1990.
- Gordon RA, Chase-Lansdale PL, Brooks-Gunn J. Extended households and the life course of young mothers: Understanding the associations using a sample of mothers with premature, low birthweight babies. *Child Development*. 2004; 75:1013–1038. [PubMed: 15260862]
- Gottfried, AE.; Gottfried, AW.; Bathurst, K. Maternal and dual-earner employment status and parenting. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 2. Biology and Ecology of Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 207-229.
- Green IW. Manual for scoring socioeconomic status for research on health behaviors. U. S. Public Health Reports. 1970; 85:815–827.
- Gross D, Conrad B, Fogg L, Willis L, Garvey C. What does the NCATS (Nursing Child Assessment Teaching Scale) measure? *Nursing Research*. 1993; 42:260–265. [PubMed: 8415037]
- Grusec JE, Goodnow JJ. Impact of parental discipline methods on the child's internalization of values: A reconceptualization of current points of view. *Developmental Psychology*. 1994; 30:4–19.
- Guyer B, Hughart N, Strobino D, Jones AS, Scharfstein D. Assessing the impact of pediatric-based, developmental services on infants, families and clinicians: Challenges to evaluating the Healthy Steps Program. *Pediatrics*. 2000; 105:E33. [PubMed: 10699135]
- Hammond-Ratzlaff A, Fulton A. Knowledge gained by mothers enrolled in a home visitation program. *Adolescence*. 2001; 36:435–442. [PubMed: 11817626]
- Hess CR, Teti DM, Hussey-Gardner B. Self-efficacy and parenting of high-risk infants: The moderating role of parent knowledge of infant development. *Journal of Applied Developmental Psychology*. 2004; 24:423–437.
- Hess RD, Kashiwagi K, Azuma H, Price GG, Dickson WP. Maternal expectations for mastery of developmental tasks in Japan and the United States. *International Journal of Psychology*. 1980; 15:259–271.
- Hickson, GB.; Clayton, EW. Parents and their children's doctors. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 5. Practical Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 439-462.
- Hitchcock DC, Oliver LI. Intellectual development and school achievements of youths 12-17 years: Demographic and socioeconomic factors. *Vital and Health Statistics*. 1976; 158:1–65.
- Hoff, E.; Laursen, B.; Tardif, T. Socioeconomic status and parenting. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 2. Biology and Ecology of Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 231-252.
- Hofferth, SL.; Hayes, CD., editors. *Risking the future: Adolescent sexuality pregnancy, and childbearing*. National Academy Press; Washington, DC: 1987.
- Hollingshead, AB. *The four-factor index of social status*. Yale University; New Haven, CT: 1975. Unpublished manuscript

