

5-2015

# More Than Just Writing: Handedness and Substance Use

Bradley Martin  
*St. Catherine University*

---

## Recommended Citation

Martin, Bradley, "More Than Just Writing: Handedness and Substance Use" (2015). *Master of Social Work Clinical Research Papers*. Paper 490.  
[http://sophia.stkate.edu/msw\\_papers/490](http://sophia.stkate.edu/msw_papers/490)

This Clinical research paper is brought to you for free and open access by the School of Social Work at SOPHIA. It has been accepted for inclusion in Master of Social Work Clinical Research Papers by an authorized administrator of SOPHIA. For more information, please contact [ejasch@stkate.edu](mailto:ejasch@stkate.edu).

# More Than Just Writing: Handedness and Substance Use

By

Bradley Martin, MHR, MA, LADC

MSW Clinical Research Paper

Presented to the Faculty of the  
School of Social Work  
St. Catherine University and the University of St. Thomas  
St. Paul, Minnesota  
In Partial fulfillment of the Requirements for the Degree of

Master of Social Work

Committee Members

Lisa Kiesel, Ph.D., LICSW (Chair)  
Julie Childs, MSW, LICSW, LADC  
Steven Schreiber, MS, LPC, CSAC, LADC, CRC

The Clinical Research Project is a graduation requirement for MSW students at St. Catherine University/University of St. Thomas School of Social Work in St. Paul, Minnesota and is conducted within a nine-month time frame to demonstrate facility with basic social research methods. Students must independently conceptualize a research problem, formulate a research design approved by a research committee and the university Institutional Review Board, implement the project, and publicly present the findings of the study. This project is neither a Master's thesis nor dissertation.

### **Abstract**

This study explored the possible association of handedness and substance use disorders. A quantitative study was conducted by administering a Handedness and Substance Use survey to participants assigned to dialectal behavior therapy (DBT) skills groups in a Midwestern city in the United States. From the 96 survey responses aging from 18-62 years old, 6.3% (n=6) identified as male, 90.6% (n=87) identified as female, and 3.1% (n=3) identified as transgender. 9.4% (n=9) identified as left handed, and 90.6% (n=87) identified as right handed. Significant association was found between handedness and participation in an alcohol and drug treatment program. The results show that over 27% of all respondents have attended a form of alcohol or drug treatment, 55.5% who report being left handed and 24.1% who are right handed. Significant association was also found between handedness and someone else recommending an alcohol and drug treatment program. The results show that over 36.5% of all respondents have had someone else recommend an alcohol or drug treatment, 66.7% who report being left handed and 33.3% who are right handed. The findings also found heightened responses from self-identified left-handed participants in having felt the need to cut down on their substance use and familial substance abuse concerns compared to right-handed respondents. This study concludes by addressing the possible implementations and recommendations stemming from discovering a possible new risk factor for substance use disorders.

### **Acknowledgements**

It is essential and just that I thank and acknowledge the following people:

Dr. Lisa Kiesel, my research chair, who has been a leader, teacher, and trusted advisor. Thank you not only for your guidance, wisdom, and expertise in this project, but also for the sound lessons of our profession that I was fortunate to have experienced over the past two years.

Julie Childs and Steve Schreiber who are both so much more than just my research committee members. You both have molded my outlook on the way I will approach my future practice. Thank you both for your time, effort, guidance, and friendships.

Thank you Justin and Juliette for the patience and support you have shown. Thank you for understanding that dad too needed to do homework and attend classes. Finally, I want to give a hearty appreciation to my wonderful wife Maria, who has been my biggest supporter in my new career adventures. Thank you for assuming so many extra responsibilities while maintaining such a loving and supporting relationship. I will forever be grateful.

## Table of Contents

Introduction.....	5
Literature Review.....	7
Research Question.....	15
Conceptual Framework.....	16
Methods.....	18
Research Design.....	18
Participants/Sample.....	18
Protection of Human Subjects.....	18
Data Collection Instrument/Process.....	19
Data Analysis.....	20
Findings.....	23
Discussion.....	35
Sample Age/Gender/Handedness.....	36
Handedness and Alcohol or Drug Treatment.....	37
Handedness and Ever been recommended for treatment.....	39
Handedness and Felt the Need to Cut Down on Use.....	40
Handedness and Family Substance Abuse.....	41
Implications.....	42
Study Limitations.....	44
References.....	46
Appendices	
Appendix A.....	50
Appendix B.....	51

## Introduction

Social recognition of substance use disorders may be hindered by the stigma that is often attached to those suffering from them; however, their impacts on society are not easily ignored. There are an estimated 76.3 million people in the world who have been diagnosed with an alcohol use disorder according to the World Health Organization (2002). Grant et al. (2004), report 17.6 million people living in the United States meet the criteria for an alcohol use disorder. Only 12.5% of people in the United States who meet the requirements for an alcohol use disorder will participate in a form of treatment (Stinson et al., 1998). Witkiewitz (2008) states of all individuals who are treated for an alcohol use disorder, 65% to 90% will have at least one alcoholic beverage or fully relapse within the first year following treatment. With such a high potential of relapse and the possibility of returning to full substance use, the cycle of addiction can become a continuous struggle for many. Further knowledge of predisposition risk factors may provide assistance in addressing substance use disorders.

The pathology of substance use disorders is well discussed and debated within the United States. Substance use disorders have been viewed with a medical perspective as a brain disease (Leshner, 2001), associated with genetic traits (Milberger, Faraone, Biederman, Chu, & Feighner, 1999), environmentally influenced (Marco, 2013), or driven by choice (Satel & Lilienfeld, 2014). Regardless of the pathology or causes, there are many shared concerns once an individual is diagnosed with a substance use disorder. Along with continued relapses worries after periods of sobriety, physiological changes in the brain have been well documented and researched. The mesolimbic dopamine pathway is one of the most impacted systems in the brain resulting from substance use

disorders (Powledge, 1999). Other regions of the brain impacted by substance use disorders are the executive functioning prefrontal cortex and the hippocampus (Koob & Volkow, 2010). Buttner (2011) also states the toxicity that is exposed to the brain from substances can also produce negative neurologic and psychiatric symptoms.

There are other human traits associated with diverse brain structure, neurological functioning, and genetics. A person's handedness is one of those identified traits. As with substance use disorders, the causation for a person to be left-handed or right-handed has been debated and associated to a variety of factors. However, there are defined physiological differences in the brain that associate with handedness (Sun & Walsh, 2006). Sun and Walsh (2006) continue to report brain asymmetry divides the brain into the left and right hemispheres. 90% of human population is right-hand dominant, which is controlled by the left hemisphere of the brain. The 10% of the population who is left-hand dominant is the result of the control of the right hemisphere of the brain.

Ocklenburg, Beste and Gunturkun (2013) report brain hemispheres produce diverse functioning tasks, such as spatial recognition, logic processing, and language. Left-handedness, along with physiological brain differences, has also been related with increased relationships in schizophrenia, depression, motivation, certain personality traits, general cognitive ability, language abilities and perception (Ocklenburg et al., 2013).

Few studies have been done to explore the relationship with handedness and substance use disorders. There have been similarities observed through research between the two conditions, both mentally and physiologically. With the possibility of identifying another predisposing risk factor for substance use disorders, future preventive awareness or treatment procedures can be incorporated to those who may be impacted. Working

with people diagnosed with substance use disorders, social workers incorporate many of the Social Work for Social Justice: Ten Principles and the Social Work Code of Ethics. Human dignity can provide paramount guidance when balancing the treatment of substance use disorders to the societal stigmas placed on them. Treating addiction as a primary disease allows focus to be placed on the disease rather than judgment on the individual. By understanding the possible risk factors of substance use disorders may help mitigate the chances of substance use disorders, or better the chances of long-term sobriety. The purpose of this paper is to explore the relationship of one possible factor that may provide another predisposition factor relating to substance use disorders.

