

One Mate or Two? Life History Traits and Reproductive Variation in Low-Income Women

Jennifer Byrd-Craven, David C. Geary, Jacob M. Vigil, and Mary K. Hoard
University of Missouri – Columbia

We contrasted the long-term mate preferences, reported developmental experiences, life history traits, and current personal traits of low-income women who reproduced with a single man ($n = 222$), two or more men ($n = 145$), or had not yet reproduced ($n = 106$). The mate preferences of the three groups were more similar than different, suggesting that group differences in reproductive strategy may be more strongly related to developmental experiences and current circumstances than to explicit preferences for one type of reproductive partner or another. Path analytic models revealed that the only direct predictor of number of reproductive mates was age of first reproduction, which in turn was predicted by level of education and age of first sexual intercourse. Age of first intercourse, in turn, was predicted by time spent with father. The pattern suggests paternal investment influences timing of adolescent sexual activity, and timing of this activity can set in motion a long-term reproductive trajectory.

Keywords: life history, mate preferences, paternal investment, reproductive strategy.

低收入女性的生活史特质与繁衍策略的关系

本研究探讨了单一性伙伴 ($n = 222$)、两个以上性伙伴 ($n = 145$) 与无性伙伴 ($n = 106$) 三组低收入女性的长期配偶偏好、人生阅历、生活史特质与个人特征的关系。研究结果显示三组女性的配偶偏好趋于一致, 繁衍策略的组别差异与人生阅历和所处环境具有较高相关, 三组女性并不偏好特定类型的配偶。路径分析显示首次生育年龄直接预测配偶数量, 受教育水平和初次性交时间对配偶数量与首次生育年龄之间的关系具有显著调节作用; 女儿与父亲相处的时间可以预测初次性交年龄。研究结果显示父亲投资影响青少年性行为发展的时间表, 人类繁衍的长期进化是性行为变化的根源。

关键词: 生活史, 配偶选择, 父亲投资, 繁衍策略。

分类号: B84-069

Studies of human reproductive strategy have disproportionately been conducted with young, well-educated adults who have not yet reproduced. These individuals nonetheless implicitly or explicitly express preferences in terms of the traits of a prospective reproductive partner (e.g., age) or in terms of the number of such partners (Buss, Larsen, Westen & Semmelroth, 1992; Cunningham, 1986; Kenrick, Groth, Trost & Sadalla, 1993; Hatfield & Sprecher, 1995; Li Bailey, Kenrick & Linsenmeier, 2002). Many women in these studies, and as reflected in related literatures (Whissel, 1996), express a preference for monogamous marriage to a physically attractive and high resource-holding man who invests heavily in the woman and her children (Geary, Vigil, & Byrd-Craven, 2004). In terms of evolutionary logic, this may indeed be an optimal strategy for many women. As in other species, however, such an optimum will not typically be achievable due to

intrasexual competition and intersexual choice (Anderson, 1994), and the optimum may differ across social or ecological context (Alberts & Altmann, 1995; Ergon, Lambin, & Stenseth, 2001), life history stage (Le Boeuf, 1974), developmental experience (Belsky, Steinberg, & Draper, 1991; Draper & Harpending, 1982), or may differ for alternative phenotypes (Figueredo Vasquez, Brumbach, Schneider, Sefcek, & Tal et al., 2006; Gross, 1985).

Lancaster (1989) provided preliminary evidence that in impoverished ecologies many women gain more resources for themselves and their children through a series of relationships with low-status men than through monogamous marriage to one of these men. In other contexts, women and their children may be better off (e.g., lower mortality of children) if the woman maintains several sexual relationships and obtains material or social resources from each of these relationships (Beckerman, Lizarralde, Ballew, Schroeder, Fingelton, Garrison, and Smith, 1998; Hill and Hurtado, 1996). In lower SES Western contexts, there is considerable evidence that early and relatively frequent childbearing in the absence of access to resources or resource-holding men is adaptive in

Received 2006-06-30

Correspondence should be addressed to Jennifer Byrd-Craven, Department of Psychological Sciences, 210 McAlester Hall, University of Missouri, Columbia, MO 65211-2500, USA; e-mail: jbfyb@mizzou.edu.

terms of number of children born per woman, considering earlier fertility decline and shortened life expectancy in comparison to women living in higher SES contexts (Burton, 1993; Geronimus, 1987; Geronimus, 1992, 1996a; Luker, 1996). Although in modern contexts number of children may not be the sole indicator of reproductive strategy given access to birth control, there are clear differences between lower and upper class women in terms of number of children born per woman and use of birth control. As such, the number of overall children produced is one concrete observable outcome of reproductive strategy that shows intrasexual variation, even given access to birth control methods.

Further, reliance on extended kin networks for primary support rather than reliance on men who may not have the ability and/or willingness to contribute long-term to childrearing is characteristic of many low SES contexts (Burton, 1995, 1996; Geronimus, 1996b). These alternative strategies are focused on ensuring the best possible economic and reproductive security in *that* particular environment (Levine, Dixon, Levine, Richman, Leiderman, Keffer, & Brazelton, 1994). This does not mean these women do not have the same preferences as Western college women – this is a testable empirical question – but rather monogamous marriage to a man with considerable social and material resources may not be an option, or in the contexts in which these women live or have developed this may not be as strong of a preference as found in college samples.

In either case, potentially important levels of intrasexual variation in women's reproductive behavior are found, and empirical and theoretical (Gangestad & Simpson 2000) research on the potential sources of this variation have focused on contextual factors, such as local mortality (Chisholm, 1993; Chisholm, Quinlivan, Petersen, & Coall, 2005; Wilson & Daly, 1997) and developmental experiences, such as stability of parental relationships, level of parent-child conflict, and security of parent-child attachments (Belsky, Steinberg, & Draper, 1991; Bereczkei & Csanaky, 2001; Draper & Harpending, 1982; Ellis, 2004). Of course, these factors external to the family and family dynamics are intricately woven and difficult to separate, as factors such as local mortality rate affect parent behavior and therefore the developmental experiences of their children. At the same time, it is clear that heritable influences also play a role in the expression of individual differences in reproductive strategies. Fathers who are absent and mothers who begin reproducing at an early age expose their children to circumstances which, along with an inherited combination of traits (e.g., low conscientiousness), may predispose their children to do the same (Figueredo et al, 2006; Kirk, Blomberg, Duffy, Heath, Owens, & Martin, 2001; Rowe, 2000).

It seems likely that the sources of intrasexual variation in women's life history development and mate choice preferences are due to a combination of developmental experience, current circumstance, and heritable variation in related traits, but the existing literature on this topic does not allow for firm conclusions regarding the relative contributions of these factors.

