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Chronological Age, Cognitions, and Practices in European American Mothers: A Multivariate Study of Parenting

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Abstract

We studied multiple parenting cognitions and practices in European American mothers ($N = 262$) who ranged in age from 15 to 47 years. All were first-time parents of 20-month-old children. Some age effects were zero; others were linear or nonlinear. Nonlinear age effects determined by spline regression showed significant associations to a “knot” age (~30 years) with little or no association afterward. For parenting cognitions and practices that are age-sensitive, a two-phase model of parental development is proposed. These findings stress the importance of considering maternal chronological age as a factor in developmental study.

Maternal Age and Parenting

Increasing numbers of adult women in the United States and Europe are delaying conception, expanding the age range for pregnancy and birth (Martin et al., 2005; Mirowsky, 2002; Paulsen & Sachs, 1998). According to the *National Vital Statistics Report* (Martin et al., 2005), birth rates for 30- to 39-year-old women increased by about 1% each year from 1991 to 2003, and births to women aged 35-39 and 40-44 years rose 38% and 58%, respectively, from 1990 to 2003. At the same time, the United States has the highest percentage of teen (15-19) births among industrialized nations (415,408 babies in the United States in 2004; Hamilton, Ventura, Martin, & Sutton, 2005). These demographics beg questions about what associations might obtain between maternal *age* per se and parenting and family process, the main concerns of this study.

The psychosocial impacts of early childbirth are now fairly well established. Younger mothers are known to possess less knowledge about parenting, to express less desirable childrearing attitudes, and to hold less realistic expectations about child development than older mothers (Hardy, Astone, Brooks-Gunn, Shapiro, & Miller, 1998; Moore & Brooks-Gunn, 2002; Sommer et al., 1993). Parenthood at very young ages is also associated with less favorable maternal behaviors toward children (Barratt & Roach, 1995; Coley & Chase-Lansdale, 1998; Moore & Brooks-Gunn, 2002; Pomerleau, Scuccimari, & Malcuit, 2003). For example, teenage mothers have been found to be less verbal, less sensitive, and less responsive to their children than older mothers (Culp, Appelbaum, Osofsky, & Levy, 1988),

and they tend to provide a less stimulating home environment (Luster & Dubow, 1990; Moore, Morrison, & Greene, 1997). Distinctive characteristics of adolescent mothers may place them at risk for nonoptimal parenting (Whitman, Borkowski, Schellenbach, & Nath, 1987): Teenage mothers have diminished intellectual ability and lower educational attainment, are less socioemotionally mature, and possess fewer social supports with the consequence that they are less well prepared to parent (Coll, Hoffman, & Oh, 1987; Streetman, 1987). To the extent that adolescent mothers are challenged by their own developmental crises in the search for personal identity, they are less likely to invest in parenting or command the wherewithal to parent optimally.

At the older end of the age continuum, however, the effects of age on parenting are not so well understood. On the one hand, increased maternal age might be associated with increased physical fatigue, a greater number of medical ailments, and multiple competing demands; generally, health problems become more serious with age (Mirowsky, 2002). Tending and supporting children challenge one physically (Bird & Fremont, 1991), and individuals who delay their first birth may not possess the physical capacities to meet those challenges. On the other hand, age is often conceived of as a marker for maturity, perspective, and patience; older adults tend to possess more experience and information, and may feel more psychologically ready to assume the responsibilities of childrearing (Cowan, 1988; Reis, Barbera-Stein, & Bennett, 1986; Walter, 1986, 1989). Women who have their first child in later adulthood are generally better educated and more financially secure and stable than are younger first-time mothers. Adult mothers appear to interact with their children in more positively affectionate, stimulating, sensitive, and verbal ways (Jones, Green, & Krauss, 1980; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). Adult mothers also show greater adaptation to the mothering role and display more reciprocity when interacting with young children: They are more skilled at maintaining longer interactive sequences with children, for instance. When Garrett, Ferron, Ng'andu, Bryant, and Harbin (1994) created a structural model of the determinants of children's motor and social development, mothers' readiness to be a parent (a significant factor in itself) was found to be determined by their competency and maturity as indexed by their chronological age at childbirth.

Theoretical Relations between Maternal Age and Parenting Cognitions and Practices

In general, age might relate to parenting following any one of three different models depending on the dependent variable: (A) a linear relation, (B) a nonlinear relation, or (C) no systematic relation (see Figure 1). In this study, we assessed these different functional relations in a variety of age-appropriate parenting cognitions and practices in mothers who varied over a wide chronological age range. We studied several maternal parenting cognitions and practices because parenting is multidimensional, modular, and specific (Bornstein, 2006).

First, a default assumption in parenting seems to hold that maternal age bears a linear relation to parenting cognitions and practices with the slope of that relation normatively

positive (Figure 1A left). For instance, some types of “capital” that are so important to parenting and family development (presumably) continuously aggregate with age (Coleman, 1988). Financial capital refers to the monetary and physical resources available to parents and thence to children, and social capital encompasses resources that stem from relationships and connections within the family and between the family and the larger community. It could be that increasing age, accompanied by maturity, experience, understanding, capitalization, and stability, helps adults to cope increasingly well with the many substantial and stressful changes and challenges of parenting (Rossi, 1968). For example, older mothers have been reported to spend more time parenting, exhibit better parenting behavior, and profess more parenting satisfaction than younger mothers (Ragozin et al., 1982). Reciprocally, of course, parenting requires time, effort, and energy, and it could be that older mothers are less healthy, possess less stamina, and command fewer internal resources than younger mothers (Figure 1A right).

Second, it could be that some types of nonlinear relations obtain between age and parenting (Figure 1B). The most straightforward would be Ω - or U-shaped functions (Figure 1B top). It was once asserted that “optimal” childbearing took place between about 20 and about 30 years of age (Rindfuss & Bumpass, 1978): Indeed, as early as 1749, the English physician Cadogan opined that “Those [who become mothers] between twenty and thirty are certainly of the best Age”. Some corroborative evidence of the significance of this developmental pattern comes from Waldron, Weiss, and Hughes (1998) who analyzed data from the National Longitudinal Survey’s sample of women aged 24 through 34. Their models show a parabolic association between health problems and age at first birth with maximally expected healthy outcomes associated with an age at first birth of 27. More recently, Mirowsky (2002) analyzed data from the survey of Aging, Status, and the Sense of Control, a 1995 national probability sample of U.S. households, and determined that the optimal age at first birth for mothers (in terms of health outcomes) was about 30.5 (with a 95% confidence interval ranging from 26.9 to 34.1). Thus, on a lifespan notion of normative developmental tasks (Havinghurst, 1972; Roberts, Walton, & Viechtbauer, 2006), having a child before 20 or after 30 might represent ill-advised “off-time” versus more appropriate “on-time” variations in one’s progression through this key phase in the life cycle (Helson, Mitchell, & Moane, 1984; Lowenthal, Thurner, & Chiriboga, 1976; Neugarten, 1968). In brief, then, parenting might grow in optimality to a certain age, level off, and later diminish. Other nonlinear relations are feasible as well (Figure 1B bottom). For example, human capital refers to nonmaterial resources parents provide children, such as cognitive stimulation and values regarding achievement, and it is usually indexed by parental educational level. Education normally aggregates to a particular age and then reaches an asymptote. It could be that some parenting cognition- or practice-age relations follow such nonlinear S- or J-shaped associations.

Third, of course, it could be that maternal age bears no fixed relation to parenting cognitions or practices (Figure 1C), as would be predicted by a trait conceptualization of parenting (Holden, 1997). Several theoreticians have contended that some parenting cognitions and practices are unconscious or habitual (see Bugental & Goodnow, 1998), and Papoušek and Papoušek’s (2002) theory of “intuitive parenting” holds that, once an individual becomes a parent, some parenting functions operate essentially automatically. For example, mothers of

all ages possess consistent implicit beliefs (Holden & Buck, 2002) and address their infants in a special register of child-directed speech (Papoušek & Bornstein, 1992). Not unexpectedly, then, some investigations have found no effects for age on maternal caregiving or childrearing (Reis et al., 1986).