### **Literature Review**

Information from multiple disciplines were reviewed and incorporated in creating this literature review. The areas of focus from these multidiscipline evaluations for this literature review were the pathology of substance use disorders, concern for substance relapse, substance use disorders and the brain, handedness, and left-handedness.

#### **Pathology of Substance Use Disorders**

A review of the literature reveals strong debates towards the pathology of substance use disorders. The World Health Organization identifies substance use disorders as a medical disease totaling 5.4% of all known diseases (2014). The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) (2013) includes substance use disorders that are assigned diagnostic schemes. Through a medical perspective, chemical addiction is often related to brain disease. Leshner (2001) defends the brain disease concept by explaining how neurological changes through chemical use can produce cognitive distortions and hamper emotional functioning. As a disease,



changes in the brain's function and structure impact its natural motivational control by prioritizing chemical use as the top motivational factor for an individual. Leshner (2001) continues to state that individuals may begin substance use voluntarily, but if they become addicted, or acquire the disease, the choice is then eliminated and replaced by uncontrollable and compulsive substance cravings that negatively interfere with daily functioning. Nutt (2013) argues that treating substance use disorders other than a medical perspective is deceitful and hurtful. With a medical disorder perspective, substance use disorders should be compared to other disorders such as type II diabetes or schizophrenia. Nutt (2013) adds, with the use of newer brain imaging technology, there is further evidence of how the brain's natural reward system is "hijacked" and altered through chemical use. This brain transformation leads to repeated urges towards the addicted substance that results in behaviors of compulsivity and loss of control. He continues to elude that once people meet criteria for substance use disorders, they will always be highly vulnerable to relapse do to the brain changes. Marco (2013) defends the disease concept of substance use disorders and compares them with other disease such as cancer, hypertension and type II diabetes. He continues by stating, as with other diseases, substance use disorders have unique characteristics in regards that the influences are biological, genetic, and environmental.

Substance use may alter the function and structure of the brain, but studies have also noted there may be a genetic elements to substance use disorders. The Milberger et al. (1999) study suggests alcohol rates of offspring from substance use disorder familial environments (21%) were significantly higher than those from non-substance use disorder familial environments (12%). Similarly Goldmen, Oroszi, and Ducci (2005)

imply heritability of substance use disorders is classified as moderate to high. The genetics associated with addiction along with environmental factors impact the initial choice to use, and possibly the onset and the life cycle of substance use disorders. As with possible genetic factors, environmental factors have closely been associated as well with substance use disorders. Marco (2013) reports twin studies have found differential risk comes 50% from environmental factors and 50% from genetic ones.

Associating and acknowledging other factors contributing to substance use disorders have lead many to question if the brain disease concept is truly accurate. Satel and Lilienfeld (2014) argue against the medical disease concept of substance use disorders. Rather, they denote the powerful impact of choosing and appropriate incentives at certain life points as primary factors contributing towards sobriety. These factors may not be easy to obtain, but the authors speak to the individual suffering from substance use disorders to acknowledge when the life circumstances allow for the needed implementation. Substance use disorders viewed with a maladaptive behavioral perspective, may allow those diagnosed find empowerment towards their recovery. Branch (2011) suggests many people are able to choose to stop substance use without clinical intervention and states those who seek treatment may be more likely to display a comorbid mental health disorder. However, Branch does acknowledge the high propensity of relapse for those who seek clinical treatment. Luntz (2006) offers another possible factor for substance used disorders, social dislocation. Aspects contributing to social dislocation include, no community affiliation, lack of intimate relationships, and absence of spirituality, which can all be contributing factors towards substance use disorders. Even though there are many views on the pathology of substance use disorders,

a review of literature reveals concern of relapse once a person is diagnosed with a substance use disorder.

### **Concern for Relapse**

Unfortunately the relief and struggles associated with substance use disorders often do not end once individuals seek professional treatment. Professional treatment may provide the catalyst for building a life of recovery, but it does not guarantee one. Stinchfield and Owen (1998) found in their research 76.9% of those successfully completing treatment remained chemically abstinent three months after treatment, 59.1% six months following treatment, and 52.8% were able to maintain chemical abstinence 12 months following treatment. Witkiewitz (2008) similarly reports up to 90% of those deemed alcohol dependent and completed treatment would have at least one drink within 12 months completing treatment. She continues by stating people diagnosed with a substance abuse disorder have a low probability of ever being able to use substances moderately post treatment. Studies have shown there are many factors that can influence, or diminish the chances of chemical relapse after treatment. Zywiak et al. (2006), report higher risk factors for relapse can include negative effect on the family, cravings for the substance, and social pressures. Substance use disorders and ongoing relapses may be more effectively addressed if a better understanding on how the brain and thought processes are impacted from continued substance use.

### **Substance Use Disorders and the Brain**

A review of literature exposes many possible correlations of substance use disorders and the brain. Powledge (1999) explains how certain categories of substances can impact the brain diversely due to their structured ingredients; however, all categories

of substances have been found to impact a single pathway in the brain. This pathway is called the mesolimbic dopamine pathway, also referred to as the reward circuit that extends from the ventral tegmental area to the nucleus accumbens then progressing to the limbic system. The limbic system is an assortment of primitive brain structures that include the hippocampus, the amygdala, and the hypothalamus. Powledge (1999) identifies the hippocampus as the brain's learning and memory region, the amygdala as a region that generates emotional reactions from different occurrences, and the hypothalamus as the carrier of hormones that control things such as hunger, sexual desire, and thirst. Dopamine, a neurotransmitter, is the primary transmitter found in the mesolimbic pathway. Dopamine is transmitted through the pathway; however, addictive drugs disrupt the normal transmission of dopamine in the pathway. Powledge (1999) continues to explain how a normal brain will regulate the amount of dopamine supplied, too little may bring symptoms of tremors, too much can produce delusions. A correctly regulated amount of dopamine in the brain can produce feelings of pleasure; however, addictive drugs increase the brain levels of dopamine that can lead to states of euphoria. As addictive drugs are introduced into the body increasing the dopamine rush, the brain will regulate the levels of dopamine and decrease its natural production. Eventually, as the natural regulated levels of dopamine are produced less in the brain, a person suffering from a substance use disorder may need to rely on substances to achieve a feeling of normality.

Koob and Volkow (2010) also report abused substances impact the mesolimbic dopamine pathway. They continue by identifying many of the aspects that are associated with the decrease levels of dopamine can produce the vital signs and symptoms of

addiction such as withdrawal, drug seeking patterns, decreased motivation, increased anxiety, decreased activity, and other adverse factors. Koob and Volkow (2010) continue to imply many other regions of the brain are also impacted through substance use. The prefrontal cortex, the executive functioning of the brain, is also linked to drug usage impairing cognitive flexibility and attention. They further report damage to the hippocampus can cause recognition, verbal, and spatial memory deficiencies. Buttner (2011) claims continued use of addictive substances, and the toxicity associated with use, can produce neurologic and psychiatric symptoms.

Depending on the frequency and types of drugs abused, the predominant neurologic-psychiatric complications of drug abuse include high prevalence of depression, memory loss and cognitive decline, and the possible predisposition to schizophrenia (Buttner, 2011, p. 119).