In this study, we compared the mate choice preferences, developmental background, life history traits, and current circumstances of low-income women who have reproduced with one man or multiple men, and a comparison group of women who have not yet reproduced and who show educational and other traits similar to those found in college samples. These groups provide a more variable sample – in terms of background and reproductive history – than is typical in this literature and thus a unique opportunity to assess various proposals regarding the sources of individual differences in women's reproductive strategy and mate preferences. In an attempt to control for some of the likely heritable variation in women's life history development, we included participants' mother's age at first childbirth in our assessments of developmental models of reproductive strategy. Age at first childbirth is moderately heritable, is the best single predictor of lifetime fecundity in Western women, and accounts for more variance in overall reproductive fitness than factors such as education and religion (Kirk et al. 2001). It is a key life history marker, and one that almost certainly influences later reproductive options. Early childbearing enables a woman to extend her reproductive career, but comes at a cost of lower educational levels and potentially unstable pair bonds, resulting in fewer financial resources and father absence for her children (Surbey, 1990).

Developmental Theory

The model of Belsky et al. (1991; Belsky, this issue) has been particularly influential in terms of framing early experiences and their relation to later reproductive strategy (see also Draper & Harpending, 1982). The reproductive preferences often found with Western college women (e.g., monogamous marriage to a resource-holding man) are predicted to form on the basis of stable parental relationships, high maternal and paternal investment, and a secure attachment to caregivers. Divergence from this strategy is predicted to result from an unstable parental relationship (e.g., high levels of unresolved conflict), insecure attachment to caregivers, and later behavior problems, possibly resulting from stress-induced alteration of the hypothalamic-pituitary-adrenal (HPA) system (Gunnar, 1998; Lupien, King, Meaney, & McEwen, 2000; Quas, Bauer, & Boyce,

2004). The combination is associated with early menarche and precocious sexuality in adolescence (Surbey 1990; Moffit, Caspi, Belsky, & Silva, 1992). In adulthood, women with these experiences tend to reproduce early, have lower attachment to romantic partners and multiple reproductive mates, as well as bear more children and show limited investment in these children (Belsky et al, 1991; Rowe, 2000).

Recent refinements of the model have focused explicitly on the father-daughter relationship. Low conflict within the parental dyad and warmer father-daughter relationships are associated with later menarche (Ellis, McFayden-Ketchum, Dodge, Pettit & Bates, 1999) and, in adulthood, with monogamy and heavy investment in a small number of children (MacDonald, 1992). Father absence and the presence of a step-father or maternal boyfriend is associated with earlier menarche and an earlier onset of sexual behavior (Ellis et al., 1999; Ellis, 2004). Fathers seem to have an important role in their daughters' reproductive prospects, strategy, and presumably mate preferences (Perrett, Penton-Voak, Little et al, 2002). Warm father-daughter relationships may reduce the chance of early pregnancy by subjectively, though implicitly, increasing a girl's self assessed value to males, and thereby influencing long-term goals, and perceived mating options. Fathers' involvement supports the mother's parenting efforts, and often involves actively monitoring daughters' early romantic involvement (Flinn, 1988). This type of paternal investment serves to "screen" possible mates, and in combination with the resulting higher self-esteem, may be used by the daughter as a cue to her own mate value and through this influence reproductive strategy (Vigil & Geary, 2006).

Potential Developmental Pathways

The sequence of events that link early experiences to adult reproduction is not well understood. For instance, early childbearing may increase the likelihood of abandonment by the first reproductive partner, reducing the likelihood of securing a long-term high-quality mate in the future (Surbey, 1990). Early reproduction may be part of a constellation of heritable personality and reproductive traits associated with unstable relationships, a relatively large number of children, and low investment in each child (Figueredo et al, 2006). The constellation of traits may also be influenced by early experiences, such as attachment to parents (Belsky et al, 1991), that contribute to early reproduction and thus set a life course that alters later reproductive options and strategy. Of course, some combination of heritable and experiential influence is most likely.

Our sample of less affluent women provides broad variation in developmental experiences, current circumstances, and reproductive strategies and thus

may be useful in attempting to disentangle the multiple potential sources of this variation. If socially salient early experiences related to the predictability of parental investment bias women toward a multiple- or single-mate reproductive strategy (Belsky et al, 1991; Vigil & Geary, 2006), then there should be systematic differences between these groups. In particular, in comparison to women with a single reproductive mate, women who reproduce with multiple men are predicted to report less time spent with father, more conflict within the family, and more parental divorce. One or both of these groups may also differ from college samples in terms of their expressed mate choice preferences, either because of their early experiences or their current circumstances. An alternative hypothesis is that women who would otherwise pursue the type of monogamous relationship preferred by many college women are forced into a multiple-mate strategy due to intense intrasexual competition over a scarcity of relatively wealthy, high-investing men. In this situation, the reproductive behavior of these women may differ from that of college women, but their mate choice preferences will not.

Methods

Participants

The current study is based on an assessment of mating strategies in a demographically diverse sample of 623 American women (ages 18-56 years, $M = 26.9$ years, $SD = 8.5$) from communities in the U.S. Midwest ($n = 418$) and Southwest ($n = 205$). Women were recruited from various community locations, targeting low income neighborhoods. Prospective participants who appeared to be between 18 and 50 years of age were solicited to complete a survey that explored "women's relationships." The racial composition of the sub-sample was heterogeneous (36% European American, 23% African American, 30% Latin American, 1% Asian American, 4% Native American, and 2% other or bi-racial; the remaining women did not respond to this item), with a mean yearly income under \$15,000 and a modal income under \$5,000. Over 38% of the sample reported current receipt of government financial assistance (e.g., food stamps). The current analyses are focused on the subset of 367 women who reported having at least one child and a comparison group of 106 women who had not yet reproduced and who were similar, as a group, to college samples (e.g., in terms of education level). The comparison group was recruited from higher income neighborhoods, public libraries, and retail locations.

Measures

The measure was a self-report questionnaire developed to assess traits grouped into the following

categories: mate preferences, personal (e.g., age) and developmental background (e.g., parental education), family-of-origin relationships (e.g., parent/child arguments), life history traits, and current reproductive behavior (see also Vigil, Geary, & Byrd-Craven 2006).

Mate preferences. Following Li et al. (2002), participants were asked to distribute 100 points across six traits of potential long-term and short-term mates; specifically, looks, money, status, commitment, intelligence, and kindness. Participants were asked to inform the experimenter if they needed clarification regarding the meaning of any of the traits. The participants were asked to “think of people you would like to have a **long-term** relationship (example: marriage) with.” They were told that they had 100 points to “spend” on this person and that they should allocate these points across the six traits any way they liked so that the total across the traits equaled 100, and that not all traits had to receive points or one trait could receive all points. We focus on long-term and not short-term relationships, because we assume the former is more likely to tap the type of relationship associated with a preferred reproductive mate.

