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Maternal egg hormones in the mating context: the effect of pair personality

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Across animal taxa from insects to mammals (also humans) individuals differ consistently in their behaviour. For example, some are always shyer and some are bolder when facing new situations. The origin of so called 'personalities' is partly genetic, but also shaped by early environment. Mothers critically shape the early environment, by giving care and food, but also by varying the hormonal environment during development. Variation in exposure to androgen hormones prenatally has been shown to affect personality traits. It has been suggested that part of the heritability of personality could thus be due to differential hormonal transfer from mothers of different personality types. Furthermore, the social environment of the mothers, i.e. the type of males they mate with, would be associated with the transfer of these hormones, and thus potentially offspring phenotype. We studied the association between female and male personality traits and the early hormone environment provided by the mothers, in a common bird model for personality studies, the great tit (*Parus major*). We collected data on parental personality traits and egg hormone levels from a wild population, as well as from captive birds where we mated them randomly with respect to personality. Finally, we also performed an experiment where birds selectively bred for fast-bold or slow-shy

A great tit (Parus major) female from the Netherlands (photo by Koos Dansen).

personalities were mated both with partners of the same selection line (i.e. fast-bold female with fast-bold male) or from the opposite line (i.e. fast-bold female with slow-shy male). We found that females of different personality types indeed had different androgen levels in their eggs. For the independent effect of social environment, the male personality traits, the results were not so clear. Data from selection lines suggested no effect but data from wild population and captive, random-mated birds suggested that male traits, and interestingly, the combination of male and female personality matter. This study highlights the complex origin of animal personalities, and suggests that the social context may play a role in shaping the early hormone environment, and thus offspring development and personalities.