The review of literature produces many examples of how substance use disorders can impact and change brain operation and structure. These neurological changes note the potential reasoning why individuals become addicted to substances. However, the literature does not indicate neurological or genetic predisposing factors within the brain that increase the potential of an individual to become susceptible to substance use disorders and their neurological impacts. Further exploration of literature reveals unique human traits that are associated with diverse brain structure, neurological functioning, and genetics.

### **Handedness**

Wiley (2005) describes handedness as a person's tendency to use one hand over the other in performing an assortment of activities. Many of the world's species tend to

have right or left limb preferences. Most species generally balance out between left and right limb preferences with little differences in overall distribution, but not humans. The overall percentage of right-handedness in the human population is around 90%. Similarly reported by Staley (2013), human right-handedness ranges from 85%-90% of the overall population.

Likewise to substance use disorders, the causation for a person to be left-handed or right-handed has been debated and associated to a variety of factors. Wiley (2005) reports handedness can be environmentally and socially influenced through implicit and explicit means. Explicitly, some societies pressure the populace to write with their right hand. Implicit factors can be seen in the design of tools, such as scissors, or sporting accessories that tend to favor right-handed use. Ocklenburg et al. (2013) report genetic traits are responsible for handedness. They note examples of left-handedness are often seen in families, and report evidence in handedness' ontogenesis can possibly be determined by genetic influences. However, no specific genes have yet been identified to handedness. Identified biological differences have also been associated with handedness.

Sun and Walsh (2006) report brain asymmetry divides the brain into the left and right hemispheres. 90% of human population is right hand dominant, which is controlled by the left hemisphere of the brain. The right hemisphere of the brain controls and is contributed to being left hand dominant of 10% of the population. Ocklenburg et al. (2013) report handedness is the most studied trait surrounding brain asymmetries. The asymmetries of the brain produce diverse functioning tasks, such as spatial recognition is normally dominant in the right hemisphere, and logic processing and language is normally dominate in the left hemisphere. Sun and Walsh (2006) continue to report that

language ability is dominant in the left hemisphere in right-handed individuals 95% of the time, but only 70% in left handed individuals. The left hemisphere is not solely associated to language; it is mainly dominant for logical reasoning and mathematical processing. The right hemisphere of the brain has been associated with artistic purposes, music, and emotional functioning. The review of literature reveals possible variations in brain functioning that is associated with handedness. This diverse brain functioning may also be associated with distinct human traits.

### **Left-Handedness**

Findings from the review of literature display there may be a variety of human traits associated with handedness. Ocklenburg et al. (2013) infer schizophrenia and depression have been associated with a greater occurrence in non-right handed individuals. They also include significant differences between handedness and motivation, personality, general cognitive ability, language and perception. Brandler and Paracchini (2013) explain how handedness is linked to many disorders in many smaller studies. In meta-analyses these association findings are less common. However, they include a 1990 meta-analysis that noted an increased prevalence of left-handedness and schizophrenia. Cairney et al. (2008) found in their study a prevalence of left-handedness and developmental coordination disorder in children. Gender identity disorder has also been associated with handedness. In their study, Zucker, Beaulieu, Bradley, Grimshaw and Wilcox (2001) found left-handed men were significantly more likely to have gender identity disorder. In a study of 205 men with gender identity disorder, 19.5% considered themselves left-handed compared to 8.3% of those in the clinical control group who reported to be left-handed.

A review of literature finds only a few studies of substance use and handedness. Bakan (1973) found in a study of 47 patients in a group of male alcoholics that 25% reported to be left-handed or ambilateral, compared to an approximate population in age sample of 8.6% being left-handed. Similarly, Denny (2011) studied the data set of 27,426 individuals over the age of 50 from 12 European countries. He found evidence that suggest left-handed people tend to drink more frequently than right-handed individuals. However, he was not able to find if the association between higher frequencies of drinking in left-handed people associated with substance abuse disorders.

### **Research Question**

Research suggests there is a valid concern regarding substance use disorders within our society. With continued chemical use, there are neurobiological changes within the brain that impact behaviors, functioning, and overall well-being. These changes have been associated with chemical cravings, withdrawal, relapse, and other factors that can lead to continued chemical addiction. There are distinct human traits that impact standard neurobiological functioning and differences. In particular, handedness and the brain asymmetries have been well researched. Handedness has been associated with depression, schizophrenia, gender identity, personality, motivation, cognitive ability, and other neurodevelopmental disorders. The review of literature has found the pathology and the classification of substance use disorders is well debated by many; however, several agree there are predisposing factors that can increase the risk for them. Genetic, environmental, and biological are some of the predisposing risk factors. There have been few studies that have found a link of handedness to chemical use. With the possibility of identifying another predisposing risk factor for substance use disorders, it may prove



beneficial in future preventive awareness or treatment procedures. Centered on the examination of multiple research articles, the proposed research question for this study is: Does being non-right handed increase the association of substance use?

### **Conceptual Framework**

In social work practice, a risk and resilience perspective can be associated with clients' abilities to overcome a variety of situations that may increase the probability of future problems. (Greene, Galambos, & Lee, 2004). Stewart, Reid, and Mangham (1997) allude resilience should be reliant on life context and considered a multifaceted biopsychosocial and spiritual process. Greene et al. (2004) continue by stating, intrinsic influences such as attitudes and temperaments as well as extrinsic influences such as neighborhoods and environments are all involved in resilience. Resilience should be viewed as a multilevel experience that can be present throughout a lifetime. Fraser, Richman, and Galinsky (1999) describe resilience as the ability to adapt to extraordinary conditions and achieve positive outcomes. They further state resilience arises from a collection of individual and external factors that combine to fabricate positive performance when faced with substantial risks. In their study, Greene et al. (2004) highlighted internal factors to resilience such as attitude, ability to intrinsically develop resilience, intelligence, and problem-solving skillsets. The study also identified some of the external factors influencing resilience such as familial and social attachments.

Incorporated into the risk and resilience perspective is the need to identify risks and protective factors to mitigate such risks. Dyer and McGuinness (1996) describe protective factors as unique abilities that people can implement, internally or externally, in order for resilience to occur. Fraser et al. (1999) report risks factors can be categorized

as individual characteristics (such as genetic traits), specific life experiences (such as experiencing trauma), or contextual factors (such as living environments). Regardless of what category risk factors are associated with, they all can be considered indicators, links, and sources of potential ill results. Fraser et al. (1999) continue and report that similar to risk factors, protective factors can forecast future outcomes. Protective factors can modify or influence risks that can result in decreasing a disorder or dysfunction.

The purpose of this research is to determine if, and to what extent, handedness may be related to substance use. The possible relationship may be incorporated with the risk and resilience framework in addressing the treatment of substance use disorders. By identifying a possible relationship between handedness and substance use disorders, an individual characteristic risk factor will also be identified. Through the risk and resilience framework, implementing protective factors that increase the resilience for a person to be susceptible to substance use disorders due to his or her handedness can mitigate the risk factor.

As a licensed alcohol and drug counselor, I have incorporated many aspects of the risk and resilience perspective in my practice. Many of the substance use disorder treatments and relapse prevention programs are centered on identifying past, current, or future risk factors and mitigating them by implementing protective factors. Possibly identifying a new individual characteristic risk factor associated to substance use disorders may provide the opportunity to implement preventive practices and awareness.