Maternal Cognitions and Practices

Parenting cognitions are important generally because they are key to understanding parenting in its own right, they help to organize the world of parenting because cognitions affect parents' sense of self and their role, they generate and shape parenting practices and afford organization and coherence to the tasks of parenting, and they also affect children's development directly and indirectly. We investigated four prominent and representative domains of parenting cognitions that are appropriate to the developmental tasks of second-year children: mothers' perceptions of their own competence, satisfaction, investment, and role balance; mothers' reports of their social interactions and limit setting with their children; mothers' attributions of their successes and failures at parenting; and mothers' knowledge of childrearing and child development. Mothers responded to questionnaires about each.

Salient perceptions of parenting we studied include parents' separate feelings of competence in the role of caregiver, satisfaction gained from caregiving, investment in caregiving, and ability to balance caregiving with other social roles. Functionally, for example, perceptions of parenting competence are associated with parents' use of effective childrearing strategies (Teti & Candelaria, 2002). We also studied mothers' reports about their own parenting practices in two different spheres especially apt to the second-year child: social interaction and limit setting (Bornstein et al., 1996). Social interactions consist of physical and verbal strategies parents use to engage their children in affective interpersonal dyadic interchanges, and limit setting consists of parents' attempts to inculcate self-control in their children. Our third domain of parenting cognitions was parents' attributions, how parents interpret their successes and failures at parenting. Attributions inform how parents behave toward their children (Bugental & Happaney, 2002). Whereas perceptions, behaviors, and attributions may or may not be factual, parenting knowledge is thought to draw on the science base and to be valid and reliable by members of the clinical and research community. The general state of knowledge that parents have constitutes a frame of reference from which they parent and interpret their children's growth and behavior. Knowledgeable parents harbor more realistic expectations and are more likely to behave in developmentally appropriate ways with their children, whereas parents who are not informed by accurate knowledge of child development experience greater stress as a result of mismatches between expectations and actual child behaviors (Benasich & Brooks-Gunn, 1996). In brief, the parental cognitions we studied are relevant to parenting, parent-child interactions, and child development, and we studied parent age-by-cognition relations in several domains.

More immediate in the phenomenology of children are parents' practices, the actions and experiences parents provide children, and so we also studied several salient domains of age-appropriate parenting practices: language, pretense play, affective interactions, and emotional availability. To obtain data for each, we observed and coded mothers' behaviors.

Language is fundamental to child development and the parent-child bond. We focused on maternal utterance length and vocabulary in the context of mothers' interactions with their children to assess their language in a parenting context (rather than maternal language generally). Children first enter the world of representation through their pretense play, and pretense is a generative forum in which children advance on their cognitions about people, objects, and actions, and construct increasingly sophisticated representations of the world and relations between symbols and their external referents. Most U.S. mothers support pretend play in their children (Farver & Wimbarti, 1995) and generally characterize such play as an enjoyable activity that facilitates their children's development (Haight & Miller, 1993; Haight, Parke, & Black, 1997; Tamis-LeMonda & Bornstein, 1991). We measured three types of expressions of affection in mothers with their toddlers: social play, praise/endearments, and physical affection. Social play includes physical and/or verbal behaviors directed toward the child to amuse the child. Praise/endearments consist of verbal expressions of approval. Affectionate physical gestures are tactile behaviors manifestly intended to convey warmth and sensitivity. Finally, we assessed emotional availability (Emde, 2000) in mothers. Emotional exchange is one of the primary modalities through which caregiving quality is expressed, and maternal emotional displays appear requisite to mothers' responsiveness, sensitivity, and contingency (Zhou et al., 2002). As such, emotional availability is the *sine qua non* of the emotional quality and health of the child-parent relationship (Biringen & Robinson, 1991). In the same way we sought parent age-parenting cognition relations, we evaluated parent age-by-parenting practice relations across several salient domains of parenting.

This Study

For this study, we undertook a systematic and comprehensive approach to a diversity of parenting cognitions and practices in first-time mothers who varied incrementally over a wide range of age from 15 to 47 years. Mothers reported about their parenting perceptions, behaviors, attributions, and knowledge, and we observed their parenting language, play, affection, and emotional availability. All the women were parents of firstborn 20-month-olds. We studied parenting in the child's second year because here we wanted information from mothers who were settled in the maternal role and whose parenting cognitions and practices had had time to stabilize. The cognitions and practices we studied were selected as appropriate parenting domains to the developmental tasks of toddlerhood (Edwards & Liu, 2002). Typically, children in the second year manifest rapid progress in all spheres of development, including fine and gross motor skills, receptive and expressive verbal and non-verbal symbolic capacities, and sensitivity and responsiveness to the expressions of feelings and emotions in others (Adolph & Berger, 2005; Bornstein & Haynes, 1998; Edwards & Liu, 2002; Užgiris & Raeff, 1995).

We hypothesized that maternal age would bear a linear relation to some parenting cognitions and practices, a curvilinear relation to others, and no relation to still others. Specifically, we predicted linear effects in that older mothers would feel more competent and attribute their parenting successes and failures to themselves more on the argument that, being more mature, older mothers would recognize and assume more parenting responsibility. Based on previous research, we predicted that older mothers would also speak more and show greater

sensitivity to their children. However, we hypothesized that, perhaps having waited so long, older mothers might be more likely to openly express affection toward their children. We predicted curvilinear effects in that mothers' parenting knowledge would increase during adolescence and young adulthood, but eventually level off.

Finally, we predicted that mothers of all ages would be similarly invested in their parenting and report that they play with their children socially at equivalent levels, and that our observations would show that mothers of all ages engage in pretense play equivalent amounts with their toddlers.

Based on an expectation of varied underlying distributions, we tested whether a quadratic function characterized maternal age-to-cognitions and -practices better than a linear function. Chronological age by itself may be a "social address" (Bronfenbrenner & Crouter, 1983), but as all of the participants in this study were at the same developmental stage of parenthood, with the same amount of first-hand parenting experience, we availed ourselves of the opportunity to explore how age intersected with developmental stage to influence parenting cognitions and practices.

So as to unconfound age associations with parenting, potential SES, education, ethnicity, and racial differences among mothers were controlled (either statistically or by design). Further to the point of localizing effects to maternal age, we included additional covariates (e.g., maternal perinatal history, personality, intelligence, and social desirability of responding, as well as child age and language competencies). These covariates were chosen because the issues surrounding the decision to bear a child, as well as certain characteristics of the mother and child, are likely to affect parenting in ways confounded with age. Sommer et al. (1993), for example, found that adolescent mothers were less verbal, positive, and appropriate in cuing and affectional style when compared with adult mothers, although additional analysis indicated that a proportion of these differences could be explained by race, SES, IQ, and education. In addition, in this literature, children have typically been studied over a wide age range, and most studies have relied on one source methodology. To redress these shortfalls, in this study we assessed mothers with children in a narrow age range, and we used multiple measures and sources of information. The sample we recruited was also balanced with respect to child gender so that potential variation in cognitions and practices associated with maternal age in mothers with girls and mothers with boys could be examined (Fagot, 1995; Leaper, 2002).

Method

Participants

A community sample of 262 European American, monolingual English-speaking mothers of firstborn 20-month-old children provided data. Mothers averaged 31.16 years of age ($SD = 6.36$) and ranged from 15.13 to 47.26 years at the time of the study. Over ninety percent (90.84%) of mothers were married, 8.02% were single, and 1.14% were separated or divorced. Family socioeconomic status (SES; Hollingshead, 1975, *Four-Factor Index of Social Status*; see Bornstein, Hahn, Suwalsky & Haynes, 2003) varied across nearly the full range of social class with a mean of 49.66 ($SD = 13.30$, $range = 14 - 66$). In terms of

education, 19.47% of the sample completed only high school or less, 20.23% completed partial college or specialized training, 30.53% completed a standard four-year college degree, and 29.77% started or completed a graduate or professional degree. At the time of the study, 62.98% of mothers were working outside the home, and those who were working ($n = 165$) averaged 32.69 hr/wk ($SD = 13.01$). Our sample was sociodemographically heterogeneous, but we recruited an ethnically homogenous group because mothers of different ethnic, racial, and cultural groups parent differently (Bornstein, 1991; Garcia Coll & Pachter, 2002); for example, parenting attitudes toward childrearing, knowledge of child development, and perceived social support as well as family structure and social network variables vary with ethnicity (e.g., Contreras, Mangelsdorf, Rhodes, Diener, & Brunson, 1999).