- Huang K, Caughy MO, Genevro JL, Miller TL. Maternal knowledge of child development and quality of parenting among White, African-American and Hispanic mothers. *Journal of Applied Developmental Psychology*. 2005; 26:149–170.
- Hulbert, A. *Raising America: Experts, parents, and a century of advice about children*. Knopf; New York: 2003.
- Institute of Medicine. *Defining primary care: An interim report*. National Academy Press; Washington, DC: 1994. Retrieved from http://books.nap.edu/openbook.php?record_id=9153&page=15
- Izzo C, Weiss L, Shanahan T, Rodriguez-Brown F. Parental self-efficacy and social support as predictors of parenting practices and children's socioemotional adjustment in Mexican immigrant families. *Journal of Prevention and Intervention in the Community*. 2000; 20:197–213.
- Jarrett GE. Childrearing patterns of young mothers: Expectations, knowledge and practices. *Maternal-Child Nursing*. 1982; 7:119–124.
- Johnston BD, Huebner CE, Tyll LT, Barlow WE, Thompson RS. Expanding developmental and behavioral services for newborns in primary care: Effects on parental well-being, practice, and satisfaction. *American Journal of Preventive Medicine*. 2004; 26:356–366. [PubMed: 15110063]
- Juffer F, Rosenboom LG. Infant-mother attachment of internationally adopted children in the Netherlands. *International Journal of Behavioral Development*. 1997; 20:93–107.
- Kammeyer K. Birth order as a research variable. *Social Forces*. 1967; 46:71–80.
- Karraker KH, Evans SL. Adolescent mothers' knowledge of child development and expectations for their own infants. *Journal of Youth and Adolescence*. 1996; 2:651–666.
- Kelly ML, Sanchez-Hucles J, Walker R. Correlates of disciplinary practices in working-to middle-class African-American mothers. *Merrill-Palmer Quarterly*. 1993; 39:252–264.
- Kreppner, K. Development in a developing context: Rethinking the family's role for children's development. In: Winegar, LT.; Valsiner, J., editors. *Children's development within social context: Vol. 2. Research and Methodology*. Erlbaum; Hillsdale, NJ: 1992. p. 161-182.
- Leaper, C. Parenting girls and boys. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 1. Children and parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 189-225.
- Leiderman, PH.; Tulkin, SR.; Rosenfeld, A., editors. *Culture and infancy: Variations in the human experience*. Academic Press; New York: 1977.
- Leon IG. Adoption losses: Naturally occurring or socially constructed? *Child Development*. 2002; 73:652–663. [PubMed: 11949914]
- Lightfoot, C.; Valsiner, J. Parental belief systems under the influence: Social guidance of the construction of personal cultures. In: Sigel, IE.; McGillicuddy-DeLisi, AV.; Goodnow, JJ., editors. *Parental belief systems: The psychological consequences for children*. 2nd ed.. Erlbaum; Hillsdale, NJ: 1992. p. 393-414.
- Linde DB, Engelhardt KF. What do parents know about infant development? *Pediatric Nursing*. 1979; 5(6):32–36. [PubMed: 252677]
- MacPhee, D. *Manual for the knowledge of infant development inventory*. University of North Carolina; 1981. Unpublished manuscript
- MacPhee, D. The nature of parents' experience with and knowledge about infant development; Paper presented at the meeting of the Society for Research in Child Development; Detroit, MI. 1983;
- MacPhee D. The pediatrician as source of information about child development. *Journal of Pediatric Psychology*. 1984; 9:87–100. [PubMed: 6726553]
- Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Kimeyer S, Mathews TJ. *Births: Final Data for 2006*. National Vital Statistics Reports. 2009; 57:1–27.
- McGillicuddy-DeLisi AB. Parental beliefs about developmental processes. *Human Development*. 1982a; 25:192–200.
- McGillicuddy-DeLisi, AB. The relationship between parental beliefs and children's cognitive development. In: Laosa, LM.; Sigel, IE., editors. *Families as learning environments for children*. Plenum; New York: 1982b. p. 7-24.
- McKim MK. Transition to what? New parents' problems in the first year. *Family Relations*. 1987; 36:22–25.