## **Methods**

### **Purpose and Design**

The purpose of this study was to determine if, and to what extent, there was a relationship of being non-right handed and an increase of substance use disorders. A sampled population was identified to voluntarily participate in this research. The information and data for this quantitative study was comprised from a specifically designed survey. The designed survey attempted to address seven objectives: 1) identify participants' gender, 2) identify participants' age, 3) identify participants' handedness, 4) hereditary of substance use, 5) ever thought the need to cut down on drinking or drug use, 6) has someone else ever recommend an alcohol or drug treatment program, and 7) to seek if the participant has been exposed to a substance abuse treatment program.

### **Participants/Sample**

The data for this study was obtained from participants assigned to dialectal behavior therapy (DBT) skills groups in a clinic offering comprehensive mental health services. The clinic is located in an urban setting in a Midwestern city in the United States. Participants were 18 years of age or older, participating in a DBT group, and receiving care for at least one clinical diagnosis from the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5). The survey was administered during scheduled monthly group sessions in conjunction with other scheduled organizational surveys. 96 participants responded to the study.

### **Protection of Human Subjects**

First level of approval for this research proposal was received from a University of St. Thomas/University of St. Catherine research committee. The second level of

approval was sought from the clinic where participants were recruited. Following the first two levels of approval, the research proposal, survey, and survey administration procedures were submitted and approved by the St. Catherine University Internal Review Board (IRB) prior to any action of this research. Participation in the survey was completely voluntary. Participants were given and read a letter of informed consent. If participants agreed to partake in the survey, the informed consent was signed and retained at the clinic. This increased the anonymity and protected the privacy of the participants. Participants had the choice to answer all or no questions on the survey, and may have requested not to continue participation at any time. Surveys were placed in an envelope by the participant and sealed after the completion of the last participant.

### **Data Collection Instrument**

A Handedness and Substance Use survey (Appendix A) was developed with the help of the literature reviewed. Demographic questions were asked to participants (survey items 1-2). The demographic information collected was the participants' age (survey item 1) and gender (survey item 2). Preferred hand to use for writing or drawing was asked to help determine participants' handedness (survey item 3). Immediate family history of substance use disorders was asked of participants (survey item 4) since research has found genetic relationships for substance use disorders (Goldmen, Oroszi, & Ducci, 2005). Participants' perception of their substance use was gathered by asking if they ever thought they ought to cut down on their drinking or drug use (survey item 5). Previous history of recommendations or participations in treatment programs to address substance use concerns was asked to participants (survey items 6-7).

**Data Collection Process**

Upon approval from the University of St. Thomas/University of St. Catherine research committee, the clinic where participants were recruited, and the IRB, the data collection began. During an identified monthly group when organizational surveys were scheduled, participants were also offered the Handedness and Substance Use survey (Appendix A). Participants were briefed of the survey by the group facilitator and asked if they were voluntarily interested in partaking in the study. If interested, a letter of informed consent (Appendix B) was read and given to the participant for signature. The letter of informed consent was signed and retained at the clinic. Participants selected to answer all or no questions of the survey, and could have requested not to continue participation at any time. Surveys from each group were placed in an envelope by the participant and sealed after the completion of last participant. The researcher collected all sealed envelopes containing the participants' surveys. Received surveys implied consent, voluntary participation, and a letter of informed consent were retained at the clinic for each survey received. Collected data was then placed in a secure filing cabinet when not being analyzed. All collected data will be destroyed no later than May 15, 2015.

**Data Analysis****Descriptive Statistics**

The nominal variable measured the respondents' gender. This variable was operationalized with the item: "Gender:" The response options are male, female, and transgender (survey item 2). The research question for the study was: How many men, women, and transgendered people are in the sample?

The nominal variable in this study measures the handedness of respondents. The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The research question for this study was: How many left-handed and right-handed participants are in the sample group?

The ratio variable measures the respondents’ age. This variable was operationalized with the item: “Age:” The response options were 0-100 (survey item 1). The research question for the study was: How old are the participants in the sample group?

### **Inferential Statistics**

Chi-Square for handedness and felt the need to cut down on drinking or drug use. The nominal variable in this study measured whether participants have ever felt they should cut down on their drinking or drug uses while the other nominal variable measured the handedness of the participant. The felt you should cut down on your drinking or drug use was operationalized with the item: “Have you ever felt you ought to cut down on your drinking or drug use?” The response options were yes and no (survey item 5). The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The hypothesis for this study was: There is an association between handedness and feeling the need to cut down on drinking or drug use. The null hypothesis for this study was: There is no association between handedness and feeling the need to cut down on drinking or drug use.

Chi-Square for handedness and participation in an alcohol or drug treatment program. The nominal variable in this study measured whether the participant has ever participated in an alcohol or drug treatment program while the other nominal variable measured the handedness of the participant. The alcohol and drug treatment variable was operationalized with the item: "Have you ever participated in an alcohol or drug treatment program?" The response options were yes and no (survey item 6). The handedness variable was operationalized with the statement: "What hand do you prefer to use when writing or drawing". The possible response options were "left" or "right" (survey item 3). The hypothesis for this study was: There is an association between handedness and participating in an alcohol and drug treatment program. The null hypothesis for this study was: There is no association between handedness and participating in an alcohol and drug treatment program.

Chi-Square for handedness and someone else ever recommending an alcohol or drug treatment program. The nominal variable in this study measured whether someone else has ever recommended participants for an alcohol or drug treatment program while the other nominal variable measured the handedness of the participant. The recommended to an alcohol or drug treatment by someone else variable was operationalized with the item: "Has someone else ever recommended you may need an alcohol or drug treatment program?" The response options were yes and no (survey item 6). The handedness variable was operationalized with the statement: "What hand do you prefer to use when writing or drawing". The possible response options were "left" or "right" (survey item 3). The hypothesis for this study was: There is an association between handedness and someone else recommending an alcohol or drug treatment program. The null hypothesis

for this study was: There is no association between handedness and someone else recommending an alcohol or drug treatment program.

Chi-Square for handedness and immediate family substance abuse. The nominal variable in this study measured whether participants had immediate family substance abuse concerns while the other nominal variable measured the handedness of the participant. The immediate family substance abuse concerns was operationalized with the item: “Has anyone in your immediate family suffered from an alcohol or drug problem?” The response options were yes and no (survey item 4). The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The hypothesis for this study was: There is an association between immediate family substance abuse concerns and handedness. The null hypothesis for this study was: There is no association between immediate family substance abuse concerns and handedness.

## **Findings**

### **Frequency Distribution of Gender**

The nominal variable measured the respondents’ gender. This variable was operationalized with the item: “Gender:” The response options were male, female, and transgender (survey item 2). The research question for the study was: How many men, women, and transgendered people are in the sample? The findings of this study in Table 1 show that of the 96 participants, 6.3% (n=6) identified as male, 90.6% (n=87) identified as female, and 3.1% (n=3) identified as transgender. These findings show that there was a strong representation of female participants in the study.



