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Are elder siblings helpers or competitors? Antagonistic fitness effects of sibling interactions in humans

Aïda Nitsch[1,2], Charlotte Faurie[2] and Virpi Lummaa[1,3]

[1]Department of Animal and Plant Sciences, University of Sheffield, Sheffield S10 2TN, UK
[2]CNRS, Institut des Sciences de l'Evolution, Place Eugène Bataillon, CC 065, 34095 Montpellier Cedex 5, France
[3]Wissenschaftskolleg zu Berlin—Institute for Advanced Study, Wallotstraße 19, 14193 Berlin, Germany

Determining the fitness consequences of sibling interactions is pivotal for understanding the evolution of family living, but studies investigating them across lifetime are lacking. We used a large demographic dataset on preindustrial humans from Finland to study the effect of elder siblings on key life-history traits. The presence of elder siblings improved the chances of younger siblings surviving to sexual maturity, suggesting that despite a competition for parental resources, they may help rearing their younger siblings. After reaching sexual maturity however, same-sex elder siblings' presence was associated with reduced reproductive success in the focal individual, indicating the existence of competition among same-sex siblings. Overall, lifetime fitness was reduced by same-sex elder siblings' presence and increased by opposite-sex elder siblings' presence. Our study shows opposite effects of sibling interactions depending on the life-history stage, and highlights the need for using long-term fitness measures to understand the selection pressures acting on sibling interactions.

1. Introduction

Determining the importance of family settings for individual success interests scientists from several disciplines, such as developmental psychology, genetics, social sciences and evolutionary biology. Evolutionary studies of family effects on offspring growth and development have traditionally focused on parental investment and parent–offspring conflict [1–3]. However, when several young co-reside in a family, sibling relationships are also likely to have important developmental, psychological, morphological or behavioural consequences [4]. Potentially, opposite sibling interactions can occur simultaneously in a