Developmental background. These items assessed parental socioeconomic status (SES), parental investment, and family dynamics (e.g., parent-child conflicts). Parental SES items included parent’s education, income, history of governmental financial assistance, and ownership of a home or new car. Paternal investment was measured by the amount of time spent with father [0 (never) to 4 (always) scale] during the time preceding and during the elementary school years. Time spent with father was constructed to reflect a gradient of direct paternal investment. While there are many reasons that a respondent could score low on this measure, we did not distinguish among these possibilities since, in theory, paternal investment itself, regardless of the reason for its presence or absence, results in alteration in the timing of life history traits (Ellis et al, 1999). Family conflict was similar, and was measured on 0 (never) to 4

(always) scale for the parent-parent and parent-child relationship.

Life history and reproductive development. Previous assessments of women’s self-disclosed, retrospective accounts of various life history traits (e.g., age at menarche) suggest these events are reliably and validly recalled (Must, Philips, Naumova, Blum, Harris, & Dawson-Hughes et al, 2002). In the current study, participants were asked to report age at first menarche, age at first sexual intercourse, and age at first reproduction.

Results

Four groups were initially formed and included women with one ($n = 222$), two ($n = 109$), three ($n = 32$), or four ($n = 4$) men with whom they have had children. Based on the small samples for the two latter groups, all women with multiple reproductive mates were collapsed together, resulting in a single reproductive mate group ($n = 222$) and a multiple reproductive mates group ($n = 145$). For purposes of comparison, a subset of the women who had not yet reproduced ($n = 106$) and were similar to a typical college sample (though older) formed a third group, as noted. Because reproductive outcomes (i.e., number of mates and children) and other variables (i.e., education, income) are at least partially dependent on age, the sample was further divided into three age categories: 18-23 years ($n = 142$), 24-33 years ($n = 121$), and 34 and older ($n = 73$). These age categories were expected to capture women in the early, middle, and later portion of their reproductive lifespan.

The results are presented in three sections. In the first, we describe group differences in mate preferences. Next, we describe mean group differences for variables that represent early background, developmental experience, and life history traits, and in the final section we describe path analytic models that assessed the potential sequence of developmental pathways to variation in number of reproductive mates.

Table 1 *Mate Preferences*

Group	Trait					
	Looks	Money	Status	Commitment	Intelligence	Kindness
	18-23 years					
No mate	16.3	11.6	7.8	23.7 ^a	20.3 ^a	20.4
Single mate	15.9	12.9	10.7	25.5 ^b	17.0 ^b	18.0
Multiple mates	14.6	11.1	9.2	32.1 ^c	13.6 ^c	19.3
	24-33 years					
No mate	13.2	10.1	6.4	29.9 ^a	19.9 ^a	20.5
Single mate	15.1	14.2	9.9	24.1 ^b	15.3 ^b	21.2
Multiple mates	18.0	16.1	8.3	21.4 ^c	17.6 ^c	18.6

Note: Superscripted letters indicate significant mate-group differences within an age category.

Mate Preferences

Mean values of participants’ long-term mate preferences are presented in Table 1. For these

analyses, we focused on the two younger age groups, because more than 50% of the women in the older group were currently married and thus presumably not

actively seeking a long-term reproductive mate. We used a repeated measures ANOVA with reproductive mate group (none, single, and multiple) and age group (18-23, 24-33) as between-subjects factors, and traits (looks, money, status, commitment, intelligence, and kindness) as the within-group factor. The results revealed significant effects for traits, $F(5, 220) = 40.68, p < .0001$, and a significant interaction between trait and age group, $F(20,220) = 1.60, p < .05$. Follow-up analyses of individual traits revealed no significant main effects or interactions for the traits of Looks, Money, Status, or Kindness. There was a significant interaction for the trait of Commitment, $F(4, 228) = 3.48, p < .05$. Women who were younger and had multiple reproductive mates placed higher value on commitment than did their same-aged peers. However, this trend reversed in the middle age group (24-33): Women who had not yet reproduced placed the highest value on commitment in a long-term partner, whereas women with multiple reproductive mates rated commitment significantly lower. The only other significant effect was for reproductive mate group and for the trait of Intelligence, $F(2, 228) = 6.49, p < .05$. Women who had not yet reproduced placed a higher value on Intelligence than did women in the single and multiple reproductive mates groups.

Group Differences

Due to the low number of women in the older age group who had not reproduced ($n = 8$), omnibus ANOVAs were conducted using the least squares procedure to control for unequal cell sizes. Significant effects were followed by comparisons of simple

means, also using the least squares procedure, and are shown in superscript in Tables 2-5.

Current Status and Family Background. Mean age varied across age group, as designed, and there was no significant main effect for reproductive mate group or for the interaction between age group and reproductive mate group ($ps > .05$). As shown in Table 2, there were significant differences in the percentage of currently married individuals across age group, $F(2,281) = 9.43, p < .0001$, and reproductive mate group $F(2,281) = 5.34, p < .05$, along with a trend for the interaction ($p < .10$). Follow-up comparisons revealed that older women were more likely to report being currently married than were women in the two younger age groups. Women with multiple reproductive mates were more likely than women with one or no reproductive mate to report being currently married for the younger age group but for the two older age groups women with multiple reproductive mates were less likely to be currently married than were women with one reproductive mate. For annual income, neither the main effects nor the interaction were significant ($ps > .10$). For years of education, there were significant main effects for age group, $F(2,290) = 8.51, p < .05$, and reproductive mate group, $F(2,290) = 11.89, p < .0001$, as well as an interaction, $F(4,290) = 3.67, p < .05$. Follow-up comparisons revealed that the lowest levels of education were found for the youngest women with one or multiple reproductive mates, and the highest for women in the middle age group (i.e., 24-33) with no reproductive mate.

Table 2 Demographic Variables

Group	Age		Currently Married		Income		Education	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
			18-23 years					
No mate	19.5	1.6	4% ^a	0.2	15,000	1.8	12.7 ^a	1.8
Single mate	20.8	1.8	17% ^a	0.4	10,000	1.2	10.8 ^b	1.3
Multiple mates	21.6	1.7	30% ^b	0.5	10,000	1.2	11.0 ^b	1.7
			24-33 years					
No mate	26.9	2.5	25% ^a	0.4	24,000	1.8	15.2 ^a	4.5
Single mate	27.4	2.9	43% ^b	0.5	19,000	1.6	12.4 ^b	2.2
Multiple mates	28.4	3.3	24% ^a	0.4	12,000	0.9	11.3 ^b	1.8
			34 and older					
No mate	39.8	2.3	50% ^a	0.3	15,000	1.5	12.4 ^a	1.7
Single mate	39.1	5.5	65% ^b	0.5	22,000	1.9	12.5 ^a	2.3
Multiple mates	40.3	4	48% ^a	0.5	16,000	1.7	12.42 ^a	1.6

Note: Means in the same age group that do not share subscripts differ at $p < .05$ in the post hoc comparison.

