

Testosterone and cortisol modulate the effects of empathy on aggression in children

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Researchers at the UPV/EHU-University of the Basque Country have explored the psychobiological mechanisms that may exist behind aggressive behaviour in children. The study, which included 139 eight-

year-old children, has concluded that low levels of testosterone and high levels of empathy may explain the low levels of aggressive behaviour in girls; low levels of empathy and high levels of cortisol may account for high levels of aggressive behaviour in boys.

The research group of the UPV/EHU's faculty of psychology has spent many years studying aggressive [behaviour](#) in [children](#). "We tackle the study of aggressive behaviour through a range of variables of a biological, psychological and social type," explained Eider Pascual-Sagastizabal, a lecturer in the department. A recent study published in *Psychoneuroendocrinology* reports on hormonal levels of [testosterone](#), estradiol and cortisol and the capacity for [empathy](#) of eight-year-old girls and boys.

"We're talking about a type of normative, mild aggressive behaviour inherent in the humans. We work with the normative population—in other words, they are not children with behavioural problems," said Pascual-Sagastizabal, one of the authors of the work. The main aim of the study was to "see whether there was any interaction on a biological and psychological level that could account for aggressive behaviour in children. A further aim was to find out whether this behaviour can be explained by means of various psychobiological mechanisms in children," she added.

The data emerging from the study indicate that "there are, in fact, psychobiological markers of aggressive behaviour, in other words, there are variables of a psychobiological type that account for aggressive behaviour in children," said the researcher.

Eighty boys and 59 girls aged eight in year three of primary education participated in the study, which involved measuring their levels of testosterone and estradiol (sexual hormones) and cortisol (a hormone associated with stress). At the same time, "we measured their empathy

through a questionnaire that we handed out to their parents, and aggressive behaviour was assessed in the classroom itself: the rest of the classmates evaluated each other's behaviour," she said.

A bid to understand the complexity of human behaviour

As the researcher explained, the results of the study revealed that "empathy and hormones could together account for aggressive behaviour. In fact, the interactions were different for boys and for girls." The researcher said, "The reason why a girl is not very aggressive could be explained partly by their high levels of empathy and their low levels of testosterone."

In other words, it was established that the girls who combine these two psychobiological elements are less aggressive. However, in boys, Pascual-Sagastizabal says, "our data do not correlate testosterone with empathy to account for aggressive behaviour." Boys with higher levels of cortisol and lower levels of empathy than the rest turned out to be more aggressive. By contrast, the levels of estradiol did not reflect any interaction with empathy in either case.

However, Pascual-Sagastizabal said that these results correspond to "this sample, to this moment and to this age. It is not a [representative sample](#); for it to be representative, we would need to handle vary large samples. Representativeness was not the aim that we were pursuing." The data correspond to a small group of boys and [girls](#), "but they are fundamental data, and more research needs to be done," Pascual-Sagastizabal added.

These researchers aimed to expand knowledge about aggressive behaviour: "We tried to understand the complexity of a human behaviour, and within that complexity to add as many variables as possible." It is [basic research](#), "essential for understanding why there are things that work when they are applied or if one intervenes, and why at

other times they don't work," she said. "For example, it has always been said that the more empathy there is, the less aggressive behaviour there is, but what we are contributing is that it may not always be like that. We professionals need to work on different levels of the same reality, which in this case is [aggressive behaviour](#)."

More information: Eider Pascual-Sagastizabal et al. Testosterone and cortisol modulate the effects of empathy on aggression in children, *Psychoneuroendocrinology* (2019). [DOI: 10.1016/j.psyneuen.2019.01.014](#)

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