The inverse associations between birth weight and later adverse health outcomes and the positive associations between adult body size and poor health imply that increases in relative body size between birth and adulthood may be undesirable. In this paper, the authors describe life course path analysis, a method that can be used to jointly estimate associations between body sizes at different time points and associations of body sizes throughout life with health outcomes. Additionally, this method makes it possible to assess both the direct effect and the indirect effect mediated through later body size, and thereby the total effect, of size and changes in size on later outcomes. Using data on childhood body size and adult systolic blood pressure from a sample of 1,284 Danish men born between 1936 and 1970, the authors compared results from path analysis with results from 3 standard regression methods. Path analysis produced easily interpretable results, and compared with standard regression methods it produced a noteworthy gain in statistical power. The effect of change in relative body size on adult blood pressure was more pronounced after age 11 years than in earlier childhood. These results suggest that increases in body size prior to age 11 years are less harmful to adult blood pressure than increases occurring after this age.

birth weight; blood pressure; body mass index; child; epidemiologic methods; growth

Abbreviations: BMI, body mass index; SBP, systolic blood pressure.

χ

β

$\beta_A, \quad \beta_A + \beta \quad , \quad \beta \quad + \beta \quad , \quad \beta_A, \quad \beta_A$

z
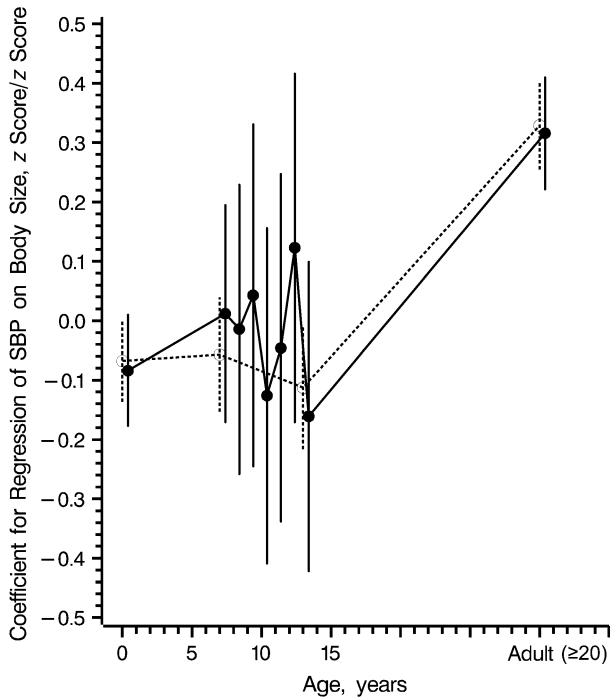
2. Life course plot (solid line), as suggested by Cole (18). The plot shows multiple regression coefficients (circular points) from the regression of systolic blood pressure (SBP)   scores on birth weight and body mass index   scores, by age at body size measurement. The dashed line represents a modified version of the life course plot using a reduced multiple regression of SBP on body size. Vertical lines, 95% confidence interval.

0.20

0.0

0.1

0.2

0.10

0.2

0.2

0.1

0.0

0.1

10

11

12

1

0.1.6

0.1.6

0.1.6

0.

0.

1.

2.

1.

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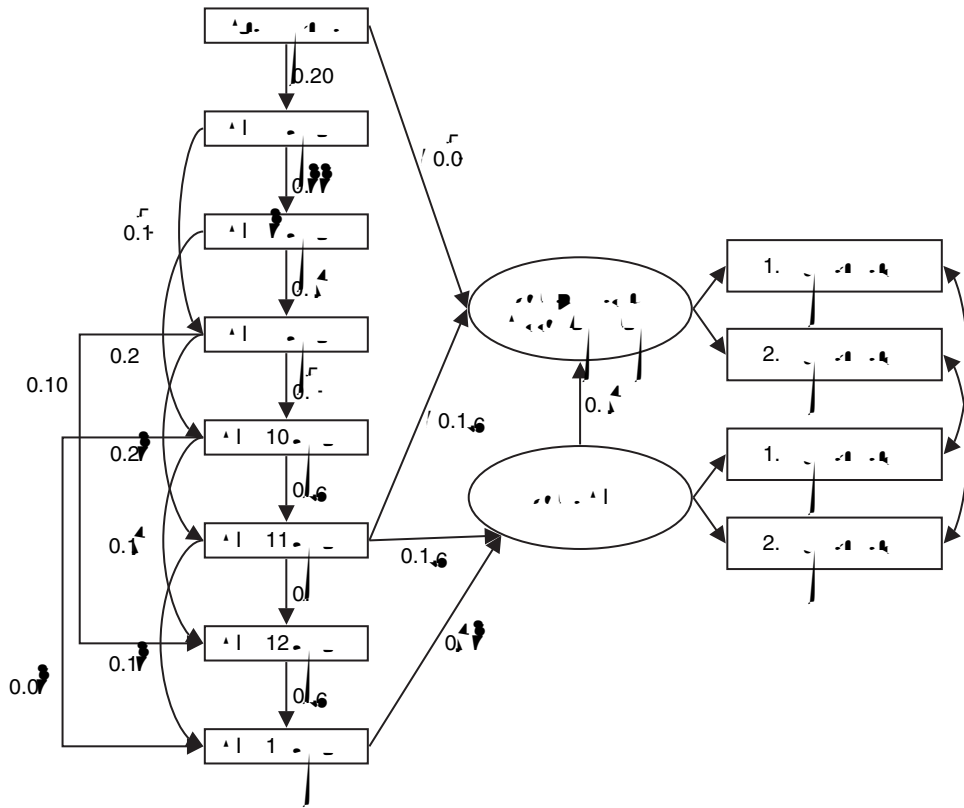
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Structural Equations With Latent Variables

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Mplus User's Guide

Statistical Analysis With Missing Data

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PLoS ONE

J Clin Epidemiol.

Hypertension

Hypertension

Int J Obes Relat Metab Disord.

$$X_{i,} = \alpha + \beta_, X_{i,} + \varepsilon_{i,}$$
$$X_{i,} = \alpha + \beta_, X_{i,} + \beta_, X_{i,} + \varepsilon_{i,}$$
$$\vdots$$
$$X_{i,} = \alpha_ + \beta_, X_{i,} + \ldots + \beta_, X_{i,} + \varepsilon_{i,}$$
$$Y_i = \alpha + \beta X_{i,} + \ldots + \beta X_{i,} + \beta X_{i,} + \sigma_i.$$

$(\quad)$

$X_{i,}, \ldots, X_{i,}$ z Y_i z $\varepsilon_{i,}, \ldots, \varepsilon_{i,}$ σ_i

β <

β X   β X β X ...   β X