As shown in Table 3, we found a main effect for reproductive mate group for mother's, $F(2,262) = 3.84, p < .05$, and father's years of education, $F(2,245) = 7.21, p < .05$, but no significant effects for age group or the interaction ($ps > .05$). Follow-up comparisons revealed women who had not yet reproduced had parents with higher educational levels than women with one or multiple reproductive mates. There were no main effects or interactions for home

or new car ownership in childhood or in reported levels of parent-parent or parent-child conflict ($ps > .10$).

Developmental Experiences and Maternal Reproduction. Core theoretical developmental and maternal variables are shown in Table 4. We found a significant main effect of reproductive mate group for reported time with father, $F(2,289) = 4.47, p < .05$, but no significant effects or age group or the

interaction. Follow-up comparisons revealed that across age groups women who had not yet reproduced reported more time spent with father during their childhood than did women who had reproduced. The only other significant effect for the variables in Table 4 was for maternal age of first childbirth, which

varied across reproductive mate group, $F(2,279) = 13.30$, $p < .0001$. Follow up comparisons revealed that women with no reproductive mate reported later maternal age of first childbirth than did women in the two other groups.

Table 3 Parent Socioeconomic Factors

Group	Mother's Education		Father's Education		Home Ownership		New Car Ownership	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
18-23 years								
No mate	12.8 ^a	2.9	13.9 ^a	3.8	70%	.5	60%	.5
Single mate	11.5 ^b	2.3	11.4 ^b	2.0	60%	.5	60%	.5
Multiple mates	11.4 ^b	2.1	11.6 ^b	1.7	60%	.5	63%	.5
24-33 years								
No mate	13.5 ^a	1.9	15.3 ^a	3.7	60%	.5	60%	.5
Single mate	12.1 ^b	2.3	12.9 ^b	3.2	68%	.5	58%	.5
Multiple mates	10.8 ^b	2.9	11.1 ^b	2.2	60%	.5	67%	.5
34 and older								
No mate	11.7 ^a	2.4	12.5 ^a	2.6	71%	.5	57%	.5
Single mate	11.6 ^a	2.6	12.1 ^a	4.0	61%	.5	51%	.5
Multiple mates	10.8 ^a	2.6	10.8 ^b	2.3	72%	.4	55%	.5

Note: Means in the same age group that do not share subscripts differ at $p < .05$ in the post hoc comparison.

Table 4 Childhood Variables

Group	Parent-Parent Conflict		Parent-Child Conflict		Time with Father		Mother's Age at first childbirth	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
18-23 years								
No mate	1.8	1.1	2.0	1.1	2.6 ^a	1.2	22.0 ^a	4.2
Single mate	1.8	1.5	1.7	1.0	2.2 ^b	1.2	18.1 ^b	2.0
Multiple mates	1.8	1.2	2.1	1.2	1.6 ^b	1.4	18.0 ^b	2.2
24-33 years								
No mate	1.8	0.7	1.7	0.8	2.4 ^a	1.2	24.0 ^a	4.7
Single mate	1.7	1.0	1.8	1.0	1.8 ^b	1.5	19.9 ^b	3.1
Multiple mates	1.5	1.2	1.5	1.2	1.7 ^b	1.6	18.9 ^b	2.9
34 and older								
No mate	1.5	0.8	2.0	0.9	3.1 ^a	1.6	20.0 ^a	2.3
Single mate	1.7	1.1	1.6	1.1	2.1 ^a	1.4	20.1 ^a	3.4
Multiple mates	2.3	1.2	1.5	0.9	2.3 ^a	1.6	17.5 ^a	3.3

Note: Means in the same age group that do not share subscripts differ at $p < .05$ in the post hoc comparison.

Table 5 Life History Traits

Group	Menarche		First Intercourse		Age of first child		Number of Children	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
18-23 years								
No mate	12.5	1.6	16.1 ^a	2.2	n/a	---	0 ^a	0
Single mate	12.3	1.6	14.9 ^{ab}	1.8	17.3 ^a	2.0	1.7 ^b	0.8
Multiple mates	13.0	1.3	15.0 ^b	1.8	17.4 ^a	2.1	2.6 ^c	1.4
24-33 years								
No mate	12.2	1.9	17.5 ^a	2.9	n/a	---	0 ^a	0
Single mate	12.7	1.9	15.5 ^{ab}	2.2	19.8 ^a	3.1	2.1 ^b	1.2
Multiple mates	12.6	2.3	16.6 ^b	3.3	18.2 ^b	2.6	2.9 ^c	1.0
34 and older								
No mate	13.2	1.8	17.0 ^a	2.3	n/a	---	0 ^a	0
Single mate	12.8	2	16.7 ^a	3.3	21.8 ^a	5.3	2.8 ^b	1.0
Multiple mates	12.8	1.7	17.3 ^a	2.4	19.8 ^b	3.9	2.9 ^b	1.1

Note: Means in the same age group that do not share subscripts differ at $p < .05$ in the post hoc comparison.

Life history traits and reproductive development. Examination of Table 5 reveals no group differences on reported age at menarche ($ps > .10$). For age at first sexual intercourse, however, there were significant effects for age group, $F(2,271) = 5.81$, p

$< .05$, reproductive mate group $F(2,271) = 5.81$, $p < .05$, and a trend for the interaction ($p = .07$). The older women (34 or older) reported having first sexual intercourse at a later age than did the younger women (18-23 and 24-33), and women with multiple

reproductive mates reported having first sexual intercourse at an earlier age than did women with no reproductive mate in the two younger groups. For age at first childbirth, we found a trend for the reproductive mate group, $F(2, 182) = 3.43, p < .10$, and a significant effect for age group, $F(2,182) = 9.63, p < .0001$. Although the main effect for reproductive mate group was marginal, we report it because it is a theoretically important life history event (e.g., Kirk et al, 2001): Women in the two older age groups with multiple reproductive mates had their first child at an earlier age than did women with one reproductive mate, and women in the older cohort (over 33) had their first child at a later age, as a group, than did the younger women. There was also a main effect of reproductive mate group for number of children, $F(2,182) = 20.78, p < .0001$, which remained significant when age was used as a covariate ($ps < .05$). Women with a single reproductive mate had fewer children than did women with multiple reproductive mates. Additional analyses (not shown in Table 5) revealed there no significant differences across reproductive mate group, age group, or for the interactions in reported number of sexual partners, or in the percentage of women reporting sexual abuse during their childhoods ($ps > .05$).

