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SHORT REPORT

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An association between women's physical attractiveness and the length of their reproductive career in a prospectively longitudinal nationally representative sample

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Abstract

Objectives: Why is physical attractiveness more important for women's mate value in long-term mating than in short-term mating? This article replicates Bovet et al.'s (*Journal of Evolutionary Biology*. 2018; 31:229–238) recent finding that physically attractive women have a later expected age of menopause.

Methods: I analyzed the prospectively longitudinal, nationally representative sample of women in the National Child Development Study, applying *t*-test and multiple regression analyses.

Results: Analyses showed that girls rated physically attractive at age 7 underwent menarche 3.12 months earlier than other girls, and they had 32% smaller odds of having undergone menopause before age 51. The results suggest that more physically attractive women have longer reproductive careers, explaining why physical attractiveness may be a more important determinant of women's mate value in long-term mating than in short-term mating.

Conclusions: Women's physical attractiveness predicts the timing of menarche and menopause, thereby the length of their reproductive careers.

1 | INTRODUCTION

Women's physical attractiveness is universally a very strong determinant of their mate value in both short-term and long-term mating (Buss, 1989). Because women's physical attractiveness is an indicator of health and fecundity (Thornhill & Møller, 1997), it makes evolutionary sense for men to pursue physically attractive women for short-term mating. However, a potential mate's physical attractiveness is even more important to men for long-term mating ("marriage") than it is for short-term mating ("dating") (Kenrick, Sadalla, Groth, & Trost, 1990). Why is women's physical attractiveness more important to men in long-term mating than in short-term mating?

Recently, Bovet, Barkat-Defradas, Durand, Faurie, and Raymond (2018) suggested that women's physical attractiveness may be an important determinant of their mate value in long-term mating because more physically attractive women may have longer reproductive careers than less physically attractive women. Consistent with their prediction, their study showed that more physically attractive women had a later expected age of menopause (proxied by their mother's age of menopause, given that the age of menopause is highly heritable). Their results suggested that women's physical attractiveness may be important for long-term mating because more physically attractive women may stay fertile longer and are thus able to have more children in their lifetimes.

As impeccable as Bovet et al.'s (2018) theoretical logic was, their empirical data suffered from two shortcomings. First, they used a very small (n = 68) convenience sample of young women. Second, because none of the young women in their 20s and 30s had actually reached menopause, they had to use their mother's age of menopause as a proxy for their *expected* age of menopause and thus their *expected* length of reproductive career.

In this article, I replicate Bovet et al.'s (2018) findings with a large, prospectively longitudinal, and nationally representative sample of women. The National Child Development Study (NCDS) has followed a *population* of babies born in Great Britain since birth for over half a century, and some women have undergone menopause while others have not. In addition, extending Bovet's original empirical analysis in line with their own theoretical logic, I also examine whether physically attractive women *begin* their reproductive careers earlier, by undergoing menarche at an earlier age.

2 | EMPIRICAL ANALYSES

2.1 | Data

The NCDS is a large, on-going, and prospectively longitudinal study that has followed a *population* of British respondents since birth for over half a century. The study included *all* babies (n = 17 419) born in Great Britain (England, Wales, and Scotland) during one week (3–9 March 1958). The respondents were subsequently reinterviewed in 1965 (sweep 1 at age 7; n = 15 496), 1969 (sweep 2 at age 11; n = 18 285), 1974 (sweep 3 at age 16; n = 14 469), 1981 (sweep 4 at age 23; n = 12, 537), 1991 (sweep 5 at age 33; n = 11 469), 1999 to 2000 (sweep 6 at age 41–42; n = 11 419), 2004 to 2005 (sweep 7 at age 46–47; n = 9534), 2008 to 2009 (sweep 8 at age 50–51; n = 9790), and 2013 (sweep 9 at age 55; n = 9137). There were more respondents in sweep 2 than in the original sample (sweep 0) because sweep 2 sample included eligible children who were in the country in 1969 but not in 1958. In each sweep, personal interviews and questionnaires were administered to the respondents, to their mothers, teachers, doctors during childhood, and to their partners and children in adulthood. Virtually all (97.8%) of the NCDS respondents were of European decent. My analyses included only female respondents.

2.2 | Dependent variable: Menarche

At age 16, the NCDS asked female respondent's mother at what age their daughter experienced menarche, defined as the first menstruation. Their response was coded: 1 = before 11, 2 = age 11, 3 = age 12, 4 = age 13, 5 = age 14, and 6 = age 15 or later.

2.3 | Dependent variable: Menopause

At age 51, the NCDS asked female respondents whether they had undergone menopause (1 = yes, 0 = no), defined as not having had any menstrual period in the last 12 months. A total of 34.9% of women (n = 1489) had undergone menopause by the age of 51 years; 65.1% (n = 2773) had not. The NCDS did not ask women the actual age of menopause.

2.4 | Independent variable: Physical attractiveness

At age 7, the teacher of each NCDS respondent was asked to describe the child's physical appearance, by choosing up to three adjectives from a (highly eclectic) list of five: "attractive," "unattractive," "looks underfed," "abnormal feature," and "scruffy & dirty." Virtually all (95.3%) responses were either "attractive" or "unattractive." From these three responses, I coded physical attractiveness = 1 if the teacher chose "attractive" as one of the three adjectives, 0 otherwise. A total of 85.5% (n = 4572) of the female respondents were described as "attractive" by this measure; 14.5% (n = 775) were not. The NCDS only measured physical attractiveness of its respondents during childhood.

