

# Causes of left and right handedness



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Literature Review The Causes of Left and Right Handedness There are many theories posing the cause of handedness. Many researchers have debated these theories but are yet to have found an unambiguous answer. Even so, it has been found the vast majority of people, around 90%, use solely their right hand for tasks involving dexterity, indicating that only around 10% of the population are left handed and ambidextrous to some degree. Generally is more common in males than in females. Correspondingly, other primates also show strong tendency to be right handed. Vast ranges of testing techniques have been used to assess handedness. There are preference and performance tests, writing hand and self-report which are two of the most popular techniques. Several theories have been advanced over the years to explain the causes of handedness and, in particular, left-handedness.

Reasons put forth by various researchers to try and explain these findings are genetics, such as inheritable traits, environmental factors, birth risk events such as stressful births and biological contributions such as variations in cerebral dominance. The theory of genetics has been examined by many theorists who believe that genetics is the key contributing factor to the cause of handedness. The only genetic models that successfully explain the family incidence data are those of Annett and McManus, which share the feature of including a random component reflecting the biological occurrence of unpredictable irregularity. The models have each been modified to explain the greater incidence of left-handedness in males. The most predominant theory of handedness is Annett's (1972) right shift theory. The theory poses that a single autosomal gene labeled the right shift (rs+) gene if dominant in a person carrying at least one copy were mostly right-handed and those absent from carrying the gene would have a and fifty-fifty chance of being

either right-handed or left-handed. The model allows for a strong element of chance as well as the genetic component. Annett's theory was put into place in 1974 where she studied the theory by interviewing children whose parents were both left-handed. Since the parents were left-handed and therefore were absent from the right-shift factor, the children, in theory, should not have it either. Annett also studied the speed with which the children could perform a peg-sorting task. The results showed that 50% of the children did better with their left hand, and 50% of the children did better with their right hand. The results found reinforced her theory that left handedness was due to the absence of the right shift gene and that the hand preference of those without the gene is determined by chance and environmental factors.

Annet's theory was questioned by McManus and Bryden (1992) when they found that the proportion children who were left-handed that were born to parent who were both left-handed was only 26. 1% which is quite low compared to that of Annett's 50%. The McManus model is seen to be more successful at explaining the maternal effect; That left-handed mothers have more left-handed offspring than left-handed fathers. Both theories explain the association of handedness with cerebral language dominance. In contrast, another theory of handedness was also proposed by Stanley Coren ( ) who believed that handedness had nothing to do with genetics and almost everything to do with prenatal traumas caused by stress to the fetus. Coren is committed to saying that all humans are biologically right-handed and that the cause of people being left handed is a major result of stress to the fetus. The handedness of 942 subjects (305 tertiary students, 591 of their siblings and 46 of their children) was discovered by a 14-item questionnaire. The mothers of the subjects supplied information about maternal age at <https://assignbuster.com/causes-of-left-and-right-handedness/>

birth, birth weight, and the presence or absence of twelve conditions likely to be associated with birth stress for each subject. No increase in left handedness was found among fourth or later born children. A significant decrease occurred in first-borns of both sexes, although these had more stressful births than other subjects and there was no relationship between maternal age, birth weight or reported birth stress and left handedness found. Thus the hypothesis that birth stress is a major cause of left handedness in normal subjects was not supported. It was reported that birth stress was as frequent for right-handers as it was for left-handers. The children of left-handed mothers were not more likely to have birth stress than the children of right-handed mothers. It was also reported that birth stress was greater for the first born than children born after them. Hence, it was shown that difficult or stressful births happen far more commonly among babies who grow up to be left-handed or ambidextrous. Another theory that is examined to be the cause of handedness is birth weight in boys and girls. This was thought of due to the fact that the hormonal environment differs with the sex of the embryo and therefore it was thought that interactive effects of birth weight by sex should be examined. The theory of handedness was also researched by Geschwind & Galaburda (1987). The theory proposed that right-handed children developed more normally than left-handed children. It shows that right-handed children display leftward symmetries in language areas. In contrast, it is believed that left-handed children have suffered problems which have led to irregular cerebral dominance. Consequently motor coordination shifts to the left side in these children. The Geschwind & Galaburda Theory indicates that genetics is an inconsequential factor in the determination of left-handedness. It is argued

that influences outside genetics put forth the most control over hand preference. Studies have shown that injuries to a developing brain at certain developmental stages can cause significant changes. It is highly possible that changes in the chemical environment of a fetus can lead to a specific cerebral dominance. According to Geschwind & Galaburda's theory, the chemical changes and its effects on the developing brain and hence its effect on cerebral dominance can account for why left-handedness is more common in men (Oldfield, 1971), and why left-handedness is linked with developmental disorders of childhood (Coren, 1981). The subject of hand preference is one that has been studied for many years with many theorists posing new ideas as to the cause of hand preference. Yet none of these theories have been able to be proven as absolute. Interestingly enough, the reason why around 10% of the world's population prefer to use the left hand over their right hand is still unknown. In trying to explain this, the reasoning behind hand preference is most probably due to an amalgamation of all factors, genetics, environment, brain hemisphere dominances, birthing process, and effect of body chemical levels. Which one is right? Researchers find it difficult to accentuate one particular theory because of the infinite contradictions in the results. Conceivably, in the near future a method may be found to conclusively give an answer to the question of what causes left and right handedness