Path analysis

Path analytic techniques were used to assess the potential sequence of background, developmental, and life history experiences leading to reproduction with one vs. several men. All of the data were of course obtained at the same time and thus “sequence” must be interpreted with caution. Nonetheless, some events necessarily occur before others (e.g., age of first sex vs. age of first childbirth) and others are more likely to occur earlier (e.g., time with father) than later (e.g., age of first sex), and thus constructing and testing a theoretically plausible sequence of experiences is possible. These analyses only included the women who had already reproduced, and the variables listed in Table 6. The variables included the core life history traits, parental education (an average of maternal and paternal education, because these were highly correlated, $r = .60$), mothers’ age at first childbirth, time with father, and two demographic variables (age, education). As described earlier, time with father is a theoretically important construct (Ellis, 2004), as is parent-parent and parent-child conflict (Belsky et al, 1991). However, the two latter variables did not differ across groups and were not correlated with any of the life history variables (rs $-.09$ to $-.12$) and thus were not included.

Table 6 Correlations between Observed Variables

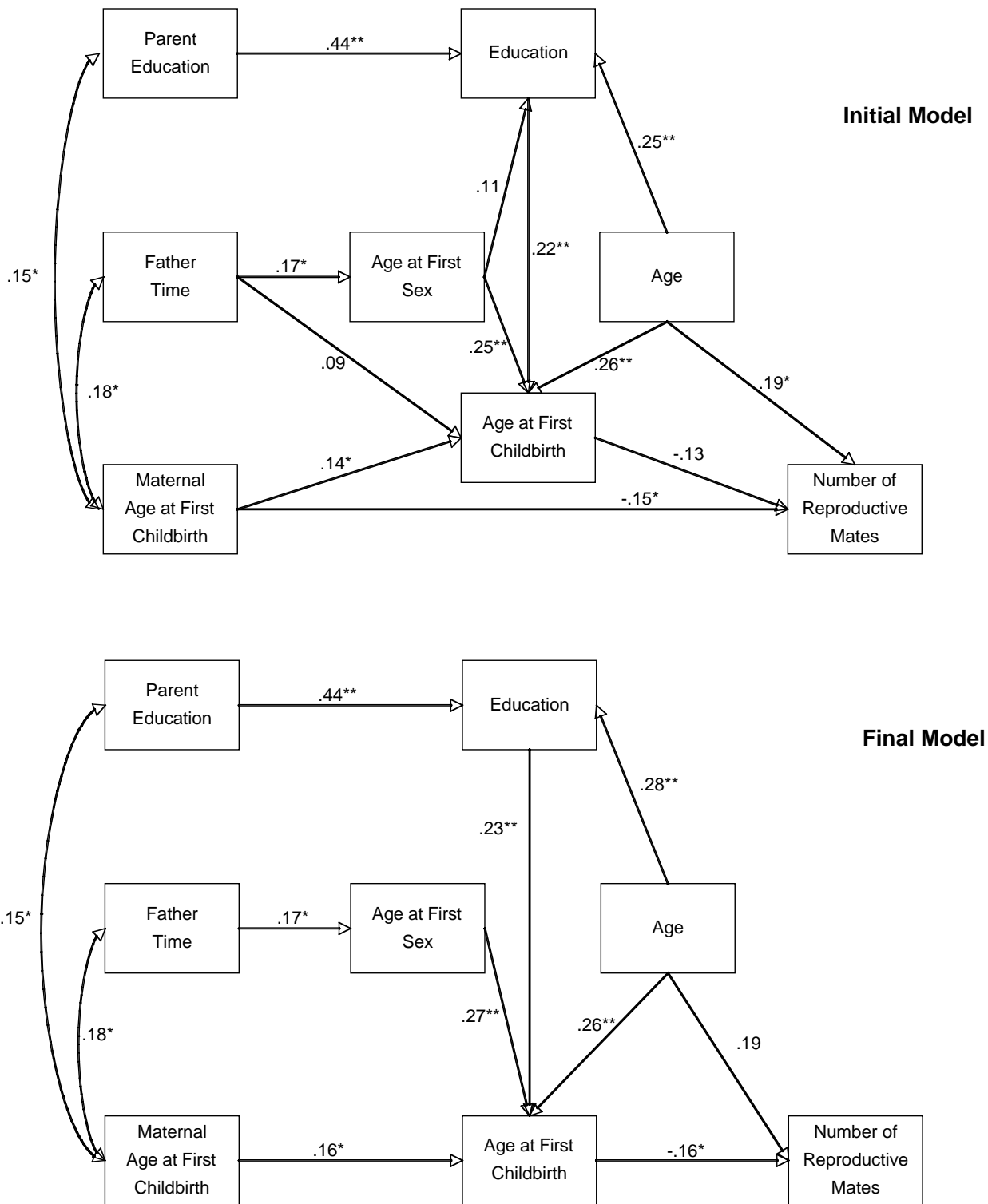
	1	2	3	4	5	6	7	8	9
1 Father Time	–	.08	.18*	.12	.17*	.02	.06	.17*	.02
2 Parent Education		–	.15*	.02	-.03	-.12	.40**	.14	-.01
3 Mother Age at First Birth			–	.07	.07	.15*	.17*	.25*	-.15
4 Menarche				–	.08	.08	.08	.16*	.03
5 Age at first Intercourse					–	.35**	.19*	.40**	.13
6 Age						–	.26*	.42**	.12
7 Education							–	.36*	-.06
8 Age at First Childbirth								–	-.09
9 Number of Reproductive Mates									–

* $p < .05$; ** $p < .0001$

All analyses were conducted using the SAS system’s CALIS procedure, and were performed on the correlation matrix (Table 6) with parents’ education, time with father, and mother’s age at first childbirth as the exogenous variables, and age of first sexual intercourse, education, age of first childbirth, and number of reproductive mates as the endogenous variables. Respondent’s age was also added as an exogenous variable to control for the potential effects of age on educational attainment, age of first childbirth, and number of reproductive mates. The goodness-of-fit of the initial and subsequent models was evaluated by the goodness-of-fit index (GFI) and the normed-fit index (NFI; Bentler & Bonnet, 1980). Values greater than .90 are typically considered acceptable, indicating the model provides an

acceptable representation of the covariation among the observed measures.

For Model 1, we estimated paths from the exogenous to endogenous variables that were predicted based on theory or previous empirical research, but did not estimate all possible paths to avoid capitalizing on chance relations. Only paths among endogenous variables that fit with the expected developmental sequence of life history experiences and/or were predicted based on previous findings (e.g., education and age of first childbirth) were estimated, again to avoid capitalizing on chance relations. These initial paths are shown in Figure 1a. Estimation of this model resulted in an acceptable GFI (.95), but the NFI was only .84.



