



Zurich, March 1, 2019

Open MNF Master's thesis project:

Life-history tradeoffs and strategies among women in the city of Basel, ca. 1850-1950

We are looking for a Master's student for the following project:

Context: From an evolutionary viewpoint, all organisms should aim to maximize their genetic contribution to future generations. However, as organisms grow and reproduce they face a series of tradeoffs: growth must cease before reproduction begins, producing a large quantity of offspring compromises their quality, etc. Life-history theory proposes that investment into these competing domains is flexibly adjusted to make the best use of an individual's resources in their current environment. For example, in an environment with high mortality risk, females can do better by producing many offspring in the hope that some will survive; in a low-mortality environment resources may be better invested in a few high-quality offspring. Lastly, individuals who have greater access to resources may be able to afford both a greater quantity *and* quality of offspring. Several studies have applied this theory to humans, with mixed results. In this project, a large, detailed dataset provides an opportunity to test for fundamental life-history tradeoffs (adult height vs age of first reproduction, offspring quantity vs offspring quality) and to put them in relation to the mother's exposure to mortality risks and access to resources, captured by her neighbourhood and socio-economic status.

Data: As early as 1910, more than half of the births in the city of Basel took place in the university maternity hospital. The State Archives of Basel have kept numerous medical records of these individual births between 1896 and 1939. These multi-page records contain detailed information on the mother (age, body height, body shape, age at first menarche, etc.), on pregnancy (gestational age, parity) and on the newborn child (sex, birth weight, vital status, etc.). The social status can be approximated by the occupation of mother and father and general environmental context by the residential address of the mother. The data set (N>12'000) is prepared from an earlier project.

Research questions:

- Did women in Basel experience the fundamental life-history tradeoffs? Specifically:
 - o Is there a tradeoff between adult height and age at first birth?
 - o Is there a tradeoff between the number of previous births (offspring quantity) and birth weight (offspring quality)?
- How does socio-economic background modulate these tradeoffs? Specifically: Does socio-economic background lead to alternative strategies (e.g. poor mothers are shorter and have more, smaller babies earlier while rich mothers are taller and have fewer, larger babies later), or do people of better socio-economic background do better overall?

Tasks: The student will become familiar with life-history theory, learn new statistical methods, take over a prepared data set and analyse it in close cooperation with the project leaders (Adrian Jaeggi and Kaspar Staub). The student will also do the main writing of the publication (a master thesis directly as a scientific publication is preferred).

Prerequisites: Knowledge of statistical methods and coding in R and a strong interest in evolutionary theory and its application to humans

Start: As soon as possible or by arrangement.

If you are interested, please send a short CV by email to the contact addresses given above.