Table 1. *Distribution of Respondents' reported gender*

		Gender		
		Value	Count	Percent
Standard Attributes	Label	Gender		
Valid Values	1.0	Male	6	6.3%
	2.0	Female	87	90.6%
	3.0	Transgender	3	3.1%

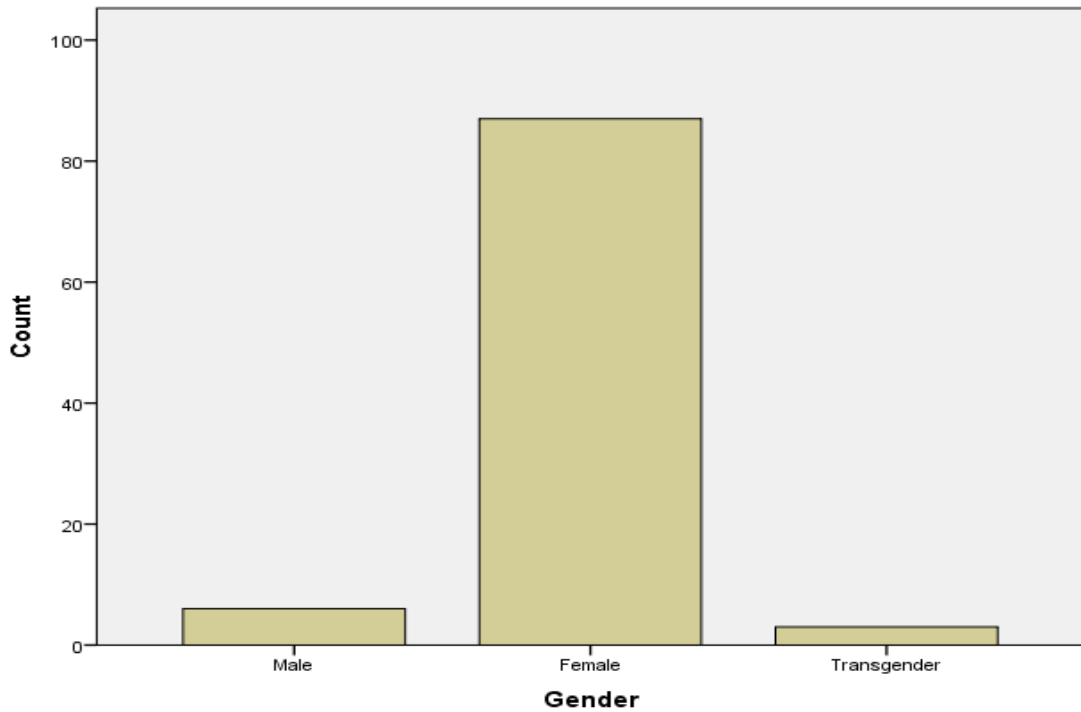


Figure 1. Respondents' reported gender

**Frequency Distribution of Handedness**

The nominal variable in this study measured the handedness of respondents. The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The research question for this study was: How many left-handed and right-handed participants are in the sample group? The findings of this study in Table 2

show that of the 96 participants, 9.4% (n=9) identified as left handed, and 90.6% (n=87) identified as right handed. These findings reflect Staley’s (2013) reporting that 90% of the population is right handed.

Table 2. *Distribution of Respondents’ handedness*

		Handedness			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Left	9	9.4	9.4	9.4
	Right	87	90.6	90.6	100.0
	Total	96	100.0	100.0	

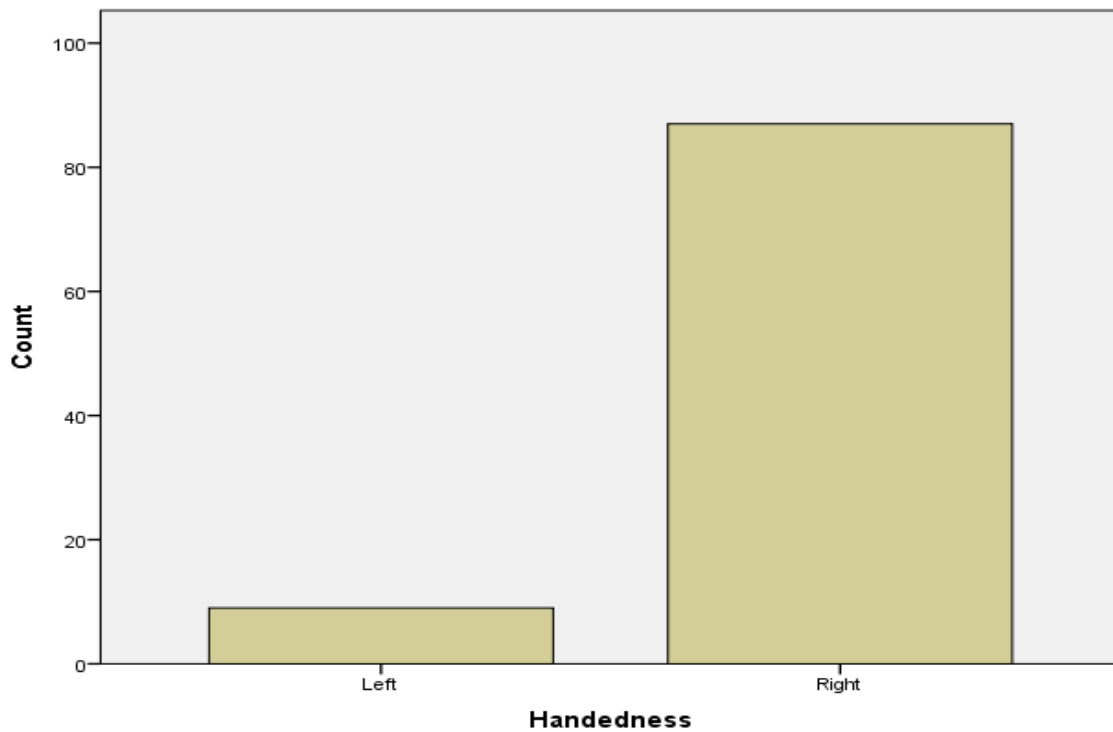


Figure 2. Respondents’ reported handedness

**Measure of Central Tendency and Dispersion of Respondents’ Age**

The ratio variable measures the respondents’ age. This variable was operationalized with the item: “Age:” The response options were 0-100 (survey item 1).

The research question for the study was: How old are the participants in the sample group? Table 3 shows that 95 participants identified their age in the study. The average age was 33.76 (SD=11.773). The histogram in Figure 3 shows that respondents are positively skewed, indicated by a longer tail on the right and by the bulk of respondents positioned to the left of the mean. With a minimum age of 18 and a maximum age of 62, the study was able to reflect a large representation of different age respondents.

Table 3. *Distribution of Respondents' reported age*

	N	Minimum	Maximum	Mean	Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Age	95	18.0	62.0	33.758	11.7733	-.686	.490
Valid N (listwise)	95						