Note: * $p < .05$; ** $p < .0001$

Figure 1 Path Models

Despite the NFI value, we attempted to further reduce the number of estimated paths, and did so by dropping two variables to increase consistency with theory. First, the direct path between maternal age at

first childbirth and number of reproductive mates was deleted. Although these variables were correlated and a theoretical argument for this path could be made, we reasoned that the relation between these variables

might be better captured indirectly, that is, through the direct path from maternal age at first childbirth to subject age of first childbirth and then from the latter to number of reproductive mates. Indeed, dropping this path improved the strength of the direct path between maternal age of first childbirth and age of first childbirth and from age of first childbirth to number of reproductive mates (Figure 1b). Second, the insignificant path between father time and age of first childbirth was deleted. These modifications (Model 2) resulted in an unchanged GFI (.95) and a slight decrease in the NFI (.81), but the chi-square difference test comparing the two models was not significant, $\chi^2(2) = 5.33, p > .05$, indicating that fit was not substantially worsened with deletion of these paths.

To further reduce model complexity, we deleted the insignificant direct path between age of first sexual intercourse and education; a Lagrange multiplier test (Bentler, 1989) also suggested that the model could be improved with the removal of this path. The result was Model 3 which had an acceptable GFI (.95) and a slightly reduced NFI (.79). The chi-square difference test comparing Models 2 and 3 was not significant, $\chi^2(1) = 2.35, p > .05$, indicating that dropping this path did not substantively worsen model fit. Moreover, examination of Lagrange multiplier indices indicated that estimation of any additional paths would not have substantively improved model fit and, thus, we accepted Model 3. For this model and with the exception of the control variable of age, the only direct path leading to number of reproductive mates was age of first childbirth, such that later age of first childbirth was related to fewer reproductive mates. Later age of first childbirth in turn was associated with more education and delayed age of first sexual intercourse. The latter was associated with more time spent with father. The final model was the most parsimonious and consistent with theory.

Discussion

The goal of the current study was to contrast the mate preferences, developmental experiences, life history development, and current circumstances (e.g., income, education) of low-income women who had reproduced with several men versus those who had reproduced with a single man. Following the lead of other researchers, we examined the developmental correlates (Belsky et al, 1991; Ellis et al, 1999; Ellis, 2004) and contextual factors (Chisholm, 1993; Chisholm et al, 2005; Wilson & Daly, 1997) that have been found to be related to variation in adult reproductive strategy, and included assessment of traits that define women's explicit preferences for a long-term mate (e.g., Kenrick et al, 1993; Li et al, 2002). We sought to extend these literatures with the direct assessment of reproductive outcomes in a large

sample of low-income women, and then examine variation in these outcomes as related to the sequence of events that might link early experience to later reproductive behavior, and by determining if variation in actual number of reproductive mates was related to differences in explicit preferences for one type of long-term mate or another.

Mate Preferences

There were more similarities than differences in traits preferred in a long-term mate between women with a single reproductive mate and women with multiple reproductive mates, and these groups were similar to the group of women who had not yet reproduced. Across groups, commitment and kindness tended to be rated more highly than other traits of a prospective long-term mate. Our results are consistent with the hypothesis that women reared in low resource contexts with relatively high paternal investment and mate value (i.e., education) expressed preferences for high quality mates, mates possessing commitment, intelligence, and kindness, similar to those found in typical college samples (Buss, 1989; Li et al, 2002). However, inconsistent with previous findings, status was not indicated as particularly important in this sample. Women with multiple reproductive mates and a history of much lower paternal investment showed many of the same preferences, with a few small, but significant differences. Young women in our study (18-23 years) who had multiple children with multiple reproductive mates expressed a higher preference for commitment than their age mates, possibly because they desired a stable adult attachment that would better enable them to raise their children. However, it was the women in the middle age group (24-33) and who had not yet reproduced, or who had reproduced with a single reproductive mate who placed the highest value on commitment. Women in the same group with multiple reproductive mates rated commitment significantly lower. As these women had more experience with the mating pool than their younger counterparts, it is possible that they perceived the trait of commitment to be unavailable or rare within their pool of potential partners. Potential mating pool characteristics were also reflected in the value of intelligence. Women who had not yet reproduced placed a higher value on this trait, again suggesting not only a preference for this trait, but that it is relatively common among their perceived mating partners. These results suggest that the differences between women with single or multiple reproductive mates are not motivated by differences in mate preferences. Had the behavioral differences between the two groups been motivated by differences in mate preferences, a pattern more similar to short-term mating preferences would be expected to emerge for women with multiple

reproductive mates. For example, these women would be expected to show a greater preference for physical attractiveness and less of a preference for resources compared with women with a single reproductive mate (Li & Kenrick, 2006).

Developmental Pathways

Although the retrospective reports used in our study should be interpreted with caution, the key variables that emerged and that are shown in Figure 1 are likely to capture some true variance in the associated experiences and outcomes. Age, education, and number of reproductive mates are not dependent on recall of childhood experiences and should be readily known and easily reported. Similarly, age at first childbirth and age at first sex are likely to be highly salient and recallable events for most women. Parental education and maternal age at first childbirth may be less salient, but may also be information that has been discussed multiple times while these women were growing up. Time with father is not a one-time event, but rather reflects recalled experiences during the entirety of childhood; women with little contact with their father for whatever reason will have few episodes to recall, whereas women with considerable contact with their father will have many episodes to recall. This is not to say that this is an optimal measure of paternal investment, but it is based on recall of multiple events that occurred over many years and, thus, is likely to capture some true variance in time spent with father.

To the extent that our measures are valid, our results suggest that it is not simply economic stressors and the associated conditions (e.g., parental stress, marital conflict) that lead to reproductive trajectories that differ from the typical or preferred outcomes found in middle class, college educated samples (Chisholm et al, 2005, Wilson & Daly, 1997), that is, monogamous marriage to a high investing man. We found variation in reproductive strategies in our sample, despite the fact that most of these women experienced higher levels of economic stress during their developmental history – stressors that continued into adulthood for most of these women – than is likely to be typical in college samples. Even within these stressful contexts, the availability and predictability of social support seemed important (Belsky et al, 1991). Factors affecting predictability of social support likely include mother's age at first childbirth and the resulting cascade of events, including reduced opportunity for the mother to pursue additional education and to maintain a long-term relationship with the child's father. Cause and effect cannot be easily determined, however, as there is a reduced opportunity cost for early childbearing when there is not a realistic opportunity for the pursuit of higher education due to economic or generational

effects (e.g., lack of parental encouragement or support) or low cognitive abilities, leaving this option (i.e., stopping the pursuit of education and reproducing early) as a viable reproductive strategy (Belsky et al, 1991; Figueredo et al, 2006; Geronimus, 1996b). Whatever the contributing factors, reproducing during the teenage years significantly increases the chance of reproducing with two or more men during adulthood.

