

In search of shared roots: Family trees reveal the negative effects of inbreeding in a small and isolated Swiss mountain village

In a study published in the international scientific journal *Journal of Evolutionary Biology*, researchers of the University of Zürich present unique data from a Swiss village, shedding new light on how inbreeding affects human fertility.

Using church books and family registries, they reconstructed the genealogies for all families living in Caveragno and Bignasco, two adjacent small and isolated Ticino mountain villages, going back as far as the 17th century. Until recently, such communities experienced only very little immigration, and marriages among (often distant) relatives were unavoidable. Therefore, historical datasets like this can thus provide a unique insight into the potentially negative effects of inbreeding on human fertility.

Not only was the team of researchers, led by evolutionary biologist Dr. Erik Postma, able to find out for each couple whether the partners were related to each other, and if so, how closely, but they could also count the number of children they had. Against common wisdom, they found that more closely related couples did not have fewer children. However, when the daughters of related couples went on to have children themselves, they did have smaller families. In other words, although related couples did not have fewer children, their daughters did give them fewer grandchildren.

Biologists and animal and plant breeders alike have long been aware of the negative effects of inbreeding on reproductive success. In humans the picture has been less clear, however. Although relationships among relatives are tabooed in many cultures, and it is well established that the children of related parents are more likely to suffer from rare genetic diseases, how inbreeding affects human fertility has remained unclear. This is because most studies have looked at this in non-Western societies with large socio-economic differences, which can easily obscure subtle genetic effects. Furthermore, most studies tested whether more closely related couples had fewer children, but they did not look for effects that only become apparent when their children start reproducing themselves. This study is the first to test for an effect of inbreeding on fertility in both parents and their offspring in an egalitarian Western community.

Postma and his colleagues emphasize that the level of inbreeding observed in these villages are typical for any isolated village of this size. The only way the communities in this study are unique is in the detailed family history that is available, which makes it possible to reveal negative effects of inbreeding. The degree of inbreeding they observed was many times smaller than that found in plants and other animals. As a matter of fact, in most cases couples would have been completely unaware of the fact that at some point back in time they shared common roots. Also, it is important to realize that inbreeding only explains a small proportion of the variation in family size. “Of course there are many socio-economic and cultural factors that also influence how many children we have”, says Postma, “but our work shows that our lives and those of our children are still influenced by our genetic make-up.”

Erik Postma, Luigi Martini and Pietro Martini, 2010. Inbred women in a small and isolated Swiss village have fewer children. *Journal of Evolutionary Biology* (<http://dx.doi.org/10.1111/j.1420-9101.2010.02013.x>)

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