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# Universal Allure of the Hourglass Figure: An Evolutionary Theory of Female Physical Attractiveness

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". . . the buttocks are full but her waist is narrow . . . the one for who[m] the sun shines . . ." From the tomb of Nefertari, the favorite wife of Ramses II, second millennium B.C.E.

". . . By the magic of powers she assumed the form of a beautiful woman . . . her hips and breast were full, the waist slender." Bhagavata Purana, sixth century C.E.

The iconic representation of a beautiful and sensuous woman as an hourglass figure defies prevalent belief among laypersons and scholars that beauty is ephemeral, arbitrary, and in the eye of the beholder. The label of "hourglass," hand gestures to depict the shape of women, and even the numbers (36-24-36) often used in vernacular speech to describe a woman effortlessly invoke the image of a youthful, attractive, and enticing woman in the present era. Describing a woman's height and weight does not conjure up images that such a woman is also young and beautiful. While slenderness is often prized, it is practically impossible to imagine that most people would judge a woman with 32-32-32 measurements as attractive regardless of how skinny she is. The hourglass figure remains critical for judgments of youthfulness and beauty even in skinny models.

So what explains the universal and enduring appeal of the hourglass figure? One explanation based on evolutionary psychological theory is that female beauty as represented by the hourglass figure taps into important biological information about various factors regulating women's reproductive potential and fertility. In this paper I will first briefly describe basics tenets of evolutionary psychology pertaining to the nature and significance of female attractiveness. Then I will summarize experimental and clinical evidence demonstrating a link between the hourglass figure and hormonal and endocrinological mechanisms regulating reproductive potential, fertility, and risk for major diseases. Such evidence is crucial to support the claim that attractiveness of the female figure is a reliable cue to a female's reproductive capability and good health. Next, I will present evidence that changes in the hourglass figure alone systematically affect female attractiveness judgments of lay and professional men and women not only in our society but in various and diverse

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societies. Finally, I will present evidence showing that equating beauty with the hourglass figure is not a novel or recent phenomenon shaped by the mass media; allure of the hourglass figure is evident across generations in ancient cultures.

## Importance of female attractiveness in mate selection

The fundamental assumption of evolutionary psychology is that natural selection not only shaped specialized bodily organs to solve the problems of efficient survival; it also shaped specialized mechanisms to solve problems encountered by humans in ancestral environments. Thus, evolutionary psychology argues that the human mind is a collection of special-purpose mechanisms designed by natural selection to solve the problems of survival and reproduction that were recurrently faced by our ancestors.

One of the adaptive problems that our male ancestors regularly faced was to assess a female's mate value, or the degree to which she would enhance his reproductive success. Potential mates necessarily varied in mate value, just like potential foods vary in their nutritional value and shelter and housing vary in their potential utility value. Female mate value was determined by numerous variables such as hormonal profile, reproductive age, fecundity, parity, and resistance to diseases, none of which could be directly observed. It has been proposed that information about some of these variables is reliably conveyed by specific characteristics of female bodies and that natural selection therefore produced psychological mechanisms in men to attend to bodily features in assessing a female's mate value [1]. It has been further proposed that as females vary in their mate value, the intensity of male sexual attraction was designed to vary directly with perceived cues of female mate value [2].

To demonstrate that the female hourglass figure is a reliable cue to her mate value, it is essential to establish that this figure has at least plausible linkage to physiological mechanisms regulating reproductive capability and good health. Furthermore, variation in the hourglass figure should not only be correlated with variation in reproductive potential, but such variations should systematically affect the judged degree of female attractiveness. The nature of body fat distribution, which largely determines the hourglass shape, meets most of the above-stated criteria.

## Waist-to-hip ratio (WHR): an indicator of women's fecundity and health status

Fat distribution in humans depends both on age and gender; the sexes are similar in infancy, early childhood, and old age, but differences in fat distribution are greater from the early teens until late middle age [3]. There is extensive evidence that sex hormones affect specific regional adiposity and regulate use and accumulation of fat [4]. Simply stated, estrogen inhibits fat deposition in the abdominal region and stimulates fat deposition in the gluteofemoral region more than in other body regions. Testosterone, in contrast, stimulates fat deposition in the abdominal region and inhibits deposition in the gluteofemoral region [5]. It is this sexually dimorphic body fat distribution that primarily sculpts the typical hourglass figure in women after pubertal onset; women have greater amounts of body fat in the lower part of the body (gynoid—aka "pear-shaped"—body fat), whereas men have greater amounts of fat in the upper body (android—aka "apple-shaped"—body fat).

A widely used anthropometric technique to ascertain the degree of gynoid and android fat distribution is to measure circumference of the waist (narrowest portion between the ribs and iliac crest) and hips (at the level of the greatest protrusion of the buttocks), and using these measurements to compute a waist-to-hip ratio (WHR). Before puberty, both sexes have similar WHRs. After puberty, females deposit more fat in the hips and buttocks; WHR therefore becomes significantly lower in females than in males. WHR has a bimodal distribution with relatively little overlap between the sexes. The typical range of WHR for healthy premenopausal women has been shown to be 0.67 to 0.80, whereas healthy men have WHRs in the range of 0.85 to 0.95. Women typically maintain a lower WHR than men throughout adulthood, although after menopause their WHR approaches the masculine range [6]. Thus, the size of WHR can be used as a reliable proxy of women's general reproductive status (pre- or post-pubertal and menopause) and youthfulness.

In addition, as shown in Box 1, WHR is a reliable independent indicator of reproductive endocrinological status and various health risks. As evident from the findings summarized in Box 1, WHR reliably signals practically all the conditions that affect women's reproductive status and fertility. It seems that an elevated level of circulating estrogen lowers WHR, whereas an elevated level of circulating testosterone increases WHR. A recent prospective study has found that women with large breasts and low WHRs have significantly higher levels of estrogen during the fertile phase of the menstrual cycle than women with smaller breasts and high WHRs [7]. Women with high WHR have more irregular menstrual cycles, fewer ovulatory cycles, and lower pregnancy rates in artificial insemination and in vitro fertilization embryo transfers than women with lower WHRs, independent of body weight. One of