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Q3(c)

What is mixed-longitudinal method of studying human growth. Discuss its merits and demerits.

UPSC Civil Services Mains 2023 · Anthropology GS 1 · 15 marks · Human Genetics

9.1 Human Genetics: Methods and Application: Methods for study of genetic principles in man-family study (pedigree analysis, twin study, foster child, co-twin method, cytogenetic method, chromosomal and karyo-type analysis), biochemical methods, immunological methods, D.N.A. technology and recombinant technologies.

Core demand of the question

- What is mixed-longitudinal method of studying human growth?
- Discuss its merits and demerits
- Write at 15-mark length

Revision summary

Cross-sectional study measures different children once.

Longitudinal study remeasures the same children, as in Tanner's work.

Mixed-longitudinal study follows overlapping cohorts and may replace drop-outs.

Merits are cost, speed, and some velocity data.

Demerits are joining error, secular-trend mix, and remaining attrition bias.

Indian school and ICMR work often uses this middle design.

Introduction

Human growth can be measured once, followed in the same children, or studied by a mix of both. The mixed-longitudinal method is that mix, designed to keep the truth of change without the full cost of a lifetime panel.

Body

The three designs

- A **cross-sectional** survey measures different children at each age once, which **Franz Boas** already used to show environment in stature, but it cannot show a single child's velocity.
- A **longitudinal** study remeasures the same children, which **J. M. Tanner** made the gold standard for velocity, age at peak height velocity, and tempo.
- A **mixed-longitudinal** design follows several overlapping cohorts for a few years each, and it may add new children as others leave, so the study covers a wide age span in calendar time shorter than a full birth-to-adult panel.

How mixed-longitudinal work is done

- Cohort A is seen from 5 to 10 years, cohort B from 8 to 14, cohort C from 12 to 18, with overlap so curves can be joined.

- Drop-outs are replaced, which is why the method is common in school, ICMR, and clinic growth programmes that cannot lock a sample for twenty years.
- Distance (size attained) and velocity (rate) can both be estimated, with more error at the joins than in a pure panel.

Merits

- It is cheaper and faster than a complete longitudinal study of one birth cohort to adulthood.
- It captures tempo and seasonal or secular change better than a one-time cross-section.
- Overlap between cohorts lets the analyst check consistency, which a pure cross-section never sees.
- Ethical and practical loss of subjects is easier to repair by adding children than in a sealed panel.

Demerits

- Joining cohorts can hide real differences between groups born in different years, which is a secular-trend confound.
- Velocity estimates are weaker than in a long panel of the same bodies.
- Selective drop-out still biases the remaining sample if the poorest or most migrant children leave.
- Statistical handling is heavier than a simple cross-section, and poor joining produces a false smooth curve.

Use in anthropology

- Population comparisons, nutritional intervention, and secular-change studies in India often use mixed-longitudinal school data because a Tanner-style twenty-year clinic panel is rare.

Flow diagram

Cross-section -> Size only

Longitudinal -> True velocity

Mixed-longitudinal -> Overlapping cohorts

Overlapping cohorts -> Faster than full panel

Conclusion

Mixed-longitudinal growth study follows overlapping cohorts instead of one lifelong sample. It buys velocity and speed at the price of joining error, and it is the practical middle path between a survey and a full panel.

Facts & figures

J. M. Tanner

Set longitudinal velocity, peak height velocity, and tempo as the clinical gold standard of growth study.

Franz Boas

Used anthropometry across ages and environments to show that growth is plastic, a background to later designs.

Distance and velocity

Distance is size attained. Velocity is rate of growth. Mixed designs estimate both with overlap error.

Secular trend

Later-born cohorts may be taller; mixed designs can confound that trend with true age change if joins are naive.

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