At birth, 98.46% of the children were term (none of the 4 preterm or postterm children emerged as a univariate or multivariate outlier, so all were retained in analyses), and all were healthy at the time of the study. 121 children (46%) were girls. On average, children were 20.09 months of age ($SD = .22$, $range = 19.45 - 20.93$) at the time of the study. Just over ten percent (10.34%) of mothers had a second (younger) child by that time; these children averaged 3.44 months of age ($SD = 2.39$, $range = .30 - 7.85$). The analyses that follow were recomputed excluding the families that had a second child, and no differences in the findings were observed; consequently, all families were included.

Procedures

Children and their mothers were observed in the home during a 2-hr visit by one female experimenter in the following procedures: A 10-min play session with child and mother, an experimenter assessment of the child's language comprehension, mother and experimenter evaluations of the visit, an experimenter assessment of maternal verbal intelligence, and an inventory of sociodemographic information about the family. At the end of the visit, the experimenter left a set of questionnaires for the mother with instructions to complete and return by mail. The following maternal characteristics were assessed in these questionnaires: (a) perceptions of parenting, (b) reports of parenting behaviors, (c) parenting attributions, (d) parenting knowledge, (e) personality, and (f) social desirability bias.

Measures of Maternal Cognitions

Perceptions of parenting—Maternal competence, satisfaction, investment, and role balance in parenting were evaluated using a theoretically based instrument, the *Self-Perceptions of the Parental Role* (SPPR; MacPhee, Benson, & Bullock, 1986). The SPPR draws on social psychological theories of self-esteem (Harter, 1983). Each item has a pair of statements that describe contrasting endpoints of the dimension in question, thereby minimizing socially desirable responses. For example, one of the items states: "Some parents do a lot of reading about how to be a good parent. BUT Other parents don't spend much time reading about parenting." The respondent chooses the statement that describes her best, and then checks *Sort of true for me* or *Really true for me*. There are four response items, weighted 1, 2, 4, and 5 to account for the absence of a response indicating that the item was equally like and unlike the respondent. Scores for each scale were the mean of responses to the items comprising the scale. The test-retest stabilities (r) across a 21-day

interval for 53 mothers of 18-month-olds were .88, .82, .86, and .92, for competence, satisfaction, investment, and role balance, respectively, and the internal consistency reliability estimates (α) were .78, .90, .72, and .76 (see MacPhee et al., 1986). In the current sample, α s for competence, satisfaction, investment, and role balance, respectively, were .71, .76, .74, and .69.

Reports of parenting behaviors—The *Parental Style Questionnaire* (PSQ; Bornstein et al., 1996) was constructed to index variation in different domains of parenting behavior (see Bornstein, 2002). In an independent sample of 222 U.S. mothers, factor analysis of responses to questions about how they interact with their 20-month-olds suggested that the 16 items in the PSQ formed three scales: (1) social interaction; (2) didactic/material exchange; and (3) limit setting. Social interaction (sensitivity, expressions of affection, and positive responsiveness to the child) and limit setting (emphasizing rule-keeping and mannerliness in the child and firmness in disciplining) domains were used in this study. Each item was rated on a 5-point scale (*hardly at all, on occasion, sometimes, frequently, all the time*). The social interaction scale was computed as the mean of 5 items, such as “I am aware of my child’s wants and feelings.” The limit setting scale was computed as the mean of 2 items, such as “I emphasize the importance of abiding by rules and being well mannered to my child.” In a multicultural sample of 102 Argentine, French, and U.S. mothers pooled α coefficients for the two scales were .68 and .72, respectively (Bornstein et al., 1996). The α s for mothers’ ratings of their social interaction and limit setting in this study were .61 and .69, respectively.

Parenting attributions—The *Parent Attributions Questionnaire* (PAQ; MacPhee, Seybold, & Fritz, n.d.; Sirignano & Lachman, 1985) contains five causal attributions to explain successes and failures in seven parenting tasks. The causes are mothers’ ability, effort, and mood, difficulty of the task, and the child’s behavior (see Weiner et al., 1972). The seven parenting tasks are dressing, bathing, comforting, teaching, disciplining, communicating, and playing. For example, one of the items for a failure outcome asks: “When I am unable to get my child to take a bath, it is because: (a) I am not good at this, (b) This is hard to do, (c) My child makes this hard to do, (d) I haven’t tried hard enough, and (e) I’m in a bad mood.” The five causal attributions for each parenting task were rated on a scale from 1, *Not at all a reason*, to 5, *Very much a reason*, and the ratings for each cause across the seven parenting tasks were summed separately for successful and unsuccessful outcomes. Four attribution measures were computed: internal attributions of failure, external attributions of failure, internal attributions of success, and external attributions of success. The internal attributions of failure and internal attributions of success scales were computed as the mean of three subscale scores: the sums of the seven ratings attributing failures or successes to maternal ability, effort, and mood. The external attributions of failure and external attributions of success scales were computed as the mean of two subscale scores: the sums of the seven ratings attributing failures or successes to child behavior and the difficulty of the task. The α s in this study were .90 for internal attributions of failure, .80 for external attributions of failure, .88 for internal attributions of success, and .78 for external attributions of success.

Parenting knowledge—The *Knowledge of Infant Development Inventory* (KIDI; MacPhee, 1981) is comprised of 75 items used to assess mothers' knowledge of parental practices, developmental processes, health and safety guidelines, and norms. Items are all close-ended, and the response format varies by question (e.g., *agree-disagree*, multiple choice). All items include an option for *Not Sure*, but no credit is given for these responses. The KIDI was standardized on four groups: college students, mothers, developmental scientists, and pediatricians. The proportion of total items that were correct, the measure used in this study, was positively and incrementally related to the degree of practical and professional experience with children, mean r s = .62, .72, .86, and .87, for college students, mothers, developmental scientists, and pediatricians, respectively. In MacPhee's (1981) study, 2-week test-retest stabilities for mothers ($N = 58$) ranged from .90 to .92, and split-half reliabilities averaged .85. In the current sample, split-half reliability was .76.

Measures of Maternal Practices

Maternal behaviors were recorded during a 10-min session of mother-child free play during the home visit. The mother was asked to play with her child the way she typically would and to disregard the experimenter's presence insofar as possible. A set of standard, age-appropriate toys was provided; the child's own toys were not included. Mother and experimenter evaluations of the visit were used to assess that maternal behavior was representative of her usual behavior and as a check against threats to validity. On 8-point (*range* = 0 to 7) graphic rating scales, mothers rated themselves as having engaged in typical behavior ($M = 5.65$, $SD = 1.33$) and as being comfortable with being filmed ($M = 5.21$, $SD = 1.63$). The experimenter also rated the mothers as being relaxed during the observation ($M = 5.54$, $SD = 1.43$). Data obtained from play sessions that were shorter than 510 sec were omitted. If the play session lasted less than 600 sec but more than 510 sec, as it did for 14 mothers (5.34% of the sample; *range* = 521 - 590 sec), measures were prorated up to 600 sec. The play sessions were coded to obtain independent measures for the following maternal variables: (a) language to child, (b) use of demonstrations and solicitations to initiate pretense play, (c) expressions of affection, and (d) emotional availability.

Language—The first 600 sec available from videotapes after the start of free play were transcribed verbatim by professional transcribers naive to all factors in the study. Following the conventions of the Codes for the Human Analysis of Transcripts (CHAT), transcripts were then coded using the MOR and POST procedures within the Computerized Language Analysis (CLAN) program (MacWhinney, 2000). Two measures of maternal speech to child were calculated. (a) Mean length of utterance (MLU): The complexity of speech was assessed using MLU based on a count of morphemes in complete and intelligible utterances. (b) Different word roots: The vocabulary mothers used was indexed by the total number of different word roots they produced, that is a count of the number of different lexical items (ignoring inflections).

