

THE SOCIO-CULTURAL EXPOSOME AS A REGULATOR OF HUMAN GROWTH

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Background: Humans are social. The social environment is strongly associated with body height. Recent evidence emphasizes the role of social signalling in the regulation of human growth.

Objective: To disentangle the influence of physical living conditions such as wealth, health, nutrition, and education from influences that are transmitted among group members. We analysed the impact of the group assuming a theoretical “transgenerational growth potential” based on 14 mill.

Subjects: German conscripts born between 1865 to 1975.

Results: The transgenerational mean height is 173cm (SD+9.8 cm). Between the late 19th and the late 20th centuries the mean male height increased from 165.8 cm (SD±6.5 cm) to 180.1 (SD+7 cm). The skewness of the height distribution was always close to zero. Height was significantly associated with living conditions, but the association disappeared when linking characteristics of the within population distribution of height with the disparity of living conditions and economic inequality. Mean height of the social community is a strong attractor of individual height and reduces the transgenerational growth potential by more than 50%.

Conclusions: Based on the SEPE concept we describe the effect of the exposome on body height through a socio-endocrine signalling cascade. This cascade “translates” social conditions - including an individual’s emotional perception of its position within the group - into hypothalamic neuropeptides. These signals trigger endocrine responses affecting stress, sexual characteristics, and body height. In turn, these outcomes serve as socially relevant signals to be perceived by other group members. This feedback loop has been evolutionarily conserved in vertebrates for more than 400 million years.

Keywords: Body height, socio-endocrine signalling, secular trend, community.