Zebrowitz, Olson, and Hoffman's (1993) analysis of the longitudinal data from the Intergenerational Studies of Development and Aging showed that individuals' relative physical attractiveness remains very stable across the life course. Their structural equation model suggests that physical attractiveness in childhood (measured between the ages of 9 and 10) is significantly positively correlated with physical attractiveness in puberty (measured between the ages of 12 and 13 for girls and 14 and 15 for boys; $r = .70$ for boys, $r = .79$ for girls), and physical attractiveness in puberty is significantly positively correlated with physical attractiveness in adolescence (measured between the ages of 17 and 18; $r = .72$ for boys, $r = .70$ for girls). This suggests that physical attractiveness in childhood is correlated with physical attractiveness in adolescence at $r = .504$ for boys and $r = .553$ for girls. The childhood measure of physical attractiveness in the NCDS has previously been used successfully to predict intelligence (Kanazawa, 2011a) and the sex of the first child (Kanazawa, 2011b).

2.5 | Control variables

In multiple regressions, I further controlled for the respondent's social class at birth, measured by the father's occupation (0 = unemployed, dead, retired, no father present, 1 = unskilled, 2 = semiskilled, 3 = skilled, 4 = white-collar, 5 = professional); the natural log of the respondent's earnings in £1K at 51 years; and self-rated health at 51 years (1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = excellent).

2.6 | Statistical analyses

I analyzed menarche in OLS multiple regression, treating the six-category, equidistant ordinal variable as an interval

variable. I analyzed menopause in binary logistic regression, as it is a binary variable in the NCDS data.

3 | RESULTS

3.1 | Menarche

Girls who were rated "attractive" at 7 years underwent menarche significantly earlier than girls not so rated (3.73 vs 3.99, $t[3702] = 4.058$, $P = .00005$). Raw means suggest that "attractive" girls underwent menarche on average at 12.73 years of age while other girls underwent menarche on average 3.12 months later at 12.99 years of age.

Columns (1) and (2) of Table 1 present the results of OLS regression. Column (1) shows that, when entered alone, whether female NCDS respondents were rated "attractive" at 7 years had a significant association with the age of menarche ($b = -.254$, $P = .00005$). Controlling for social class at birth (column (2)) *strengthens* the association between physical attractiveness and age of menarche ($b = -0.282$, $P = .0000145$), while social class at birth itself is not significantly associated with age of menarche ($b = 0.042$, $P = .064$).

3.2 | Menopause

Women who were rated "attractive" at 7 years were significantly less likely to have undergone menopause before the age of 51. A total of 33.8% of "attractive" women had undergone menopause before 51 years, while 42.9% of other women had ($t[2821] = 3.370$, $P = .00076$).

Table 1, column (3), shows that when entered alone in binary logistic regression, physical attractiveness at 7 years was significantly associated with whether NCDS respondents had undergone menopause before the age of 51 ($b = -0.387$, $P = .00081$). The unstandardized coefficient of −0.387 suggests that attractive women had 32% ($1 - e^{(-0.387)} = 0.321$) smaller odds of having undergone menopause before 51 years. Controlling for social class at birth, earnings at 51 years, and self-rated health at 51 years attenuated the association between physical attractiveness and menopause, but it still remained statistically significant ($b = -0.265$, $P = .036$).

4 | DISCUSSION

The analyses of the NCDS data replicated Bovet et al.'s (2018) findings, based on a small convenience sample, that physically attractive women have a later expected age of menopause, thereby enjoying longer reproductive careers. The results presented above showed that, not only do "attractive" women experience menopause later, but they also undergo menarche earlier. The reproductive careers of more physically attractive women therefore appear to begin earlier and end later. Its association with the length of

TABLE 1 The association between childhood physical attractiveness and age of menarche and menopause

	Menarche		Menopause	
	(1)	(2)	(3)	(4)
Physical attractiveness	−.254***	−.282***	−.387***	−.265*
	(.062)	(.065)	(.115)	(.126)
	−.067	*−.073*	*.679*	*.767*
Social class at birth		.042		−.093*
		(.023)		(.042)
		.031		*.911*
Earnings				.000
				(.008)
				1.000
Self-rated health				−.178***
				(.041)
				.837
Intercept	3.987	3.896	−.284	.491
	(.058)	(.083)	(.107)	(.203)
R^2	.004	.006		
Cox & Snell R^2			.004	.014
Number of cases	3704	3541	2823	2507

Note. Main entries are unstandardized coefficients.
(Entries in parentheses are standard errors.)
Italicized entries are standardized regression coefficients (e^b for logistic regression).
*$P < .05$, **$P < .01$, ***$P < .001$.

reproductive career can explain why physical attractiveness is an even stronger determinant of women's mate value in long-term mating than in short-term mating (Kenrick et al., 1990).

While the NCDS data rectify two shortcomings of Bovet et al.'s (2018) earlier data, they have their own shortcomings. Physical attractiveness was measured in childhood by teachers, not in adulthood by potential mates, as in Bovet et al. The NCDS did not measure the precise age of menopause, only whether they have undergone it before 51 years. Further research is thus clearly necessary to demonstrate that more physically attractive women begin their reproductive career earlier and end it later, thereby making them more desirable, not only in short-term mating but in long-term mating as well.

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