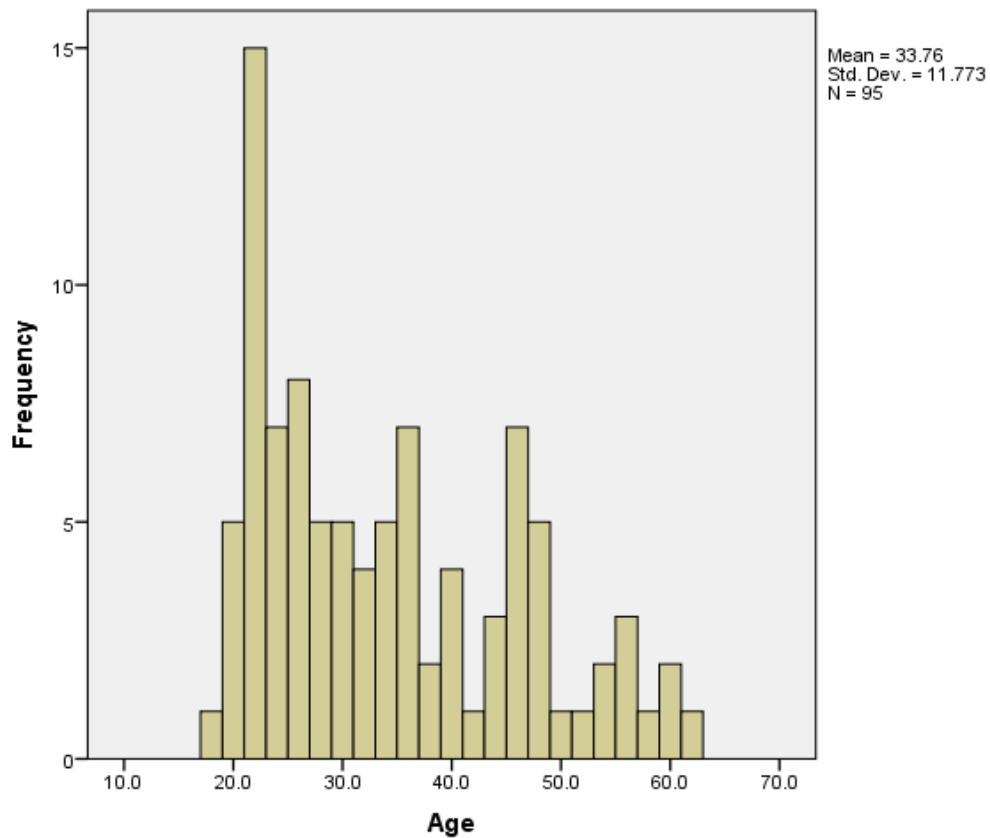


Figure 3. Respondents' reported age

**Chi-Square for Handedness and Alcohol or Drug Treatment**

The nominal variable in this study measured whether the participant has ever participated in an alcohol or drug treatment program while the other nominal variable measures the handedness of the participant. The alcohol and drug treatment variable was operationalized with the item: "Have you ever participated in an alcohol or drug treatment program?" The response options were yes and no (survey item 6). The handedness variable was operationalized with the statement: "What hand do you prefer to use when writing or drawing". The possible response options were "left" or "right" (survey item 3). The hypothesis for this study was: There is an association between handedness and participating in an alcohol and drug treatment. The null hypothesis for this study was: There is no association between handedness and participating in an alcohol and drug treatment program.

Table 4 shows that, of all the respondents who are left handed, 5 (55.6%) reported they had been to some form of substance abuse treatment. 21 (24.1%) of the respondents who were right handed reported they had participated in a substance abuse treatment. This crosstabulation demonstrates that in the sample, those who were right handed were less likely than those who were left handed to have participated in an alcohol or drug treatment program.

Table 4. Crosstabulation for Handedness (Recorded) and Participated in Treatment.

**Handedness \* Participated in Treatment Crosstabulation**

			Participated in Treatment		Total	
			Yes	No		
Handedness	Left	Count	5	4	9	
		Expected Count	2.4	6.6	9.0	
		% within Handedness	55.6%	44.4%	100.0%	
		Participated in Treatment	% within Participated in Treatment	19.2%	5.7%	9.4%
			% of Total	5.2%	4.2%	9.4%
Right	Count	Count	21	66	87	
		Expected Count	23.6	63.4	87.0	
		% within Handedness	24.1%	75.9%	100.0%	
		Participated in Treatment	% within Participated in Treatment	80.8%	94.3%	90.6%
			% of Total	21.9%	68.8%	90.6%
Total	Count	Count	26	70	96	
		Expected Count	26.0	70.0	96.0	
		% within Handedness	27.1%	72.9%	100.0%	
		Participated in Treatment	% within Participated in Treatment	100.0%	100.0%	100.0%
			% of Total	27.1%	72.9%	100.0%

Table 5 shows the p-value for the chi-square of the variables Handedness and Participated in an Alcohol or Drug Treatment Program is .043. Since the p-value is less than .05 we reject the null hypothesis. Therefore, this data does support the research hypothesis that there is a significant association between handedness and participation in an alcohol and drug treatment program. The results show that over 27% of all respondents have attended a form of alcohol or drug treatment, 55.5% who report being left handed and 24.1% who are right handed.

Table 5. Chi-Square Tests for Handedness (Recorded) and Participated in Treatment.

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.077 <sup>a</sup>	1	.043		
Continuity Correction <sup>b</sup>	2.641	1	.104		
Likelihood Ratio	3.616	1	.057		
Fisher's Exact Test				.058	.058
Linear-by-Linear Association	4.034	1	.045		
N of Valid Cases	96				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.44.

b. Computed only for a 2x2 table

**Chi-Square for Handedness and Someone Else Ever Recommending Treatment**

The nominal variable in this study measured whether someone else has ever recommended participants for an alcohol or drug treatment program while the other nominal variable measured the handedness of the participant. The recommended to an alcohol or drug treatment by someone else variable was operationalized with the item: “Has someone else ever recommended you may need an alcohol or drug treatment program?” The response options were yes and no (survey item 6). The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The hypothesis for this study was: There is an association between handedness and someone else recommending an alcohol or drug treatment program. The null hypothesis for this study was: There is no association between handedness and someone else recommending an alcohol or drug treatment program.

Table 6 shows that, of all the respondents who are left handed, 6 (66.7%) reported that someone else has recommended them to an alcohol or drug treatment program. 29 (33.3%) of the respondents who were right handed reported they had been recommended

to an alcohol or drug treatment program by someone else. This crosstabulation demonstrates that in the sample, those who were right handed were less likely than those who were left handed be recommended by someone else for an alcohol or drug treatment program.

Table 6. Crosstabulation for Handedness (Recorded) and Recommended to Treatment

<b>Handedness * Recommended to Treatment Crosstabulation</b>					
			Recommended to Treatment		Total
			Yes	No	
Handedness	Left	Count	6	3	9
		Expected Count	3.3	5.7	9.0
		% within Handedness	66.7%	33.3%	100.0%
		% within Recommended to Treatment	17.1%	4.9%	9.4%
		% of Total	6.3%	3.1%	9.4%
	Right	Count	29	58	87
		Expected Count	31.7	55.3	87.0
		% within Handedness	33.3%	66.7%	100.0%
		% within Recommended to Treatment	82.9%	95.1%	90.6%
		% of Total	30.2%	60.4%	90.6%
Total	Count	35	61	96	
	Expected Count	35.0	61.0	96.0	
	% within Handedness	36.5%	63.5%	100.0%	
	% within Recommended to Treatment	100.0%	100.0%	100.0%	
	% of Total	36.5%	63.5%	100.0%	

Table 7 shows the p-value for the chi-square of the variables Handedness and Recommended by Someone Else for an Alcohol or Drug Treatment Program is .048. Since the p-value was less than .05 we rejected the null hypothesis. Therefore, this data did support the research hypothesis that there was a significant association between

handedness and someone else recommending an alcohol and drug treatment program.

The results show that over 36.5% of all respondents have had someone else recommend an alcohol or drug treatment, 66.7% who report being left handed and 33.3% who are right handed.

Table 7. Chi-Square Tests for Handedness (Recorded) and Recommended for Treatment.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.912 <sup>a</sup>	1	.048		
Continuity Correction <sup>b</sup>	2.605	1	.107		
Likelihood Ratio	3.743	1	.053		
Fisher's Exact Test				.069	.056
Linear-by-Linear Association	3.871	1	.049		
N of Valid Cases	96				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.28.

b. Computed only for a 2x2 table

### **Chi-Square for Handedness and Ever Felt the Need to Cut Down Drinking or Drug Use**

The nominal variable in this study measured whether participants have ever felt they should cut down on their drinking or drug uses while the other nominal variable measures the handedness of the participant. The participants' who felt they should cut down on their drinking or drug use was operationalized with the item: "Have you ever felt you ought to cut down on your drinking or drug use?" The response options were yes and no (survey item 5). The handedness variable was operationalized with the statement: "What hand do you prefer to use when writing or drawing". The possible response options were "left" or "right" (survey item 3). The hypothesis for this study was: There is an association between handedness and feeling the need to cut down on drinking or drug



use. The null hypothesis for this study was: There is no association between handedness and feeling the need to cut down on drinking or drug use.