Consistent with previous studies (Belsky et al, 1991; Ellis et al, 1999; Flinn, 1988), paternal investment emerged is a vital component of the equation. However, the path analyses suggested that the relation between paternal investment, or at least time spent with father, and number of reproductive mates may be indirect. In particular, we found that more time spent with father appears to contribute to women's long-term reproductive trajectory through delay of first sexual intercourse, which in turn, contributes to later age of first reproduction. There are many ways in which time spent with father might influence age at first intercourse, from direct paternal monitoring of their daughter's sexual behavior (Flinn, 1988) to women's subjective evaluation of their own potential mate value, and through this, subjective prospects for a long-term reproductive relationship. Paternal investment may also indirectly influence reproductive strategy by influencing long-term goals such as educational attainment (Ellis, 2004). Education – both parents' and participant's education – is an important correlate of adult reproductive strategy, but again the paths linking education and reproduction are not fully understood. In our sample, as in others, women who were more highly educated were more likely to pursue a single-mate versus a multiple-mate strategy, were more likely to have their first child at a later age, and had fewer children.

Some research has suggested that early childbearing cuts short educational aspirations (Palazzi, De Vito, Luzzati, Guerrini, & Torre, 1990). However, as mentioned above, the direction of the association between early correlates of reproductive strategy (i.e., age of first intercourse) and educational attainment appears to be more complex. In our study, there were no differences in age at first intercourse between women with a single reproductive mate compared with women with multiple reproductive mates, suggesting that women anticipating more education may simply be more likely to use contraceptive techniques and thus reduced their chances of early childbearing compared with women less focused on educational goals (Figueredo et al, 2006). It is also likely that heritable differences in age at first childbirth (e.g., Kirk et al, 2001) accounted for a significant portion of the variance in reproductive strategy. There was a moderate, but significant correlation between mother's age at first birth and the

respondent's age a first birth ($r^2 = .25, p < .05$). In our path analysis, the inclusion of the relation between mother's age of first reproduction and participants' age of first reproduction should provide at least a partial control of this heritable variation. In any event, it is likely a combination of a genetically-influenced traits and the environmental consequences of those traits (e.g., early childbearing, likelihood of father absence) that influences adult reproductive behavior (Figueredo et al, 2006; Rowe, 2000).

Conclusion

These results indicate that a combination of developmental experience (time with father), current circumstance (income and educational level), and heritable variation (mother's age at first childbirth) and the cascade of events that result from these factors contribute to intrasexual variation in women's life history development and long-term mate preferences. In terms of long-term mate preferences, women who have had multiple reproductive mates are more similar to than different from women with one reproductive mate and women who have not yet reproduced. These findings suggest that variation in adult reproductive behavior, at least among low-income women, is due to factors other than differences in mate preferences. In this study, age at first childbirth was found to be the single best indicator of whether women reproduced with one man or many men. Women reproducing early were less likely to retain their first reproductive partner, placing them at risk for a trajectory that included multiple reproductive partners. In contrast, women reproducing at a later age were more likely to have higher educational levels, reproduce with a single reproductive mate, and have fewer children. This combination appeared to be preceded by delayed age at first sexual intercourse and more time spent with father during childhood. However, the relation between time spent with father and age of first childbirth was indirect: Women reporting more time spent with father delayed timing of first sexual intercourse, which was directly related to age at first reproduction.

In sum, these findings suggest that women, in general, have similar preferences in terms of long-term mates, a committed relationship with a high quality mate. However, due to a relative shortage of men with these biases in impoverished environments, some women are forced to seek multiple partners, which often results in more overall children. Paternal investment may provide an important cue as to the relative availability of high quality mates in the potential mating pool, and along with heritable variation, may be associated with deviation from the "optimal" strategy and toward a strategy that involves a series of reproductive relationships.

References

- Alberts, S. C., & Altmann, J. (1995). Preparation and Activation: Determinants of Age at Reproductive Maturity in male Baboon. *Behavioral Ecology and Sociobiology*, 36, 397-406.
- Anderson, M. (1994). *Sexual Selection*. Princeton, N.J: Princeton University Press.
- Beckerman, S., Lizzaralde, R., Ballew, C., Schroeder, S., Fingelton, C., Garrison, A., & Smith, H. (1998). The Bari partible paternity project: Preliminary results. *Current Anthropology*, 39, 164-167.
- Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood Experience, Interpersonal Development, and Reproductive Strategy: An evolutionary Theory of Socialization. *Child Development*, 62, 647-670.
- Bentler, P. M., & Bonnet, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588-606.
- Bentler, P. M. (1989). *EQS structural equations program manual*. Los Angeles: BMDP Statistical Software.
- Berezkei, T., & Csanaky, A. (2001). Stressful family environment, mortality, and child socialization: Life-history strategies among adolescents and adults from unfavourable social circumstances. *International Journal of Behavioral Development*, 25, 501-508.
- Boyce, W. T., & Ellis, B. J. (2005). Biological Sensitivity to Context: An Evolutionary-Developmental Theory of the Origins and Functions of Stress Reactivity. *Development and Psychopathology* 17, 271-301.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypothesis tested in 37 cultures. *Behavioral and Brain Sciences*, 12, 1-49.
- Buss, D. M., Larsen, R. J., Westen, D., & Semmelroth, J. (1992). Sex Differences in Jealousy: Evolution, Physiology, and Psychology. *Psychological Science*, 3, 251-255.
- Burton, L. M. (1993). Teenage childbearing as an alternative life-course strategy in multigeneration black families. In *Life-span development: A diversity reader*. Dubuque, IA: Kendall/Hunt Publishing Company.
- Burton, L. M. (1995). Intergenerational patterns of providing care in African American families with teenage childbearers: Emergent patterns in ethnographic study. In V. L. Bengston, K. W. Schaie, & L. M. Burton (Eds.), *Adult intergenerational relations: Effects of societal change* (pp. 79-125). New York: Springer.
- Burton, L. M. (1996). The timing of childbearing, family structure, and the role responsibilities of aging black women. In E. Mavis Heatherington, & E. Blechman (Eds.), *Stress and coping in children and families* (pp. 155-172). Hillsdale, NJ: Lawrence Erlbaum.
- Chisholm, J. S. (1993). Death, Hope, and Sex: Life-history Theory and the Development of Reproductive Strategies. *Current Anthropology*, 34, 1-24.
- Chisholm, J. S., Quinlivan, J. A., Petersen, R. W., & Coall, D. A. (2005). Early Stress Predicts Age at Menarche and First Birth, Adult Attachment, and Expected Lifespan. *Human Nature*, 16, 233-265.
- Cunningham, M. R. (1986). Measuring the Physical in Physical Attractiveness: Quasi-experiments on the Sociobiology of Female Beauty. *Journal of Personality and Social Psychology*, 50, 925-935.
- Draper, P. & Harpending, H. (1982). Father absence and reproductive strategy: An evolutionary perspective. *Journal of Anthropological Research*, 38, 255-273.
- Ellis, B. J., McFadyen-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Quality of Early Family Relationships and Individual Differences in the Timing of Pubertal Maturation in Girls: A Longitudinal Test of an Evolutionary Model. *Journal of Personality & Social Psychology*, 77, 387-401.
- Ellis, B. J. (2004). Timing of Pubertal Maturation in Girls: An Integrated Life History Approach. *Psychological Bulletin*, 130, 920-958.
- Ergon, T., Lambin, X., & Stenseth, N. C. (2001). Life-history Traits of Voles in a Fluctuating Population Respond to the Immediate Environment. *Nature*, 411, 1043-1045.
- Figueredo, J. A., Vasquez, G., Brumbach, B. H., Schneider, S. M. R., Sefcek, J. A., Tal, I. R., et al. (2006). Consilience and life historytheory: From genes to brain to reproductive strategy. *Developmental Review*, 26, 243-275.
- Flinn, M. V. (1988). Mate guarding in a Caribbean village. *Ethology and Sociobiology*, 9, 1-28.