- Melamed, BG. Parenting the ill child. In: Bornstein, MH., editor. *Handbook of Parenting: Vol. 5. Practical Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 329-348.
- Michael, RT. *The effect of education on efficiency in consumption*. Columbia University Press; New York: 1972.
- Michalski RL, Shackelford TK. Methodology, birth order, intelligence, and personality. *American Psychologist*. 2001; 56:520–524. [PubMed: 11413876]
- Miller CL, Miceli PJ, Whitman TL, Borkowski JG. Cognitive readiness to parent and intellectual-emotional development in children of adolescent mothers. *Developmental Psychology*. 1996; 32:533–541.
- Miller SA. Parents' beliefs about children's cognitive development. *Child Development*. 1988; 59:259–285.
- Miller SA, Manhal M, Mee LL. Parental beliefs, parental accuracy, and children's cognitive performance: A search for causal relations. *Developmental Psychology*. 1991; 27:267–276.
- Miller, TW., editor. *Stressful life events*. International Universities Press, Inc; Madison, CT: 1989.
- Minkovitz CS, Hughart N, Strobino D, Scharfstein D, Grason H, Hou W, Guyer B. A practice-based intervention to enhance quality of care in the first 3 years of life: The Healthy Steps for young children program. *Journal of the American Medical Association*. 2003; 290:3081–3091. [PubMed: 14679271]
- Mirowsky J. Parenthood and health: The pivotal and optimal age at first birth. *Social Forces*. 2002; 81:315–349.
- Mondschein ER, Adolph KE, Tamis-LeMonda CS. Gender bias in mothers' expectations about infant crawling. *Journal of Experimental Child Psychology*. 2000; 77:304–316. [PubMed: 11063631]
- Moore KA, Myers DE, Morrison DR, Nord CW, Brown B, Edmonston B. Age at first childbirth and later poverty. *Journal of Research on Adolescence*. 1993; 3:393–422. [PubMed: 12319701]
- Moore, MR.; Brooks-Gunn, J. Adolescent parenthood. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 3. Status and social conditions of parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 173-214.
- National Campaign to Prevent Teen Pregnancy. How is the 3 in 10 statistic calculated?. Author; Washington, DC: 2004. Retrieved from http://www.thenationalcampaign.org/resources/pdf/FactSheet_3in10_Apr2008.pdf
- Ninio A. The naïve theory of the infant and other maternal attitudes in two subgroups in Israel. *Child Development*. 1979; 50:976–980. [PubMed: 535448]
- Nunnally, JC.; Bernstein, IH. *Psychometric theory*. 3rd ed.. McGraw-Hill; New York: 1994.
- O'Callaghan MF, Borkowski JG, Whitman TL, Maxwell SE, Keogh D. A model of adolescent parenting: The role of cognitive readiness to parent. *Journal of Research on Adolescence*. 1999; 9:203–225.
- Oldershaw, L. *A national survey of parents of young children*. Invest in Kids; Toronto, ON: 2002.
- Olson LM, Inkelas M, Halfon N, Schuster MA, O'Connor KG, Mistry R. Overview of the content of health supervision for young children: reports from parents and pediatricians. *Pediatrics*. 2004; 113:1907–1916. [PubMed: 15173461]
- Pachter LM, Dworkin PH. Maternal expectations about normal child development in 4 cultural groups. *Archives of Pediatrics and Adolescent Medicine*. 1997; 151:1144–1150. [PubMed: 9369877]
- Palacios J. Parents' ideas about the development and education of their children: Answers to some questions. *International Journal of Behavioral Development*. 1990; 13:137–155.
- Paris R, Dubus N. Staying connected while nurturing an infant: A challenge of new motherhood. *Family Relations*. 2005; 54:72–83.
- Parke, RD. Fathers and families. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 3. Status and Social Conditions of Parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 27-73.
- Parks PL, Smeriglio VL. Parenting knowledge among adolescent mothers. *Journal of Adolescent Health Care*. 1983; 4:163–167. [PubMed: 6685116]
- Parks PL, Smeriglio VL. Relationships among parenting knowledge, quality of stimulation in the home and infant development. *Family Relations*. 1986; 35:411–416.