Demonstrations and solicitations of pretense play—Mothers' pretense play with their children was independently coded from videotapes in accordance with a mutually exclusive and exhaustive play category system that included four levels of pretense play derived from previous research on the progressive nature of early play (Bornstein &

O'Reilly, 1993). Scores on the four levels were summed to form measures of the frequency and duration of pretense play. Mothers could initiate pretense play through demonstrations or solicitations. In demonstrating, a mother provides her child with information about how to engage in particular activities by modeling them (e.g., pretending to feed a doll). In soliciting, a mother places the onus for play on the child by encouraging (but not modeling) specific play activities. Demonstrations were calculated as the mean of the standard scores ($M = 0$, $SD = 1$) of four measures: frequency, duration, proportion frequency, and proportion duration. Solicitations were calculated as the mean of the standard scores ($M = 0$, $SD = 1$) for two measures: frequency and proportion frequency. For maternal demonstrations, about 15% of the sample was coded by two coders for reliability, and for maternal solicitations, about 18%. Reliability of the play code was based on coder agreement on play level for each sec, as indexed by kappa (6). For behaviors that were based only on frequency counts (e.g., solicitations) intra-class correlation (two-way random, absolute agreement, average of coders *ICC*; McGraw & Wong, 1996) was used as the reliability index. Average 6 for maternal pretense demonstrations was .79, and average *ICC* for maternal pretense solicitations was .92.

Expressions of affection—Mothers' interactions with their children were also independently coded from the free-play videotapes for three types of expression of affection: (a) social play, (b) praise/endearaments, and (c) physical affection. Social play was defined as physical and/or verbal behaviors directed toward the child to amuse the child. Praise/endearaments consisted of verbal expressions of warmth and approval. Affectionate physical gestures consisted of tactile behaviors manifestly intended to convey warmth and sensitivity. Social play, praise/endearaments, and physical affection were measured as frequency counts of each behavior. About 18% of the sample was coded by two coders for reliability: *ICC* for social play was .86, for praise/endearaments .93, and for physical affection .66.

Emotional availability—The third edition of the *Emotional Availability Scales* (EAS; Biringen, Robinson, & Emde, 1998) was used to assess independently two measures of maternal emotional availability, Sensitivity and Structuring, from the videotaped mother-child play interactions. Maternal Sensitivity assesses the parent's contingent responsiveness to child communications, appropriate affectivity, acceptance, flexibility, clarity of perceptions, affect regulation, conflict resolution, and variety and creativity displayed toward the child; scores range from 1 (*highly insensitive*) to 9 (*highly sensitive*). Maternal Structuring assesses the degree to which the mother appropriately facilitates, scaffolds, or organizes her child's exploration or routines by providing rules, regulations, and a supportive framework for interaction without compromising the child's autonomy; scores range from 1 (*non-optimal*) to 5 (*optimal*). Thirty-one randomly selected videotapes (11.83% of the sample) were double coded by trained reliable coders, and their agreement (*ICC*) was .90 for Sensitivity and .83 for Structuring.

Potential Covariates

To isolate associations with maternal age, we asked mothers to provide basic demographic information about family socioeconomic status, their pregnancy and childbirth, personality,

intelligence, and social desirability of responding. As well, we collected data on child language.

Family socioeconomic status—The Hollingshead (1975) *Four-Factor Index of Social Status* is scored based on the education and occupation of each employed person in a household. Occupation is graded on a 9-point scale; education is based on the number of years of school achievement and is scored on a 7-point scale. The sum of the education and occupation scale scores multiplied by factor weights results in a score ranging from 8 to 66. For families with more than one householder, individual scores are averaged to obtain a single family Hollingshead Index.

Maternal perinatal history—As part of a demographic questionnaire, mothers were asked to indicate whether they had planned the pregnancy, attended a childbirth class, experienced fertility problems (i.e., delayed conception), or had lost one or more pregnancies prior to the birth of this child. The frequency of prenatal care (5-point scale ranging from *never* to *once/month or more often*) and the method of delivery (vaginal vs. caesarean section) were also assessed. These variables are often associated with maternal age at childbirth (Fretts, Schmittiel, McLean, Usher, & Goldman, 1995) and could impact maternal parenting cognitions and practices.

Maternal personality—Eleven of the 16 subscales of the *Jackson Personality Inventory* (JPI; Jackson, 1976) were self-administered. Following the factor solutions reported for 8 independent samples (N s = 86 to 740) that confirmed the Five-Factor structure of personality in the JPI (Jackson, 1976; Paunonen & Jackson, 1996), three principal components and two JPI subscales were used as measures of the five personality dimensions in mothers. In the current sample, one principal component, Openness, accounted for 76.6% of the variance in two subscales (breadth of interest and innovation) with unrotated loadings on those subscales of .77 and .77, respectively; a second principal component, Neuroticism, accounted for 52.2% of the variance in three subscales (interpersonal affect, anxiety, and conformity) with unrotated loadings on those subscales of .68, .78, and .70, respectively; and a third principal component, Extraversion, accounted for 63.8% of the variance in two subscales (social participation and self-esteem) with unrotated loadings on those subscales of .80 and .80, respectively. The subscale, organization, was used as a single indicator of Conscientiousness, and the subscale, responsibility, was used as a single indicator of Trustworthiness.

Maternal verbal intelligence—Mothers were administered the *Peabody Picture Vocabulary Test-Revised* (PPVT-R Form L; Dunn & Dunn, 1981). Up to 175 vocabulary words were presented verbally by a trained administrator, and for each word presented the mother chose one of four pictures to indicate the meaning of the word. Standard scores with a possible range of 40 to 160 ($M = 100$, $SD = 15$) were obtained based on the mothers' age. The median split-half reliability coefficient for 828 adults ranging from 19 to 40 years was .82.

Maternal social desirability—The *Social Desirability Scale* (SDS; Crowne & Marlowe, 1960) uses 33 items to assess adults' tendency to respond to questions in a socially desirable

fashion. Questions like, “I have never intensely disliked anyone.”, are rated as *True* or *False*. Crowne and Marlowe (1960) reported that test-retest reliability for the SDS was .89. The SDS was used as a control on all maternal reports.

Child language comprehension—An experimenter administered the Verbal Comprehension Scale ‘A’ of the *Reynell Developmental Language Scales–Second Revision* (RDLS; Reynell & Gruber, 1990). In the Verbal Comprehension Scale, the child is asked to demonstrate understanding of increasingly difficult verbal expressions from labeled familiar objects through to assimilating higher-order verbal concepts. The split-half reliability coefficient for the Verbal Comprehension ‘A’ Scale is .91 for 18- to 23-month-old children (Reynell & Gruber, 1990).

Child language production—Children’s MLU and number of different word roots were derived from transcripts of the mother-child free-play session in exactly the same way as for mothers.

Analytic Plan

First, regressions were performed on the full sample to determine the shape (linear vs. curvilinear) of relations between maternal age at the time of the home observation and maternal cognitions and practices. Second, for variables that were significantly associated with maternal age at the zero-order level, we performed a family of spline regression analyses to determine if and where on the maternal age continuum the distribution changed slope. Third, based on the results of the spline analysis, correlation analyses were performed on younger mothers and older mothers to clarify relations observed in the full sample. Fourth, relations of maternal age with parenting cognitions and practices were re-evaluated controlling for covariates in regression analyses.

Results

Preliminary Analyses and Covariates

Prior to data analysis, maternal cognitions and practices were evaluated for missing data. In the sample of 262 mothers, 1.86% of the total data points were missing completely at random (Little’s MCAR test: $\chi^2(557) = 594.26, p = .13$); missing data points were imputed using the Expectation-Maximization algorithm (Dempster, Laird, & Rubin, 1977). Univariate and multivariate distributions of the dependent variables and potential covariates were examined for normalcy, homogeneity of variance, outliers, and influential cases; transformations were applied to resolve problems of nonnormalcy (see Fox, 1997; Tabachnick & Fidell, 1996); residuals were examined for influential points in preliminary regressions of each measure on maternal age; and the distance of each case to the centroid was evaluated to screen for multidimensional outliers (Bollen, 1987).

