Quality of early family relationships and the timing and tempo of puberty: Effects depend on biological sensitivity to context

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Abstract

Guided by evolutionary–developmental theories of biological sensitivity to context and reproductive development, the current research examined the interactive effects of early family environments and psychobiologic reactivity to stress on the subsequent timing and tempo of puberty. As predicted by the theory, among children displaying heightened biological sensitivity to context (i.e., higher stress reactivity), higher quality parent–child relationships forecast slower initial pubertal tempo and later pubertal timing, whereas lower quality parent–child relationships forecast the opposite pattern. No such effects emerged among less context-sensitive children. Whereas sympathetic nervous system reactivity moderated the effects of parent–child relationships on both breast/genital and pubic hair development, adrenocortical activation only moderated the effect on pubic hair development. The current results build on previous research documenting what family contexts predict variation in pubertal timing by demonstrating for whom those contexts matter. In addition, the authors advance a new methodological approach for assessing pubertal tempo using piecewise growth curve analysis.

Pubertal maturation is neither unitary nor uniform. There are multiple pubertal processes that occur in different people (and within the same person) at different ages and rates of development (Dorn, Dahl, Woodward, & Biro, 2006; Styne & Grumbach, 2002). This variation is not an isolated phenomenon, moreover, but part of a larger developmental continuum. At early points on the continuum are upstream developmental factors and processes (e.g., nutritional history, energetic expenditures, family conflict, and cohesion) that influence the timing and tempo of puberty (reviewed in Ellis, 2004). At later points on the continuum are the downstream consequences of this variation, consequences that have substantial social and biological implications.

Epidemiologic evidence from ethnically diverse populations indicates that early-maturing girls, relative to their on-time or later developing peers, are at elevated risk for a variety of negative physical and mental health outcomes, including unhealthy weight gain, early initiation of substance use, early sexual initiation and pregnancy, emotional and behavioral problems, and mortality from cardiovascular disease and breast cancer (Bratberg, Nilsen, Holmen, & Vatten, 2007; Colditz & Frazier, 1999; Deardorff et al., 2007; Deardorff, Gonzales, Christopher, Foosa, & Millsap, 2005; Dick, Rose, Viken, & Kaprio, 2000; Golub et al., 2008; Jacobsen, Oda, Knutsen & Fraser, 2009; Kelsey, Gammon, & John, 1993; Lakshman et al., 2009; Vo & Carney, 2007). This is particularly concerning given the ongoing trend toward younger age of breast development and menarche among girls in the United States (Euling et al., 2008).

Beyond the effects of pubertal timing, pubertal tempo, which is the rate at which adolescents progress through puberty, has also been implicated in development of psychopathology and physical health problems. Changing levels of exposure to steroid hormones underpin changes in pubertal tempo, with associated emotional and behavioral sequelae (Parry & Newton, 2001). A fast pubertal tempo not only causes maturational events to occur sooner, but may itself be psychologically challenging. Periods of faster pubertal maturation and rapid hormonal changes, including punctuated development of secondary sexual characteristics, negatively affect mood and adjustment in adolescents (Buchanan, Eccles, & Becker, 1992; Ge et al., 2003; Slap, Khalid, Paikoff, & Brooks-Gunn, 1994; Warren & Brooks-Gunn, 1989). In addition to the challenges of fast pubertal tempo, slow sexual maturation may also augment risk. Although research on physical health outcomes is limited, there is reason to believe that slowing of pubertal tempo may extend the window of vulnerability for breast carcinogenesis, given prolonged exposure to endogenous hormones during...