- Paulsen, R.J.; Sachs, J. Rewinding your biological clock: Motherhood late in life. W. H. Freeman; New York: 1998.
- Pickett W, Marlenga B, Berg RL. Parental knowledge of child development and the assignment of tractor work to children. *Pediatrics*. 2003; 112:11–16.
- Price JS, Hare EH. Birth order studies: Some sources of bias. *British Journal of Psychiatry*. 1969; 115:633–646. [PubMed: 5806855]
- Putnam, SP.; Sanson, AV.; Rothbart, MK. Child temperament and parenting. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 1. Children and parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 255-277.
- Ragozin AS, Basham RB, Crinic KA, Greenberg MT, Robinson NM. Effects of maternal age on parenting role. *Developmental Psychology*. 1982; 18:627–634.
- Ramey, CT.; Ramey, SL. Prevention of intellectual disabilities: Early interventions to improve cognitive development. In: Ceci, S.J.; Williams, W.M., editors. *The nature/nurture debate: Essential readings*. Blackwell; Walden, MA: 1999. p. 147-163.
- Reich S. What do mothers know? Maternal knowledge of child development. *Infant Mental Health Journal*. 2005; 26:143–156.
- Reis J, Barbera-Stein L, Bennett S. Ecological determinants of parenting. *Family Relations*. 1986; 35:547–554.
- Reisinger KF, Bires J. Anticipatory guidance in pediatric practice. *Pediatrics*. 1980; 66:889–892. [PubMed: 7454479]
- Richman AL, Miller PM, LeVine RA. Cultural and educational variations in maternal responsiveness. *Developmental Psychology*. 1992; 28:614–621.
- Rickard KM, Graziano W, Forehand R. Parental expectations and child deviance in clinic-referred and non-clinic children. *Journal of Clinical Child & Adolescent Psychology*. 1984; 13:179–186.
- Riley, D.; Salisbury, M.J.; Walker, S.K.; Steinberg, J. Parenting in the first year: Wisconsin statewide impact report. University of Wisconsin-Extension and School of Human Ecology, University of Wisconsin; Madison, WI: 1996.
- Roggman LA, Benson B, Boyce L. Father with infants: Knowledge and involvement in relation to psychosocial functioning and religion. *Infant Mental Health Journal*. 1999; 20:257–277.
- Roosa MW, Vaughan L. A comparison of teenage and older mothers with preschool age children. *Family Relations*. 1984; 33:259–265.
- Rothbaum F, Martland N, Jannsen J. Parents' reliance on the Web to find information about children and families: Socio-economic differences in use, skills and satisfaction. *Journal of Applied Developmental Psychology*. 2008; 29:118–128.
- Rothbaum F, Weisz JR. Parental caregiving and child externalizing behavior in nonclinical samples: A meta-analysis. *Psychological Bulletin*. 1994; 116:55–74. [PubMed: 8078975]
- Rowe ML. Child-directed speech: Relation to socioeconomic status, knowledge of child development, and child vocabulary skill. *Journal of Child Language*. 2008; 35:185–205. [PubMed: 18300434]
- Ruchala P, James DC. Social support, knowledge of infant development, and maternal confidence among adolescent and adult mothers. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*. 1997; 26:685–689.
- Sanders LM, Thompson VT, Wilkinson JD. Caregiver health literacy and the use of child health services. *Pediatrics*. 2007; 119:e86–92. [PubMed: 17200263]
- Sandqvist K. Verbal boys and mathematical girls: Family background and educational careers. *Scandinavia Journal of Educational Research*. 1995; 39:5–36.
- Sanghavi DM. Taking well-child care into the 21st century – A novel, effective method for improving parent knowledge using computerized tutorials. *Archives of Pediatrics and Adolescent Medicine*. 2005; 159:482–485. [PubMed: 15867124]
- Schilmoeller GL, Baranowski MD. Childrearing of firstborns by adolescent and older mothers. *Adolescence*. 1985; 2:805–822. [PubMed: 4083139]
- Schmidley, AD. Profile of the foreign-born population in the United States, 2000. Government Printing Office; Washington, D.C.: 2001. Series P23-206U.S. Bureau of the Census Current Population ReportsElectronic version

