



# GROWTH AND MATURATION IN HUMAN BIOLOGY AND SPORTS

*FESTSCHRIFT HONORING ROBERT M. MALINA  
BY FELLOWS AND COLLEAGUES*

PETER TODD KATZMARZYK  
MANUEL J COELHO E SILVA  
EDITORS

IMPrensa DA  
UNIVERSIDADE  
DE COIMBRA  
COIMBRA  
UNIVERSITY  
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# NEW DIRECTIONS IN THE STUDY OF MATURATION AND PHYSICAL ACTIVITY

*Sean P. Cumming*

Those interested in the study and promotion of physical activity in children and adolescents have focussed predominantly on the contributions of various psychosocial and environmental factors (Cumming & Riddoch, 2009). Although it is well documented that factors such as self-concept, motivation, and the built environment contribute to physical activity in youth, it is equally apparent that physical activity has a biological basis (Eisenmann & Wickel, 2009; Rowland, 1998; Sherar, Cumming, Eisenmann, Baxter-Jones, & Malina, 2010). As noted by Malina (2008), physical activity is, after all, a biological process that exists within a cultural context in which various meaning and values are ascribed to it. Thus, a true understanding of physical activity likely resides in the interactions of various biological, psychosocial and environmental factors (Malina, 2008).

A biological process that occurs in all children and youth and may contribute to variance in physical activity is maturation (Eisenmann & Wickel, 2009; Sherar, et al., 2010). Biological maturation denotes progress towards the mature (i.e., adult) state, and can be viewed in terms of tempo and/or timing (Malina, Bouchard, & Bar-Or, 2004). Whereas tempo implies the rate at which maturation progresses, timing refers to the time at which maturity-related events, such as age at menarche, or peak height velocity occurs. Within a chronological age group, children and adolescents can vary considerably in maturity timing, with certain individuals, or groups, maturing much earlier or later than others. For example, girls generally enter puberty two years in advance of boys.

Research examining the contribution of biological maturation to adolescent involvement in physical activity has produced mixed results (Sherar, et al., 2010). Although research has consistently shown that advanced maturation explains why girls are less active and more sedentary when compared against boys of the same chronological age (Cumming, Standage, Gillison, & Malina, 2008; Machado Rodrigues et al., 2010; Sherar, Esliger, Baxter-Jones, & Tremblay, 2007; Thompson, Baxter-Jones, Mirwald, & Bailey, 2003); the effects of maturity timing on individual variation in physical activity within sex are unclear (Sherar, et al., 2010). The physical and functional characteristics associated with advanced maturation in females are considered to be less conducive to successful engagement in most forms of physical activity, particularly activities or sports that involve elements of endurance or weight-bearing (Baxter-Jones, Thompson, & Malina, 2002; Malina, 1994). Accordingly, it has been hypothesized that early maturation in females will be associated with less involvement in most forms of PA (Sherar, et al., 2010). In support of this contention, a number of studies have found early maturing girls to be less active than their 'on time' or late maturing peers (Baker, Birch, Trost, & Davison, 2007; Cumming et al., in