Table 8 shows that, of all the respondents who are left handed, 7 (77.8%) reported that they felt the need to cut down on their drinking or drug use. 46 (52.9%) of the respondents who were right handed reported they felt the need to cut down on their drinking or drug use. This crosstabulation demonstrates that in the sample, those who were right handed were less likely than those who were left handed to feel the need to cut down on their drinking or drug use.

Table 8. Crosstabulation for Handedness (Recorded) and Felt Need to Cut Down

<b>Handedness * Felt the Need to Cut Down Crosstabulation</b>					
			Felt the Need to Cut Down		Total
			Yes	No	
Handedness	Left	Count	7	2	9
		Expected Count	5.0	4.0	9.0
		% within Handedness	77.8%	22.2%	100.0%
		% within Felt the Need to Cut Down	13.2%	4.7%	9.4%
		% of Total	7.3%	2.1%	9.4%
		Right	Count	46	41
	Expected Count	48.0	39.0	87.0	
	% within Handedness	52.9%	47.1%	100.0%	
	% within Felt the Need to Cut Down	86.8%	95.3%	90.6%	
	% of Total	47.9%	42.7%	90.6%	
Total		Count	53	43	96
		Expected Count	53.0	43.0	96.0
		% within Handedness	55.2%	44.8%	100.0%
		% within Felt the Need to Cut Down	100.0%	100.0%	100.0%
		% of Total	55.2%	44.8%	100.0%

Table 9 shows the p-value for the chi-square of the variables Handedness and Felt the Need to Cut Down on Drinking or Drug Use is .153. Since the p-value is greater than .05 we failed to reject the null hypothesis. Therefore, this data did not support the research hypothesis that there was a significant association between handedness and feeling the need to cut down on drinking or drug use. The results show that 55.2% of all respondents have felt the need to cut down on their drinking or drug use, 77.8% who reported being left handed and 55.2% who were right handed.

Table 9. Chi-Square Tests for Handedness (Recorded) and Felt Need to Cut Down.

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.046 <sup>a</sup>	1	.153		
Continuity Correction <sup>b</sup>	1.163	1	.281		
Likelihood Ratio	2.186	1	.139		
Fisher's Exact Test				.181	.140
Linear-by-Linear Association	2.024	1	.155		
N of Valid Cases	96				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.03.

b. Computed only for a 2x2 table

**Chi-Square for Handedness and Immediate Family Substance Abuse**

The nominal variable in this study measured whether participants had immediate family substance abuse concerns while the other nominal variable measured the handedness of the participant. The immediate family substance abuse concerns was operationalized with the item: “Has anyone in your immediate family suffered from an alcohol or drug problem?” The response options were yes and no (survey item 4). The handedness variable was operationalized with the statement: “What hand do you prefer to use when writing or drawing”. The possible response options were “left” or “right” (survey item 3). The hypothesis for this study was: There is an association between

immediate family substance abuse concerns and handedness. The null hypothesis for this study was: There is no association between immediate family substance abuse concerns and handedness.

Table 10 shows that, of all the respondents who were left handed, 6 (66.7%) reported that they have immediate family members with substance abuse concerns. 53 (60.9%) of the respondents who were right handed reported they have immediate family members with substance abuse concerns. This crosstabulation demonstrates that in the sample, those who were right handed were a little less likely than those who were left handed to have immediate family members with substance abuse concerns.

Table 10. Crosstabulation for Handedness (Recorded) and Immediate Family Substance Abuse

			Handedness * Familial Addiction Crosstabulation			Total
			Familial Addiction			
			Yes	No	Unknown	
Handedness	Left	Count	6	3	0	9
		Expected Count	5.5	3.4	.1	9.0
		% within Handedness	66.7%	33.3%	0.0%	100.0%
		% within Familial Addiction	10.2%	8.3%	0.0%	9.4%
		% of Total	6.3%	3.1%	0.0%	9.4%
	Right	Count	53	33	1	87
		Expected Count	53.5	32.6	.9	87.0
		% within Handedness	60.9%	37.9%	1.1%	100.0%
		% within Familial Addiction	89.8%	91.7%	100.0%	90.6%
		% of Total	55.2%	34.4%	1.0%	90.6%
Total	Count	59	36	1	96	
	Expected Count	59.0	36.0	1.0	96.0	
	% within Handedness	61.5%	37.5%	1.0%	100.0%	
	% within Familial Addiction	100.0%	100.0%	100.0%	100.0%	
	% of Total	61.5%	37.5%	1.0%	100.0%	

Table 11 shows the p-value for the chi-square of the variables Handedness and Immediate Family Substance Abuse is .908. Since the p-value was greater than .05 we failed to reject the null hypothesis. Therefore, this data did not support the research hypothesis that there was a significant association between handedness and immediate family substance abuse. The results show that 61.5% of all respondents have immediate family substance abuse concerns, 66.7% who reported being left handed and 60.9% who were right handed.

Table 9. Chi-Square Tests for Handedness (Recorded) and Immediate Family Substance Abuse

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.193 <sup>a</sup>	2	.908
Likelihood Ratio	.287	2	.866
Linear-by-Linear Association	.148	1	.701
N of Valid Cases	96		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .09.

### Discussion

This research was conducted seeking if, and to what extent, handedness may be related to substance use. The tailored survey Handedness and Substance Use was administrated to voluntary participants attending DBT groups in a clinic located in a Midwestern city. The survey sought participants’ demographic information of age and gender, and also identified what hand they preferred to use. The participants were then asked unique questions surrounding substance use within their family and themselves.

Since the participant responses and views were instrumental in the research, the survey was designed with low-risk questioning, while still being able to capture key data that may identify possible associations of handedness and substance use. The results of this level of questioning resulted in only one question of a survey being left unanswered in all of the 96 returned surveys.

### **Sample Age, Handedness, and Gender**

Monette (2011) identifies a representative sample as one that can truthfully echo the relevant variables of a targeted population. The study's sample population achieved this goal on a variety of different levels. Through the measure of central tendency it was found the age of the study's sample ranged from 18 years to 62 years old, with the mean age being 33.8 years old. The age of the study's sample represents the age demographics reflected of elevated substance use in a lifespan. Lefrancois (1993) reports substance use patterns in the percentage of people increase from late adolescents into adulthood. As people age, the percentage of those using substances decreases in late adulthood. As the sample's age represents the lifespan of substance use in the population, so does its handedness.

Through frequency distribution, the handedness of the participants was analyzed. 9.4% of participants reported they were left handed, and 90.6% stated they were right handed. This distribution of the survey's sample of handedness is similar to the general population. Wiley (2005) states the overall percentage of right-handedness in the human population is around 90%. This is also reflected in the reporting of Staley (2013) stating human right-handedness ranges from 85%-90% of the overall population.

The study's sample population was found to have a strong representation of female participants through the measure of central tendency. Of the 96 participants, 87 (90.6%) identified as female. Six (6.3%), identified as male, and three (3.1%) identified as transgender. Brady and Randall (1999) report, notwithstanding the fact that the rate of substance use disorders is less among women than men, the frequency rates, indicate that a diagnosis of substance abuse is not gender definite. To help factor the possible overrepresentation of a substance use disorder per gender, this research expanded substance use concerns beyond just diagnoses. It also allowed the opportunity for the participant to honestly evaluate if they, or someone they know, have ever had concern about their substance use.