- Schuster MA, Duan N, Regalado M, Klein D. What information do parents receive? What information do they want? *Archives of Pediatrics & Adolescent Medicine*. 2000; 154:1191–1198. [PubMed: 11115301]
- Seefeldt C, Denton K, Galper A, Younoszai T. The relation between Head Start parents' participation in a Transition Demonstration, education, efficacy and their children's academic abilities. *Early Childhood Research Quarterly*. 1999; 14:99–109.
- Sices L, Feudtner C, McLaughlin J, Drotar D, Williams M. How do primary care physicians manage children with possible developmental delays? A national survey with an experimental design. *Pediatrics*. 2004; 113:274–282. [PubMed: 14754938]
- Sigel, IE. The belief-behavior connection: A resolvable dilemma?. In: Sigel, IE.; McGillicuddy-DeLisi, AV.; Goodnow, JJ., editors. *Parental belief systems: The psychological consequences for children*. 2nd ed.. Erlbaum; Hillsdale, NJ: 1992. p. 433-456.
- Singh S, Darroch JE. Adolescent pregnancy and childbearing: Levels and trends in developed countries. *Family Planning Perspectives*. 2000; 32:14–23. [PubMed: 10710702]
- Sistler AK, Gottfried NW. Shared child development knowledge between grandmother and mother. *Family Relations*. 1990; 39:92–96.
- Smeriglio VL, Parks PL. Measuring mothers' perceptions about the influence of infant caregiving practices. *Child Psychiatry and Human Development*. 1983; 13:237–244.
- Smith, C.; Perou, R.; Lesesne, C. Parent education. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 4. Applied parenting*. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 389-410.
- Sobel, ME. Asymptotic intervals for indirect effects in structural equations models. In: Leinhardt, S., editor. *Sociological methodology 1982*. Jossey-Bass; San Francisco: 1982. p. 290-312.
- Sommer K, Whitman TL, Borkowski JG, Schellenbach C, Maxwell S, Keogh D. Cognitive readiness and adolescent parenting. *Developmental Psychology*. 1993; 29:389–398.
- Sonnander K, Claesson M. Predictors of developmental delay at 18 months and later school achievement problems. *Developmental Medicine and Child Neurology*. 1999; 41:195–202. [PubMed: 10210252]
- Sparling, J.; Lowman, B. Parent information needs as revealed through interests, problems, attitudes, and preferences. In: Haskins, R.; Adams, D., editors. *Parent education and public policy*. Ablex; Norwood, NJ: 1983. p. 304-323.
- Spock, B. *Baby and child care*. Pocket Books; New York: 1946.
- Stern, D. *The motherhood constellation: A unified view of parent-infant psychotherapy*. Basic Books; New York: 1995.
- Stern M, Alvarez A. Knowledge of child development and caretaking attitudes: A comparison of pregnant, parenting, and nonpregnant adolescents. *Family Relations: Interdisciplinary Journal of Applied Family Studies*. 1992; 41:297–302.
- Stevens JH Jr. Child development knowledge and parenting skills. *Family Relations*. 1984; 33:237–244.
- Stevens GD, Inkelas M, Kuo AA, Peek-Asa C, Olson LM, Halfon N. Child injury prevention: Disparities in physician guidance and parent practice. *Pediatric Research*. 2003; 53:218A.
- Stoiber KC. Parents' beliefs about their children's cognitive, social, and motor functioning. *Early Education and Development*. 1992; 3:244–257.
- Stoiber KC, Houghton TG. The relationship of adolescent mothers' expectations, knowledge and beliefs to their young children's coping behavior. *Infant Mental Health Journal*. 1993; 14:61–79.
- Suwalsky, JTD.; Bornstein, MH. Parenting support measure. National Institute of Child Health and Human Development; 1991. Unpublished manuscript
- Suwalsky JTD, Hendricks H, Bornstein MH. Families by adoption and birth: I. Mother-infant socio-emotional interactions. *Adoption Quarterly*. 2008a; 11:101–125. [PubMed: 19888444]
- Suwalsky JTD, Hendricks H, Bornstein MH. Families by adoption and birth: II. Mother-infant cognitive interactions. *Adoption Quarterly*. 2008b; 11:126–151. [PubMed: 20151033]
- Tabachnick, BG.; Fidell, LS. *Using multivariate statistics*. Allyn & Bacon; Boston: 2001.