The frequencies of social play, praise, and physical affection were not normally distributed. Instead, because they are counted behaviors, they naturally correspond to Poisson distributions. The EA Sensitivity and Structuring scales are intended to capture a continuous latent construct, but they are operationally defined as ordinal scales; behaviors were coded in

half-point intervals, but the distance between each interval was not construed to be equal (Agresti, 1996). In addition, preliminary inspection of the data revealed that Sensitivity and Structuring were not normally or continuously distributed. Therefore, when examining relations between maternal age and these variables, Spearman's rho was used in lieu of Pearson's correlation, and ordinal or Poisson regression was used in place of linear regression.

The remainder of the cognitions and practices were continuously distributed, but six maternal cognitions and one practice required transformations to normalize their distributions. To remove the effect of the mothers' social desirability bias, residuals were computed for perceptions of competence and role balance, reports of limit setting, internal attributions of failure, and Neuroticism and Trustworthiness. Analyses were conducted on the transformed data; for clarity, descriptive statistics (see Table 1) and figures are presented in the variables' original metrics.

Potential covariates included family SES; maternal prenatal and perinatal history, personality (Openness, Neuroticism, Extraversion, Conscientiousness, and Trustworthiness), verbal intelligence, and social desirability as well as child age and language comprehension and production. As expected, maternal age was correlated with family SES, $r = .66, p < .001$, and maternal verbal intelligence, $r = .53, p < .001$. In controlling for these variables, we did not want to remove the variance associated with maternal age that was due to a natural confound (e.g., younger mothers did not have an opportunity to complete their education, thereby reducing their ability to acquire high-yielding employment and higher verbal intelligence scores). Therefore, both family SES and maternal verbal intelligence were residualized for their association with maternal age, resulting in age-adjusted scores.

In the analyses that follow, we controlled for potential covariates that were significantly associated with the outcome variable and shared at least 5% of its variance (given our sample size, if we controlled each variable that was statistically significant, we might partial variables that accounted for a mere 1% of the variance; we were only interested in controlling for variables that were practically important as well as conceptually compelling). The number of significant relations of parenting cognitions and practices with covariates precludes detailed report. However, 10 correlations in the full sample met the covariate criteria, and the range of correlations with covariates was $|r| = .23 - .30, ps < .001$. In younger mothers, 30 correlations met covariate criteria, range $|r| = .24 - .37, ps < .001$, and in older mothers, 9 correlations met covariate criteria, range $|r| = .23 - .27, ps < .001$.

Linear versus Quadratic Relations Between Maternal Age and Maternal Cognitions and Practices

First, we tested whether maternal age was linearly or quadratically related to parenting cognitions and practices. This test was necessary to determine the appropriate method of analysis. In only two cases did the quadratic function explain additional variance in the model over the linear function: SPPR satisfaction, $\beta = -.18, F(1, 259) = 9.42, p < .01$, and parenting knowledge, $\beta = -.27, F(1, 259) = 25.74, p < .001$. However, examination of scatter plots with lowess smoothers at .50 tension between maternal age and all cognitions and practices showed that, when a relation emerged with maternal age, there was generally a

clear linear relation up to a certain age, and after that the trend line flattened (these scatterplots were repeated using cognitions and practices that had been residualized for significant covariates, and the pattern remained apparent). Figure 2 shows an example of a positive linear relation with maternal age; Figure 3 shows an example of a positive relation with maternal age in mothers under 30 years, but no relation with maternal age in mothers over 30; and Figure 4 shows an example of no relation to maternal age.

As no strictly curvilinear patterns emerged (i.e., there were no downward trends at the upper end of the age distributions) and no other nonlinear trends were apparent, we performed a family of spline regressions (Marsh & Cormier, 2002) to determine the point on the maternal age continuum when the slopes changed (i.e., locations of “knots” in pairs of regression lines). Spline regression does not assume a curvilinear pattern (e.g., a 1-shaped distribution), but instead allows for different linear trend lines in segments of the sample. For each variable that was significantly associated with maternal age, the location of a single knot was estimated using nonlinear least squares regression. The knots were estimated at an average age of 28.28 years ($SD = 3.19$) with a range of 23.14 to 35.78 years (as a point of reference, the corresponding average knot age at the birth of the child is approximately $M = 26.61$, $SD = 3.19$). Due to the range of knot locations, sample size considerations, and visual inspection of the plots, we split the sample into mothers under 30 years of age and mothers 30 years of age or older to clarify relations observed in the full sample (M_{age} at the child’s birth = 28.33). Although the range of estimated knot ages appears broad (i.e., a 12-year knot range in a possible range of 32 years), using age 30 as the cut-point is unlikely to alter the findings related to the underlying distributions given the sample size in this study. Furthermore, choosing the age of 30 as the cut-point for splitting the sample is not meant to imply that there is a developmental shift at this exact age. We only wish to demonstrate that, with adequate group sizes, relations between maternal age and parenting cognitions and practices differ in younger and older first-time mothers of toddlers.

Relations Between Maternal Age and Maternal Parenting Cognitions

Table 2 presents the linear correlation coefficients for maternal age in relation to cognitions in the full sample, and in younger and older first-time mothers. In the full sample ($n = 262$), maternal age was related to greater self-perceived parenting satisfaction, less limit setting, greater internal and external attributions of failure and internal attributions of success, and greater parenting knowledge. In younger mothers ($n = 98$), the pattern of relations was identical to the full sample, except that maternal age was also related to parenting competence. In older mothers ($n = 164$), maternal age was only associated with parenting satisfaction. The correlations for younger mothers were significantly stronger than those for older mothers for parenting satisfaction, $z = 2.31$, $p < .05$, limit setting, $z = -1.81$, $p < .05$, and knowledge, $z = 5.47$, $p < .001$ (see bolded coefficients in Table 2). Correlations were examined separately for mothers of girls and boys; all correlations were similar except that in the full sample and in younger mothers, maternal age was more strongly related to competence and satisfaction in mothers of girls than mothers of boys, $z_s = 2.25$ and 2.54 , $p_s < .05$.

Correlations predicting cognitions from maternal age alone were followed with regression analyses controlling for conceptually and statistically significant covariates. Table 2 displays the standardized beta coefficients for maternal age after controlling for covariates. All relations remained significant when controlling for covariates with one exception: Younger mothers' age was no longer significantly associated with internal attributions of success, $\beta = .15$, $F(1, 94) = 2.22$, *ns*, $r_{\text{part}}^2 = .02$, when controlling for Openness, age-adjusted maternal verbal intelligence, and child MLU.

Relations Between Maternal Age and Maternal Parenting Practices

Table 2 also presents the correlation coefficients (or Spearman's rhos) for maternal age in relation to parenting practices in the full sample, and in younger and older first-time mothers. In the full sample ($n = 262$), maternal age was related to speaking in a longer MLU, using more different word roots in speech, and displaying more praise and physical affection. In younger mothers ($n = 98$), the pattern of relations was identical to the full sample, except that maternal age was not related to praise and was related to EA Sensitivity and Structuring. In older mothers ($n = 164$), maternal age was only associated with using more different word roots in speech. The correlations for younger mothers were significantly higher than those for older mothers for MLU, $z = 1.80$, $p = .05$, and word roots, $z = 1.78$, $p = .05$, and Spearman's rho was significantly higher for younger than older mothers for EA Sensitivity, $z = 3.20$, $p = .001$, and Structuring, $z = 2.65$, $p = .01$ (see bolded coefficients in Table 2). Correlation coefficients and Spearman's rhos were examined separately for mothers of girls and boys; all were similar.

Regression analyses predicting practices from maternal age alone were followed with regression analyses controlling for conceptually and statistically significant covariates. Table 2 displays the standardized beta coefficients for maternal age after controlling for covariates. All relations remained significant when controlling for covariates.