- Gangestad, S. W., & Simpson, J. A. (1990). Toward an Evolutionary History of Female Sociosexual Variation. *Journal of Personality*, 58, 69-96.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, 23, 573-644.
- Geary, D. C., Vigil, J., & Byrd-Craven, J. (2004). Evolution of human mate choice. *Journal of Sex Research* 41, 27-42.
- Geronimus, A. T. (1987). On teenage childbearing and neonatal mortality in the United States. *Population and Developmental Review*, 13, 245-279.
- Geronimus, A. T. (1992). Clashes of common sense: On the previous childcare experience of teenage mothers-to-be. *Human Organization*, 51, 318-329.
- Geronimus, A. T. (1996a) Black/white differences in the relationship of maternal age to birthweight: A population-based test of the weathering hypothesis. *Social Science & Medicine*, 42, 589-597.
- Geronimus, A. T. (1996b). What Teen Mothers Know. *Human Nature*, 7, 323-352.
- Gross, M. R. (1985). Disruptive Selection for Alternative Life Histories in Salmon. *Nature*, 313, 47-48.
- Gunnar, M. (1998). Quality of Early Care and Buffering of Neuroendocrine Stress Reactions: Potential Effects on the Developing Human Brain. *Preventative Medicine*, 27, 209-211
- Hatfield, E., & Sprecher, S. (1995). Men's and Women's Preferences in Marital Partners in the United States, Russia, and Japan. *Journal of Cross-Cultural Psychology*, 26, 728-750.
- Hill, K., & Hurtado, A. M. (1996). *Ache life history: The ecology and demography of a foraging people*. New York: Aldine de Gruyter.
- Kenrick, D. T., Groth, G. E., Trost, M. R., & Sadalla, E. K. (1993). Integrating Evolutionary and Social Exchange Perspectives on Relationships: Effects of Gender, Self-appraisal, and Involvement Level on Mate Selection Criteria. *Journal of Personality and Social Psychology*, 64, 951-969.
- Kirk, K. M., Blomberg, S. P., Duffy, D. L., Heath, A. C., Owens, I. P. F., & Martin, N. G. (2001). Natural Selection and Quantitative Genetics of Life History-traits in Western Women: A Twin Study. *Evolution*, 55, 423-435.
- Lancaster, J. B. (1989). Evolutionary and Cross-Cultural Perspectives on Single-Parenthood. In R. Bell & N. Bell (Eds.), *Interfaces in psychology: Sociobiology and the social sciences* (pp. 63-72). Lubbock, TX: Texas Tech University Press.
- Le Boeuf, B. J. (1974). Male-male Competition and Reproductive Success in Elephant Seals. *American Zoology*, 14, 163-176.
- Levine, R. A., Dixon, S., Levine, S., Richman, A., Leiderman, P. H., Keefer, C. H. & Brazelton, T.B. (1994). *Childcare and culture: Lessons from Africa*. Cambridge, England: Cambridge University Press.
- Li, N. P., Bailey, J. M., Kenrick, D. T., & Linsenmeier, J. A. W. (2002). The Necessities and Luxuries of Mate Preferences: Testing the Tradeoffs. *Journal of Personality and Social Psychology*, 82, 947-955.
- Lupien, S. J., King, S., Meaney, M. J., & McEwen, B. S. (2000). Child's Stress Hormone Levels Correlate with Mother's Socioeconomic Status and Depressive state. *Biological Psychiatry*, 48, 976-980.
- Luker, K. (1996). *Dubious conceptions: The politics of teenage pregnancy*. Cambridge, MA: Harvard University Press.
- MacDonald, K. (1992). Warmth as a Developmental Construct: An Evolutionary Analysis. *Child Development*, 63, 753-773.
- Moffitt, T. E., Caspi, A., Belsky, J., & Silva, P. A. (1992). Childhood Experience and the Onset of Menarche: A Test of a Sociobiological Model. *Child Development*, 63, 47-58.
- Must, A., Phillips, S. M., Naumova, E. N., Blum, M., Harris, S., Dawson-Hughes, B., & Rand, W. M. (2002). Recall of early menstrual history and menarcheal body size: After 30 years, How well do women remember? *American Journal of Epidemiology*, 155, 672-679.
- Palazzi, S., De Vito, E., Luzzati, D., Guerrini, A., & Torre, E. (1990). A study of the Relationship Between Life Events and Disturbed Self-image in Adolescents. *Journal of Adolescence*, 13, 53-63.
- Perrett, D. I., Penton-Voak, I. S., Little, A. C., Tiddeman, B. P., Burt, D. M., Schmidt, N., et al. (2002). Facial attractiveness judgments reflect learning of parental age characteristics. *Proceedings of the Royal Society of London B*, 269, 873-880.
- Rowe, D. C. (2000). Environmental and genetic influences on pubertal development: Evolutionary life history traits? In J. L. Rodgers, D. C. Rowe, & W. B. Miller (Eds.), *Genetic Influences on Human Fertility and Sexuality: Recent Empirical and Theoretical Findings* (pp. 147-168). Boston: Kluwer.
- Surbey, M. K. (1990). Family composition, stress, and the timing of human menarche. In T. E. Ziegler & F. B. Bercovitch (Eds.), *Socioendocrinology of primate reproduction* (pp. 11-32). New York: Wiley-Liss.
- Quas, J. A., Bauer, A. M., & Boyce, W. T. (2004). Physiological reactivity, social support, and memory in early childhood. *Child Development*, 75, 797-814.
- Whissell, C. (1996). Mate selection in popular women's fiction. *Human Nature*, 7, 427-447.
- Wilson, M., & Daly, M. (1997). Life expectancy, economic inequality, homicide, and reproductive timing in Chicago neighborhoods. *British Medical Journal*, 314, 1271-1274.
- Vigil, J. M., Geary, D. C., & Byrd-Craven, J. (2006). Trade-offs in low income women's preferences for long-term and short-term mates: Within-sex differences in reproductive strategy. *Human Nature*, 17, 319-336.
- Vigil, J. M., & Geary, D. C. (2006). Family and community background and variation in women's life history development. *Journal of Family Psychology*, 20