- Tamis-LeMonda CS, Chen LA, Bornstein MH. Mothers' knowledge about children's play and language development: Short-term stability and interrelations. *Developmental Psychology*. 1998; 34:115–124. [PubMed: 9471009]
- Tamis-LeMonda CS, Damast AM, Bornstein MH. What do mothers know about the developmental nature of play? *Infant Behavior and Development*. 1994; 17:341–345.
- Tamis-LeMonda CS, Shannon J, Spellman M. Low-income adolescent mothers' knowledge about domains of child development. *Infant Mental Health Journal*. 2002; 23:88–103.
- Terrisse B, Roberts DSL, Palacio-Quintin E, MacDonald BE. Effects of parenting practices and socioeconomic status on child development. *Swiss Journal of Psychology*. 1998; 57:114–123.
- Teti DM, Gelfand DM. Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development*. 1991; 62:918–929. [PubMed: 1756667]
- Thompson RJ Jr, Gustafson KE, Bonner MJ, Ware RE. Neurocognitive development of young children with sickle cell disease through three years of age. *Journal of Pediatric Psychology*. 2002; 27:235–244. [PubMed: 11909931]
- Tichenor PJ, Donohue GA, Olien CN. Mass media flow and differential growth in knowledge. *Public Opinion Quarterly*. 1970; 34:159–170.
- Tilton-Weaver, LC.; Kakihara, F. United States of America. In: Arnett, JJ., editor. *International encyclopedia of adolescence*. Routledge; New York: 2008. p. 1061-1076.
- Twentyman CT, Plotkin RC. Unrealistic expectations of parents who maltreat their children: An educational deficit that pertains to child development. *Journal of Clinical Psychology*. 1982; 38:497–503. [PubMed: 7107912]
- U.S. Census Bureau. Table 1. Total population by age, race and Hispanic or Latino origin for the United States: 2000. 2004. Retrieved June 23, 2006 from <http://www.census.gov/population/cen2000/phc-t9/tab01.pdf>
- U.S. Department of Health and Human Services. Administration for Children and Families. Early Head Start Research and Evaluation Project (EHSRE), 1996-Current. n.d. Retrieved from http://www.acf.hhs.gov/programs/opre/ehs/ehs_resrch/
- Viswanath K, Kahn E, Finnegan JR Jr, Hertog J, Potter JD. Motivation and the “knowledge gap”: Effects of a campaign to reduce diet-related cancer risk. *Communication Research*. 1993; 20:546–563.
- Vukelich C, Kliman DS. Mature and teenage mothers' infants growth expectations and use of child development information sources. *Family Relations*. 1985; 34:189–96.
- Wacharasin C. Predicting child cognitive development in low-income families. *Dissertation Abstracts International*. 2001; 62(5-B):2263.
- Waddell, KJ.; Ball, FL. Parental knowledge questionnaire: The first two years; Paper presented at the meetings of the American Psychological Association; Montreal, Quebec, Canada. 1980, August;
- Waldfoegel, J. *What children need*. Harvard University Press; Cambridge, MA: 2006.
- Walker M. International breastfeeding initiatives and their relevance to the current state of breastfeeding in the United States. *Journal of Midwifery & Women's Health*. 2007; 52:549–555.
- Weisner TS, Gallimore R. My brother's keeper: Child and sibling caretaking. *Current Anthropology*. 1977; 18:169–190.
- Wethington E, Kessler RC. Perceived support, received support, and adjustment to stressful life events. *Journal of Health and Social Behavior*. 1986; 27:78–89. [PubMed: 3711634]
- Whitman TL, Borkowski JG, Schellenbach CJ, Nath PS. Predicting and understanding developmental delay of children of adolescent mothers: A multidimensional approach. *American Journal of Mental Deficiency*. 1987; 92:40–56. [PubMed: 2441600]
- Whitman, TL.; Borkowski, JG.; Weed, K.; Keogh, D. *Interwoven Lives: Adolescent Mothers and their Children*. Erlbaum; Mahwah, NJ: 2001.
- Williams LO, Decouflé P. Is maternal age a risk factor for mental retardation among children? *American Journal of Epidemiology*. 1999; 149:814–823. [PubMed: 10221318]