Discussion

Because the demographics of age at first parturition for an increasing proportion of the population are changing, current demographics make maternal age a rather basic consideration in studies of contemporary parenting, child development, and family process; yet too little is understood about age effects in mothers, children, and families. Conventional wisdom supposes that younger mothers are more energetic and, perhaps, impulsive, and older mothers are more patient and knowledgeable, but there is not a wealth of empirical support for either commonplace supposition or for the parenting or family-level implications of how maternal chronological age per se might manifest itself in parenting cognitions and practices. It is also unclear what effects demographic trends in age have on parenting apart from commonly confounding effects of socioeconomic status and education, for example. Investigators who have devoted time and effort to this topic have adopted varying methods and varying measures with varying samples, producing unsystematic, contradictory, and often confounded results. Samples and designs in this field vary in terms of key demographic and dependent variables (race, ethnicity, family intactness, and child age on the one hand, and on the other belief perceptions versus behavioral interactions). As the number

of very young mothers remains large, and as it is increasingly common for older adult women to become mothers, studying parenting across the age continuum becomes increasingly consequential because of the insights such study potentially yields not only about parenting, child development, and family science, but also for obstetrics and pediatrics and for education and social policy.

We found evidence for all three possible theoretical relations between maternal age and parenting in mothers of toddlers (Figure 1). Controlling for a wide range of child, maternal, and family characteristics had little effect on those variables that were significantly correlated with maternal age. The data we report here show that, in a large sample of women giving birth for the first time in their teens, 20s, 30s, and 40s, maternal age was unsystematically related to about one-half of the representative cognitions and practices we assessed. Therefore, a large number of parenting cognitions and practices in mothers of all ages do not differ. Apparently, investment and balance in parenting, social interaction, and attributing parenting successes to external factors are age-independent parenting cognitions, as engaging in pretense and social play with toddlers are age-independent parenting practices. These findings support and extend our predictions, and the fact that so many cognitions and practices of parents are independent of age points to some strong perhaps universal aspects of parenting. Many parenting cognitions and practices may be automatic, unconscious, or intuitive (Bugental & Goodnow, 1998; Kuczynski, 1984; Papoušek & Papoušek, 2002) and not subject to modification with age. The results for these functions are also consistent with a trait conceptualization of parenting (Holden, 1997).

Maternal age was also monotonically related to about one-quarter of cognitions and practices in the full sample (i.e., slopes were not significantly different in the younger and older samples), including stronger internal and external attributions for parenting failures as well as stronger internal attributions of parenting successes, and exhibiting more praise and physical affection toward toddlers.

When we split the full sample into mothers younger than 30 years of age and 30 years of age or older (the point at which most trend lines became flat) to clarify apparent nonlinear relations observed in the full sample, we found that several variables exhibited significantly stronger relations in younger mothers than in older mothers. This two-phase pattern held for parenting satisfaction, limit setting, knowledge, mean length of utterance and word roots, and Sensitivity and Structuring. Furthermore, all variables that were associated with maternal age in the full sample showed this same trend of stronger relations in younger than older mothers (although this difference was significant only for the above-mentioned variables).

These findings articulate with other reports in the extant literature: Significant differences have previously been reported between adolescent and adult mothers in terms of knowledge of child development and parenting (e.g., MacPhee, 1981; Ruchala & James, 1997); speech to children (Culp, Osofsky, & O'Brien, 1996; Rowe, Pan, & Ayoub, 2005); affectionate responsiveness to children (Contreras, Narang, Ikhlas, & Teichman, 2002; Jones et al., 1980); and stimulation (Roosa, Fitzgerald, & Carson, 1982). However, our results do not split the age continuum uniformly or arbitrarily, although they show an identifiable break

point for some parenting variables. Ragozin et al. (1982) observed that, when other demographic factors and psychosocial variables were controlled, increased maternal age was significantly related to greater satisfaction with parenting, to greater time commitment to that role, and to more optimal observed parenting behavior. Similarly, Shapiro and Mangelsdorf (1994), who studied adolescent mothers ranging in age from 15 to 20 years of age, found support from the baby's father was positively associated with self-esteem and maternal efficacy, and negatively associated with life stress. Our data confirm that "young mothers" are not a homogeneous category but in fact a heterogeneous group. Continuous linear age effects argue against the popular belief that adolescence, for example, represents a monolithic category of childbearing or -rearing risk.

Although the exact age inflection varied somewhat with specific cognitions or practices in the fashion of a *décalage* (knot locations for the cognitions and practices we measured ranged over several years), for parenting cognitions and practices that are age sensitive, we deduce a two-phase model of parental development: A linear phase of growth with age to about 30 years, followed by a static phase of continuity, or constancy, after about 30 years. That is, for many parenting cognitions or practices that are subject to change with age, increasing age appears at first associated with linear growth and later with steady state parenting. Several explanations, independently or in combination, might account for this pattern of association between maternal age and parenting cognitions and practices. First, it could be that this association reflects the immaturity or inexperience of teenage and twenty-something mothers themselves or, second, similar social and behavioral limitations of their partners or, third, diminished family supports arising from the fact that younger parents have fewer economic resources and are exposed to greater life stresses than older parents.

Many characteristics of the individual change during the second and third decades of the life span, including self-concept, identity, locus of control, and self-esteem (Arnett, 2004); moreover, in the same period individuals normally amass multiple kinds of capital. So, for example, adolescents and emerging adults face the challenges of solidifying their sense of identity (Hauser, 1991; Hauser & Bowlds, 1990) and developing autonomy and independence (Chase-Lansdale, Wakschlag, & Brooks-Gunn, 1995; Feldman & Elliott, 1990; Wakschlag, Chase-Lansdale, & Brooks-Gunn, 1996). Women who time the birth of their first child in their teens and early twenties take on the role of parent well before the resolution of their own separation/individuation that occurs during late adolescence and early adulthood (Arnett, 2004; Daniels & Weingarten, 1982). Just how supports and resources available to the adolescent's own development (e.g., peer relationships, childcare assistance) facilitate or inhibit development as a parent merits attention. Parenthood, with its unrelenting demands and responsibilities, might leave little time or capacity for exploration and appropriate individuation in these areas of normative adolescent concern or others, such as peer relationships, school, and career choice.

We found that most nonlinear age functions showed an inflection at around 30 years of age. Thirty years may not be special, but regardless of the somewhat varied estimates of the knot ages, nonlinear patterns of relations changed around this age, and so 30 years might constitute a guideline for examining change in the underlying distribution. Walter (1986, 1989) argued from the perspective of adult developmental theory that, during their early

twenties, adults shift their “center of gravity” from their family of origin to their own home base, and then during their thirties adults develop roots and settle down (Gould, 1978; Levinson, Darrow, Klein, Levinson, & McKee, 1978; Roberts & Newton, 1987). Costa and McCrae (1988; McCrae & Costa, 1994) have contended that personality traits tend to stabilize at age 30, and although there is not universal agreement that all traits do, Roberts et al. (2006) reported on the basis of a meta-analysis of 92 samples that all of the Big Five personality factors, *viz.*, Extraversion (Social Vitality and Social Dominance), Agreeableness, Conscientiousness, Emotional Stability, and Openness, stabilize in the 30-50 year age range. Perhaps diverse features of parenting settle once certain personality and cognitive functions mature (see also Block, 1971).

The participants in this study were unique in the sense that they varied widely in age, but were alike in terms of developmental stage (all had firstborn children of 20 months). In general, new parents are thought to be more aware of the needs of others, and they are beginning to establish a more coherent self in their different roles. For example, Flick (1985) found, in a sample of young mothers ranging from 15 to 20 years in age, that level of parental awareness increased with age. For new parents achieving such a balance may take months or even years. We see parents’ conceptions of the parental role as representing part of the structure of parenthood, and the phases we defined offer a blueprint of idealized normal development. These phases refer to patterns of thought and activity that define how an individual (here, a parent) makes sense out of her (or his) experiences and organizes her (or his) responses to them. Perhaps this phase theory of parent development will ultimately lead to a more comprehensive understanding of the complexities of parenting (Demick, 2002).

Our study contributes to the developmental literature in a variety of ways, but is also limited in some important senses. On the one hand, the sample was not fully representative, and the generalizability of our findings is circumscribed to European American first-time married mothers of healthy 2-year-olds. We also held parity constant; that is, all participants were mothers with firstborns. The fact that we adopted a cross-sectional approach (a longitudinal design is essentially prohibited in this domain of study – no one can become a first-time parent at more than one age) means that we did not study life-span change directly, but must infer it from differences we observed across age. The “developmental function” defines the form of a relation between the chronological age of an individual and the level observed in some specified cognition or practice over the course of development. We assume that corresponding functions for different individuals have some overall communality and that we have defined modal functions characteristic of mothers. In other words, had a 20-year-old mother in our sample delayed parenthood for 20 years, we would expect her cognitions and practices to resemble 40-year-old mothers in our sample. Although we controlled a variety of person and social characteristics, the resultant developmental function still obtained. Furthermore, we expect that the cognitions and practices we studied do not cause adolescent or adult parenthood, so we take the causal order of our assumptions as reasonable (Mirowsky, 2002).

