**The following appeared as part of a letter to the editor of a scientific journal.**

**"A recent study of eighteen rhesus monkeys provides clues as to the effects of birth order on an individual's levels of stimulation. The study showed that in stimulating situations (such as an encounter with an unfamiliar monkey), firstborn infant monkeys produce up to twice as much of the hormone cortisol, which primes the body for increased activity levels, as do their younger siblings. Firstborn humans also produce relatively high levels of cortisol in stimulating situations (such as the return of a parent after an absence). The study also found that during pregnancy, first-time mother monkeys had higher levels of cortisol than did those who had had several offspring."**

**Write a response in which you discuss one or more alternative explanations that could rival the proposed explanation and explain how your explanation(s) can plausibly account for the facts presented in the argument.**

**Assumptions:**

- the author assumes that a study conducted on 18 rhesus monkeys is representative of their whole population.

- he suggests that this study is also applicable to firstborn humans without indicating how and where he collected this data.

- he suggests that first-time mother monkeys had higher levels of cortisol than those with several offsprings without indicating the credibility of this statement

In the letter to the editor of a scientific journal, the author suggests that the order of birth has some effects on an individual's levels of stimulation. The author supports his claim through a study conducted on eighteen rhesus monkeys which found that firstborn monkeys produced up to twice as much cortisol as compared to their younger siblings. The author then introduces the fact that firstborn humans also produce large amounts of cortisol, suggesting a correlation between monkeys and humans. Finally, he mentions that first-time mother monkeys had higher levels of cortisols as compared to those with several offsprings. The author's argument, as it stands now, doesn't hold water due to three reasons.

First, the author assumes that a study conducted on eighteen rhesus monkeys is a representative sample of the entire population rhesus monkey. Perhaps the monkeys in the study could have been bred in captivity. It could also be possible that the monkeys in the study displayed abnormal behaviour due to human intervention during the study. Any of the aforementioned reasons, if true, would mean that the data collected from these monkeys would serve as outliers and would not be applicable to the entire population of rhesus monkeys which would reduce the efficacy of the author's contention,

The author suggests that this study is also applicable to humans since he mentions that first-born humans 'also' produce high levels of cortisol in stimulating situations without any evidence to support this claim. Not only does the author assume that rhesus monkeys and humans are biologically similar, he does so on questionable evidence. There is no proof to support the fact that ALL first-born humans produce high levels of cortisol under simulation. Perhaps this was the result of another study conducted where the sample size was too small, and therefore not applicable to the entire population. If the explanation mentioned above is true, it suggests that the author's argument is full of logical fallacies which diminishes its credibility.

Finally, the study also finds that first-time pregnant monkeys have a higher level of cortisol than those with several offsprings. The author previously mentions that firstborn monkeys have high levels of cortisol. Perhaps this could affect the cortisol level of the mother who is pregnant with her firstborn. It could also be the opposite where the high level of cortisol in the mother during her first pregnancy could affect the cortisol level of the firstborn. In either case, the author assumes that these two situations are mutually exclusive which reduces the strength of his claim.

Overall, the author's argument, as it stands now, is flawed as it warrants more evidence to support it. Based solely on a study conducted on eighteen rhesus monkeys, the author comes to the conclusion not only firstborn infant monkeys produce more cortisol than their siblings, he also assumes this to be the case in humans. Finally, he also mentions that first-time pregnant mother monkeys also have high cortisol levels without investigating whether this is the reason why the firstborn monkeys have high cortisol levels (or vice versa). Conducting a well-defined scientific study with control and experimental groups would be a more accurate way for the author to support his claim.