- Williams PD, Williams AR, Lopez M, Tayko NP. Mothers' developmental expectations for young children in the Philippines. *International Journal of Nursing Studies*. 2000; 37:291–301. [PubMed: 10760536]
- Williams SB, Whitlock EP, Edgerton EA, Smith PR, Bell TL, U.S. Preventive Services Task Force. Counseling about proper use of motor vehicle occupant restraints and avoidance of alcohol use while driving: A systematic evidence review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*. 2007; 147:194–206. [PubMed: 17679708]
- Wolf, A. Exposing the great equalizer: Demythologizing internet equity. In: Ebo, B., editor. *Cyberghetto or cybertopia? Race, class, and gender on the Internet*. Praeger Publishers/Greenwood Publishing; Westport, CT: 1998. p. 15-32.
- Wright JD, Wright SR. Social class and parental values for children: A partial replication and extension of the Kohn thesis. *American Sociological Review*. 1976; 41:527–537.
- Yarrow, MR.; Campbell, JD.; Burton, RV. *Child rearing: An inquiry into research and methods*. Jossey-Bass; San Francisco: 1968.
- Young, KT. What parents and experts think about infants. In: Kessel, FS.; Bornstein, MH.; Sameroff, AJ., editors. *Contemporary constructions of the child*. Erlbaum; Hillsdale, NJ: 1991.
- Young KT, Davis K, Schoen C, Parker S. Listening to parents. A national survey of parents with young children. *Archives of Pediatrics & Adolescent Medicine*. 1998; 152:255–262. [PubMed: 9529463]

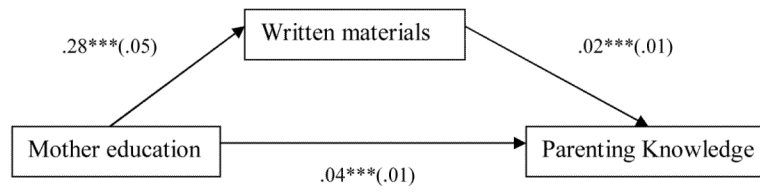


Figure 1. Mediation effect of a source of parenting knowledge (written materials) on the relation between mother education and parenting knowledge. *** $p < .001$

Table 1
Sample Sociodemographic Data and Correlations with KIDI Proportion Correct

Sociodemographics	M	SD	Correlation with KIDI Proportion Correct	
			Zero-order	Controlling for Mothers' Age Education
Mother				
Age (years)	31.11	6.27	.46***	.15*
Education ^a	5.59	1.35	.49***	.21***
Occupational status	6.9	1.6	.19**	.06
Number of hours employed weekly ^b	20.43	19.04	.05	.02
Child				
Age (months)	20.08	2.3	-.10	-.06
Birth weight (grams)	3522.94	447.18	.04	.06
Family				
Hollingshead Index	49.96	13.23	.43***	.14*

Note. N = 268.

^aThe education factor in the Hollingshead *Four-Factor Index of Social Status* (1975) was scaled that: 1 = less than 7th grade; 2 = 7th, 8th, 9th grade; 3 = 10th or 11th grade; 4 = high school graduated or GED; 5 = partial college or specialized training; 6 = standard college or university graduate; 7 = graduate professional training.

^bIncludes homemaker mothers.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 2
Parenting Sources of Support and Correlations with KIDI Proportion Correct

Parenting Support	M	SD	Correlation with KIDI Proportion Correct		
			Zero-order	Controlling for Mothers' Age	Controlling for Mothers' Education
Child's father	3.40	1.04	.07	.01	-.00
Written materials	2.85	1.14	.32***	.20**	.20**
Pediatrician	2.65	1.10	.04	-.01	.05
Mother's mother	2.36	1.56	-.16*	-.05	-.08
Friends/neighbors	2.06	1.31	.01	-.03	-.03
Other relatives	1.76	1.42	-.13*	-.04	-.03
Mother-in-law	1.45	1.49	-.13*	-.07	-.09
Childbirth class (% Yes)	89.92	-	.23***	.14*	.06
Parenting class (% Yes)	28.46	-	.08	.05	.02

Note. $N = 268$; sample sizes for some analyses are slightly smaller due to missing data.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 3
Prediction of Proportion KIDI Correct from Mothers' Age, Education, Access to Books and Written Materials, and Attendance at a Childbirth Class

Model	Variable Added	R ² _{increment}	F _{increment (1, 234)}
Mothers' education Written materials Childbirth class	Mothers' age	.013	4.64 *
Mothers' age Written materials Childbirth class	Mothers' education	.054	19.03 ***
Mothers' age Mothers' education Childbirth class	Written materials	.029	10.35 **
Mothers' age Mothers' education Written materials	Childbirth class	.002	.88

*
p .05

**
p .01

p .001.