These limitations notwithstanding, our study incorporated several features that recommend it. First, older mothers are often better educated and of higher SES than younger mothers

(Baldwin & Cain, 1981; Elster, McAnarney, & Lamb, 1983; Luster & Dubow, 1990), as we found here; consequently, the possible associations between maternal age *per se* and parenting cognitions and practices need routinely to be separated from the possible influences of various related sociodemographics. In this study, we did so. In our analyses, we also took into consideration other possible confounding factors like maternal perinatal history, parity, personality, verbal intelligence, and social desirability, as well as child age and competencies. The extant literature on maternal age effects is problematic due to failures to exercise these kinds of controls, as well as sampling differences, and interest in an *ad hoc* diversity of dependent variables. Furthermore, the majority of studies addressing maternal age has compared (usually dichotomously) the parenting cognitions or practices of “adolescent” mothers to those of “adult” mothers. Dichotomizing a variable in analysis discards important information, deleteriously affects the power to detect an effect, and can negatively impact the findings of the analysis (Cohen, 1988; MacCallum, Zhang, Preacher, & Rucker, 2002). The adolescent-adult dichotomization at a particular age is also usually *ad hoc* and made *a priori*. Beyond accounting for extraneous factors, in this study we defined and controlled the sample, and we examined a range of age-appropriate dependent measures all in the same mothers. As the demographic age trend of first-time parenthood is increasing (Martin et al., 2005), studying the full and feasible age range of mothers in the same multivariate design, as we did here, is vital to gain a more complete picture of the role of chronological age in parenting.

Childrearing principles and activities evolve and change (e.g., Bronfenbrenner, 1958; French, 2002), and the cognitions and practices of older versus younger mothers at any one time may differ from those characteristic of younger and older mothers separated by just one or two generations. Because the life span generally has increased so dramatically, and because of the growth of assisted reproductive technologies, parenting at older ages is an emerging trend which merits on-going research attention. The existence of greater numbers of increasingly older parents also surely differs from our recent evolutionary past. These days, a woman may not only conceive a child at a much older age than her mother did, but at age 40 she may rear her child at least as long as a 20-year-old mother did 100 years ago (Trommsdorf & Nauck, 2006).

Maternal chronological age appears to be a pervasive factor in parenting. Overall, we found that maternal age *per se* was related to approximately one-half of the diverse maternal cognitions we assessed and to approximately one-half of the diverse maternal practices we evaluated, including all categories of parenting cognitions (perceptions, reports, attributions, and knowledge) as well as maternal language and emotional interactions. Maternal age was more strongly related to parenting cognitions and practices in younger, and less so in older, mothers, however. Thus, our findings have implications for the way maternal age is examined and how it is controlled in developmental science, especially in samples with wide ranges of maternal age and samples of mothers under 30. Our findings indicate that adolescent parenting is not a unique or monolithic categorical phase of life and also point to a possible two-phase model of parental development for cognitions and practices that are sensitive to chronological age. Finally, on a practical note, our results imply that women who delay parenthood beyond 30 years (as is increasingly common) can expect little or no continuing change in many parenting cognitions or practices.

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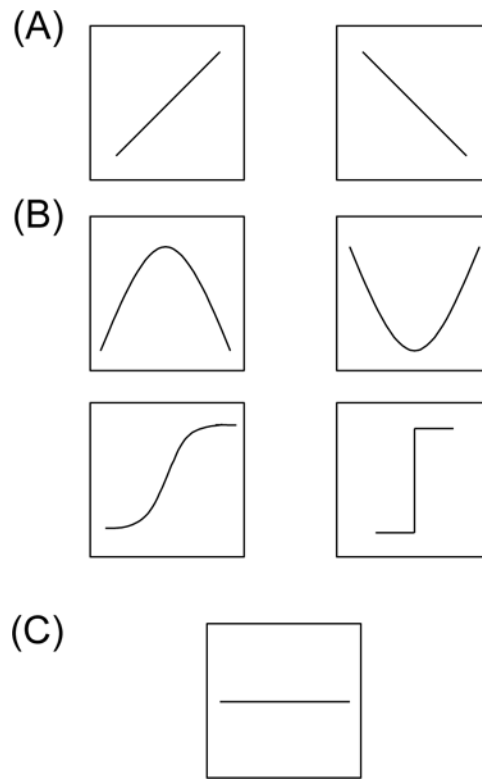


Figure 1. Some feasible theoretical relations between maternal age and a dependent variable: (A) Linear relations. (B) Nonlinear relations. (C) No relation.

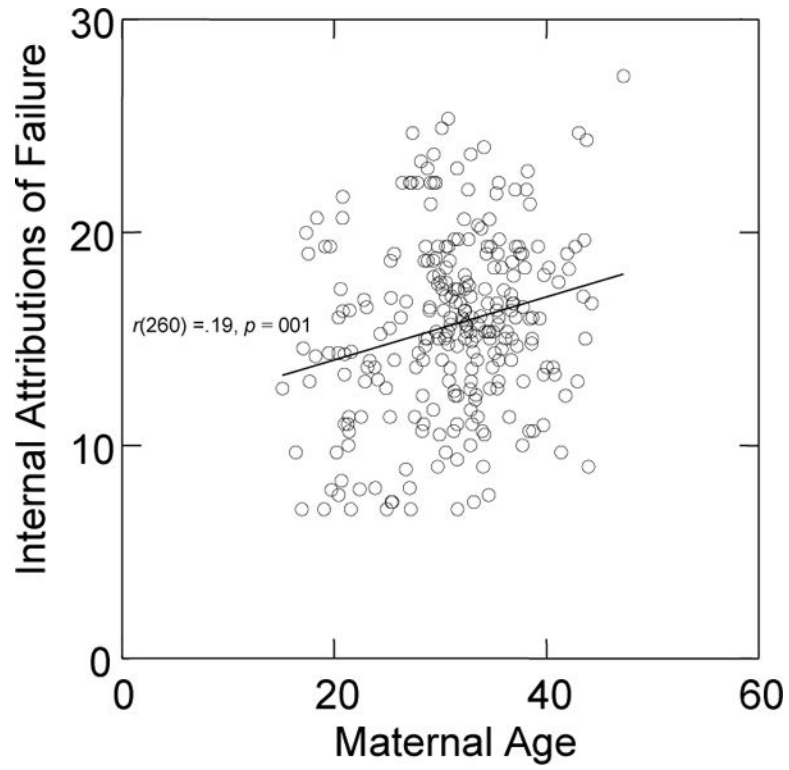


Figure 2.
Scatterplot of maternal age and internal attributions of failure with linear trend line.

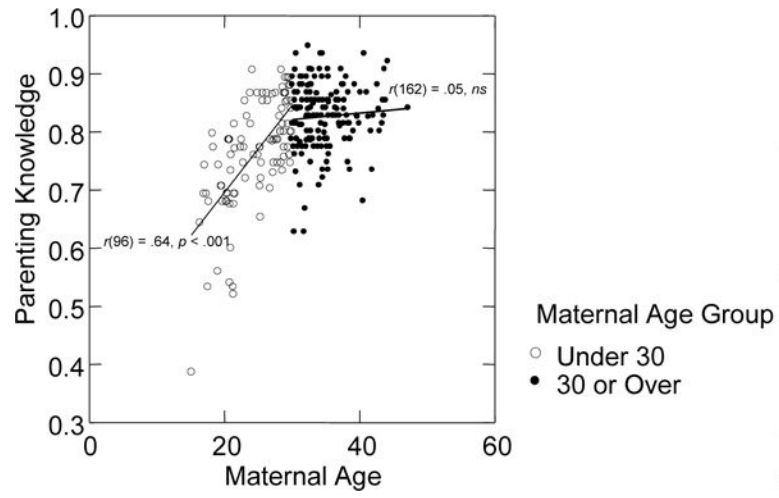


Figure 3. Scatterplot of maternal age and parenting knowledge with separate linear trend lines for mothers younger and older than 30 years.

