RESEARCH SYNOPSIS

Agrawal, A., & Lynskey, M. T. (2008). Are there genetic influences on addiction: evidence from family, adoption and twin studies. *Addiction, 103*, 1069-1081.

RESEARCH QUESTIONS

What is the genetic component of addiction? Can family, twin, and adoption studies help researchers understand how genetic and environmental factors work alone and together to influence addiction?

PURPOSE

Advances in technology have allowed researchers to directly examine the sequence and function of disease-causing genes. However, substance use and addiction is the result of complex interactions between multiple genes and the environment. The contributions and interactions of genetic and environmental factors to addiction can be untangled using studies of twins, adoptions, and families. This review article examined such research for evidence of a heritable, genetic component to drug and alcohol addiction.

HYPOTHESIS

None stated.

PARTICIPANTS

None stated (review article).

PROCEDURE

Researchers examined previous research on substance use and addiction rates among fraternal and identical twins, adoptive children and parents (adoptive and biological), and other family members. Summaries of previous research findings are collected and collated in this review paper.

MAIN OUTCOME MEASURES

Studies concerning genetic and environmental contributions to addiction to alcohol, nicotine, and other drugs were included in this review. Addiction rates were compared across family members (e.g., parent vs. children) and also across environments (e.g., twins living in urban vs. rural environments). Specific comparisons varied across previous studies.

KEY RESULTS

Family, adoption, and twin studies all suggest that there is a moderate to strong genetic influence on addiction to drugs and alcohol, such that 30-70% of the variability in risk of developing addiction can be explained by genetic contributions. The remaining 70-30% of variability in addiction risk depends on both environmental influences and on interactions between genetic and environmental factors. The same genes may act as risk factors for both initiation and maintenance of substance use and abuse. Similarly, the same genes may be risk factors for addiction to multiple substances (e.g., drugs and alcohol). However, multiple genes are involved in addiction, and specific genes may be more important risk factors at certain developmental milestones or environmental contexts. Genetic influences on addiction are important for both men and women, but may vary across age groups and cultural contexts. Even in the era of direct sequencing and measurement of individual genes, twin studies are a valuable tool for examining genetic influences on behavior. Complex research designs that include children of twins as comparison groups may be an important means of further untangling interacting gene-environment influences on addiction.

LIMITATIONS

This review paper did not provide the criteria used in searching for previous research, and the current findings may not completely represent findings from previous research. The qualitative rather than statistical (i.e., meta-analytic) aggregation of previous results means that the reliability of numerical estimates of genetic and environmental effect is unknown.

CONCLUSIONS

The genes we inherit from our parents and the environment where we live both influence our risk of developing an addiction to alcohol, nicotine, and other drugs. Research using family-based comparisons, such as twins and adoption studies, are useful means of examining the complex interactions between multiple genes and environments that contribute to addiction.

KEYWORDS: **a**ddiction; environment; genetic; heritability; twins

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