Handedness

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Handedness is a poorly understood phenomenon, that can be defined in many ways. Some consider handedness to be the hand that is used for writing. Others define handedness as the hand that is preferred to be used, or the hand that performs better on manual tasks (Markou, Ahtam & Papadatou-Pastou, 2017). Individuals are generally considered to be right-handed or left-handed, however some individuals may be ambidextrous, or able to use both hands. Finally, some consider handedness to be along a continuum, and not summed into these three categories.

The vast majority of individuals are right-handed, such that they prefer to use and/or write with their right hand. About 90% of individuals are right handed, and about 10% are left-handed or ambidextrous (Ooki, 2014). Left-handed individuals are more likely to learn to be ambidextrous, as they may have been taught in school to use their right hand, and often have to adapt to everyday objects that are designed for right-handed people. As a result, left-handed individuals often have stronger motor skills in their non-dominant hand than do right-handed individuals. Left-handed individuals are also more likely to be male (Markou et al., 2017).

Handedness was originally thought to be related to brain lateralization. Brain lateralization refers to how different parts of the brain are responsible for different functions. The function that was thought to be implicated in handedness was language (Knecht et al., 2000). In the late 19th century, it was discovered that language production and comprehension are localized in the left hemisphere for most individuals (Knecht et al., 2000). It was thought that an individual's handedness was the opposite of the language-dominant hemisphere, such that an individual with language localization in the left hemisphere would be right-handed, and an individual with

language localization in the right hemisphere would be left-handed. In the 60s, it was discovered that only about 10% of left-handed individuals have right hemisphere language lateralization (Markou et al., 2017). Most left-handed individuals process language in either the left hemisphere or both hemispheres. Other theories, therefore, have been explored in an attempt to explain handedness.

More contemporary research on handedness focuses on genetics. Some researchers suggest that right-handedness is a universal phenomenon, and that left-handedness is a result of some genetic mutation or prenatal complication (Bailey & McKeever, 2004; Ooki, 2014). Certain genes have been implicated in handedness, however little research has been conducted to replicate and validate these findings. Twin studies have been conducted to examine heritability effects on handedness. Those who are twins are more likely to be left-handed than those who are not twins, however not all pairs of twins have the same handedness (Ooki, 2014). As a result, twin studies on handedness are often mixed and inconclusive. Many researchers have found genetics to account for only a small portion of the variance of handedness, and suggest that the remainder of the variance can be explained by environmental factors (Ooki, 2014; Knecht et al., 2000).

In a study on environmental factors and handedness, Bailey and McKeever (2004) examined the effects of pregnancy and birth risk factors and stressors on handedness. Out of the 25 factors examined, Bailey and McKeever (2004) found maternal age to be the only factor that had a significant association with offspring left-handedness. This association, however, was very weak. In another study, left-handedness and mixed-handedness were found to be associated with prenatal maternal depressive symptoms and critical life events (Rodriguez & Waldenström, 2008). Ultrasound exposure was not significantly associated with handedness.

Handedness has been implicated in a number of psychological conditions. Left-handedness has been implicated in schizophrenia; however, the results have been mixed (Markou et al., 2017). Some researchers have found higher rates of left-handedness in those with psychotic disorders, while others found higher rates of right-handedness or no difference in handedness. Higher rates of left-handedness and inconsistent/mixed handedness have also been found in those with autism spectrum disorder, intellectual disabilities, and ADHD (Markou et al. 2004; Rodriguez & Waldenström, 2008). It is unknown as to why certain disorders may display higher rates of left-handedness; however, it is theorized that neurobiological factors may play a role.

Further Readings:

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Kushner, H. I. (2017). *On the other hand: Left hand, right brain, mental disorder, and history.* Johns Hopkins University Press, Baltimore, MD. Retrieved from http://search.proquest.com.ezproxylocal.library.nova.edu/docview/1979172375?accountid=6579

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Ooki S. (2014). An overview of human handedness in twins. *Frontiers in psychology*, *5*, 10. https://doi.org/10.3389/fpsyg.2014.00010

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