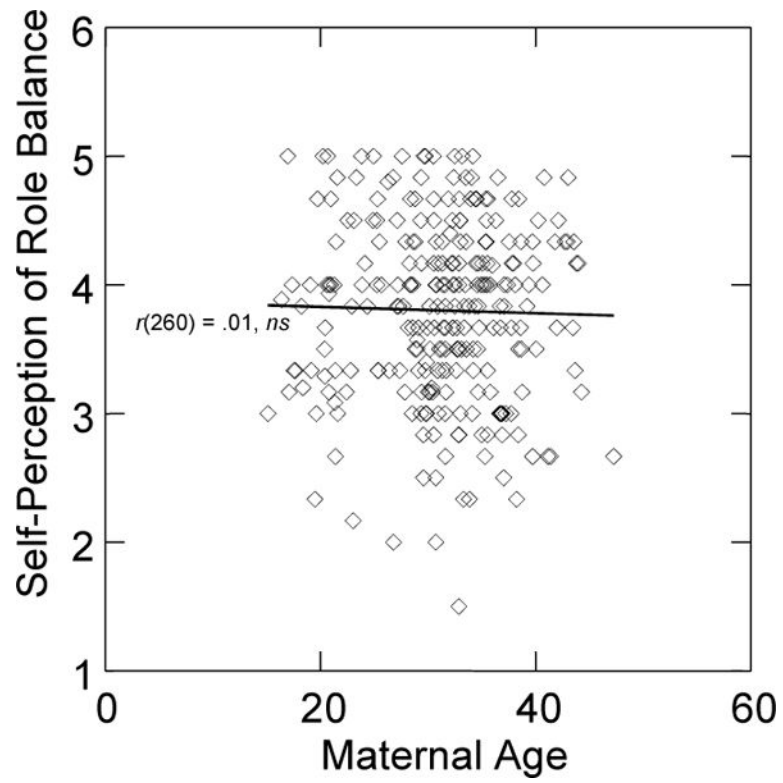


Figure 4.
Scatterplot of maternal age and parenting role balance.

Table 1

Descriptive Statistics for Maternal Cognitions and Practices (N = 262)

	M	SD	range
<i>Cognitions</i>			
SPPR Competence ^a	4.12	.58	2.17–5.00
SPPR Satisfaction	4.67	.49	1.80–5.00
SPPR Investment	3.22	.84	1.20–5.00
SPPR Role Balance ^a	3.80	.69	1.50–5.00
MSQ Social Interaction	4.46	.35	3.40–5.00
MSQ Limit Setting	3.98	.73	1.00–5.00
Internal Attributions of Failure ^a	15.66	4.18	7.00–27.33
External Attributions of Failure	19.89	3.99	8.00–30.00
Internal Attributions of Success	21.73	4.29	7.33–33.00
External Attributions of Success	25.16	3.64	9.50–35.00
Parenting Knowledge	.80	.08	.39–.95
<i>Practices</i>			
MLU in morphemes	4.14	.69	2.38–6.52
Number of Word Roots	142.20	34.33	42.00–234.00
Pretense Demonstrations ^b	.00	.86	–1.41–2.17
Frequency	4.18	2.81	.00–13.00
Duration	53.33	50.01	.00–270.00
Proportion Frequency	.40	.25	.00–1.00
Proportion Duration	.47	.31	.00–1.00
Pretense Solicitations ^b	.00	.86	–1.91–3.88
Frequency	13.33	9.79	.00–80.00
Proportion Frequency	.62	.25	.00–1.00
Social Play	.98	1.65	.00–11.00
Praise	2.24	2.85	.00–18.00
Physical Affection	.93	1.54	.00–10.00
EA Sensitivity	7.23	1.24	3.00–9.00
EA Structuring	4.32	.72	2.00–5.00
<i>Covariates</i>			
Family socioeconomic status	49.66	13.30	14.00–66.00
Planned pregnancy (% planned)	65.36%		
Childbirth class (% who took a class)	90.48%		
Fertility Problems (% with problems)	25.79%		
Prenatal Care (% getting regular care)	99.13%		
Delivery Method (% vaginal)	73.56%		
Openness	.00	1.00	–2.42–2.01
Neuroticism ^a	.00	1.00	–2.73–2.32
Extraversion	.00	1.00	–2.57–2.24

	M	SD	range
Conscientiousness	54.37	9.83	22.00–72.00
Trustworthiness ^a	56.32	7.50	31.00–71.00
Verbal intelligence	107.83	17.03	60.00–159.00
Social Desirability	16.77	5.07	4.00–33.00
Child Reynell Comprehension	105.47	19.81	64.00–136.00
Child Mean length of utterance (MLU)	1.35	.32	0.00–2.88
Child Number of different word roots	22.08	14.97	0.00–84.00

Note.

^aResidualized for socially desirable response pattern.

^bMean standard aggregate (z-score).

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Table 2

Zero-order Correlations and Beta Coefficients for Maternal Age with Cognitions and Practices in the Full Sample, in Mothers under 30 Years, and in Mothers 30 Years or Older

Variables	Mother Age r/β		
	Full Sample ($N = 262$)	Under 30 years ($n = 98$)	30 years or Older ($n = 164$)
<i>Cognitions</i>			
Competence	.02	.20*	.07
Satisfaction	.38***/.33*** ^b	.43*** /.26* ^e	.16*
Investment	.10	.14	.10
Role Balance	.01	.08	.04
Social Interaction	.05	-.04	.03
Limit Setting	-.19***	-.24** /.22* ^f	-.00
Internal Attributions of Failure	.19***	.29**/.18* ^b	.09
External Attributions of Failure	.24***	.19*	-.01
Internal Attributions of Success	.08	.22*/.13 ^g	.08
External Attributions of Success	.08	.09	.02
Parenting Knowledge	.47***/.39*** ^c	.64*** /.55*** ^h	.05
<i>Practices</i>			
MLU in morphemes	.29***/.26*** ^d	.34*** /.30*** ⁱ	.12
Word Roots	.35***/.31*** ^d	.39*** /.23* ^j	.18* /.20*** ^k
Pretense Demonstrations	-.04	.17	-.05
Pretense Solicitations	-.03	.15	-.02
Social Play ^a	.00	.09	.10
Praise ^a	.16**	.14	.11
Physical Affection ^a	.19***	.21*	.13
Sensitivity ^a	.03	.35***	-.06
Structuring ^a	-.01	.33***	.01

Note. Zero-order correlations are presented before the slash, and standardized beta coefficients for maternal age, controlling for covariates are presented after the slash. All tests were one-tailed. Bolded coefficients were significantly stronger in younger than older mothers.

^aStatistics presented are Spearman's rho.

^bStandardized beta for maternal age, controlling for maternal Openness.

^cStandardized beta for maternal age, controlling for maternal Openness, age-adjusted verbal intelligence, whether the pregnancy was planned and whether the mother attended a childbirth class.

^dStandardized beta for maternal age, controlling for child language comprehension.

^eStandardized beta for maternal age, controlling for maternal Openness and Trustworthiness and whether the pregnancy was planned.

^fStandardized beta for maternal age, controlling for the number of word roots produced by the child.

^gStandardized beta for maternal age, controlling for maternal Openness, age-adjusted verbal intelligence, and child MLU.

h Standardized beta for maternal age, controlling for age-adjusted socioeconomic status, age-adjusted verbal intelligence, maternal Openness and Trustworthiness, whether the pregnancy was planned and whether the mother attended a childbirth class.

i Standardized beta for maternal age, controlling for age-adjusted socioeconomic status, age-adjusted verbal intelligence, and the number of word roots produced by the child.

j Standardized beta for maternal age, controlling for age-adjusted socioeconomic status, maternal Openness and Trustworthiness, and child language comprehension.

k Standardized beta for maternal age, controlling for child language comprehension and the number of word roots produced by the child.

*
 p .05.

**
 p .01.

 p .001.