### **Handedness and Alcohol or Drug Treatment**

This study does support the research hypothesis that there is a significant association between handedness and participation in an alcohol and drug treatment program. 55.5% of self-identified left-handed participants reported they had been to some form of substance abuse treatment. In comparison, only 24.1% of self-identified right-handed participants stated they had participated in a form of substance abuse treatment program. As stated in the literature review, only a few studies have been recorded that focuses on handedness and substance abuse treatment. This research reflects similar results of a higher percentage of left-handed individuals participation in substance abuse treatment in Bakan (1973). His study found that 47 patients in a group of male alcoholics, that 25% of the sample reported to be left-handed or ambilateral compared to an approximate population in age sample of 8.6% being left-handed. Participation in a

substance use treatment program usually arrives from a professional recommendation based on unique criteria.

As identified in the literature review, other diagnosable concerns have been associated with handedness. Ocklenburg et al. (2013) infer schizophrenia and depression have been associated with a greater occurrence in non-right handed individuals. They also include significant differences between handedness and motivation, personality, general cognitive ability, language and perception. Brandler and Paracchini (2013) explain how handedness is linked to many disorders in many smaller studies. In meta-analyses these association findings are less common. However, they include a 1990 meta-analysis that noted an increased prevalence of left-handedness and schizophrenia. Cairney et al. (2008) found in their study a prevalence of left-handedness and developmental coordination disorder in children. Gender identity disorder has also been associated with handedness. In their study, Zucker, Beaulieu, Bradley, Grimshaw and Wilcox (2001) found left-handed men were significantly more likely to have gender identity disorder.

As with other diagnosable and non-diagnosable concerns being associated with handedness, this study's sample found there is also a significant association between handedness and participation in an alcohol and drug treatment program. Future research should be directed at participants attending substance abuse treatment facilities. A better understanding of the handedness demographics of those screened appropriate for a substance abuse treatment program may provide better clarification of the significant association of handedness and treatment participation found in this study.

**Handedness and Someone Else Ever Recommending Treatment**

The research hypothesis, there is a significant association between handedness and someone else recommending an alcohol and drug treatment program is supported in this study. The study considered recommendations from both professional and personal as criteria for being recommended to a substance abuse treatment program. This allowed participants to also include if family, friends, or other acquaintances that may have ever recommended the participant to seek substance abuse treatment along with professional recommendations. The results reflected that 66.7% of those who self-identified as left-handed had been recommended to an alcohol or drug treatment program. This is a much higher percentage than the 33.3% of self-identified right-handed participants that had been recommended for an alcohol or drug treatment programs. Overall, 35.5% of all participants were recommended for an alcohol or drug treatment program. This survey question may better clarify if there is an association of handedness and substance use than just measuring if a person has attended a substance abuse program. It may better identify real life concerns through professional and personal relationships with the participants and their substance use patterns. It also may indicate that external motivators in a person's life may identify a substance use concern, but the individual may never seek substance use treatment. This may reflect on other studies of handedness and substance use.

Denny (2011) studied the data set of 27,426 individuals over the age of 50 from 12 European countries. He found evidence that suggest left-handed people tend to drink more frequently than right-handed individuals. However, he was not able to find if the association between higher frequencies of drinking in left-handed people associated with



diagnoses of substance abuse disorders. Treatment availability or participation is also highlighted in Stinson et al. (1998), stating only 12.5% of people in the United States who meet the requirements for an alcohol use disorder will participate in a form of treatment for it. This study could reflect how a substance use concern is noticed on a personal or relational level, but a person may never seek professional treatment or evaluation for it.

### **Handedness and Ever Felt the Need to Cut Down Drinking or Drug Use**

The study does not support the research hypothesis that there is a significant association between handedness and feeling the need to cut down on drinking or drug use. Furthermore, the research results show that the majority of self-identified left and right-handed participants have felt the need to cut down on their drinking or drug use. Even though the study did not find a significant association, it did find an elevated number of left-handed participants had identified having felt the need to cut down on their drinking or drug use (77.8%) compared to the right-handed participants responding similarly (55.2%). The research findings highlighting the self-report concern of needing to cut down on drinking or drug use is also statistically reflected in our society. The World Health Organization (2002) states there are an estimated 76.3 million people in the world who have been diagnosed with an alcohol use disorder. In the United States, Grant et al. (2004) report there are 17.6 million people who meet the criteria for an alcohol use disorder.

The majority of the survey participants identified they have felt the need to cut down their drinking or drug use. This can also reflect the concern for relapse for those who have attempted to cut down or quit their substance use in the past. This was further

supported in the literature review. Stinchfield and Owen (1998) found in their research 76.9% of those successfully completing treatment remained chemically abstinent three months after treatment, 59.1% six months following treatment, and 52.8% were able to maintain chemical abstinence 12 months following treatment. Witkiewitz (2008) similarly reports up to 90% of those deemed alcohol dependent and completed treatment would have at least one drink within 12 months completing treatment. She continues by stating people diagnosed with a substance abuse disorder have a low probability of ever being able to use substances moderately post treatment.

### **Handedness and Immediate Family Substance Abuse**

The study does not support the research hypothesis that there is a significant association between handedness and immediate family substance abuse. 61.5% of all respondents have immediate family substance abuse concerns. Self-reported left-handed respondents had heightened familial substance abuse (66.7%), compared to 60.9% of self-identified right-handed participants. Goldmen, Oroszi, and Ducci (2005) imply heritability of substance use disorders is classified as moderate to high. The genetics associated with addiction along with environmental factors impact the initial choice to use, and possibly the onset and the life cycle of substance use disorders. The research question may have been too broad to establish a proper association between handedness and family substance abuse. Further studies may find a biological association of handedness and substance use when utilizing a multi-level questioning for better data collection.

**Implications**

The findings of this study found significant associations of handedness and participation in alcohol or drug treatment, and also in handedness and being recommended by someone else for a substance abuse treatment program. Furthermore, the findings found heightened responses from self-identified left-handed participants in having felt the need to cut down on their substance use and familial substance abuse concerns compared to right-handed respondents. The pathology of substance use disorders continues to be highly debated. Marco (2013) defends the disease concept of substance use disorders and compares them with other disease such as cancer, hypertension and type II diabetes. He continues by stating, as with other diseases, substance use disorders have unique characteristics in regards that the influences can be biological, genetic, and environmental. By better understanding possible characteristics that are associated with substance used disorders, focus and resources can be allocated to treat, or prevent them. This research sought to identify another possible predisposition characteristic of substance use disorders in the means of handedness. With the possible association of substance use and handedness, prevention and treatment of substance use disorders can greatly be impacted.

Handedness and brain hemisphere dominance has been well researched. According to Sun and Walsh (2006), 90% of human population is right hand dominant, which is controlled by the left hemisphere of the brain. The right hemisphere of the brain controls and is contributed to being left hand dominant of 10% of the population. Additionally, they continue to report that language ability is dominant in the left hemisphere in right-handed individuals 95% of the time, but only 70% in left handed

individuals. The left hemisphere is not only associated to language, it is mainly dominant for logical reasoning and mathematical processing. The right hemisphere of the brain has been associated with artistic purposes, music, and emotional functioning. Implications of this study could impact future treatment approaches of substance use disorders. A person being dominant in the right brain hemisphere may be more receptive to a treatment program that integrates approaches such as artwork, collages, drawings, and other abstract methodologies. Further research may also impact the awareness and approach of how individuals, parents, educators, and professionals seek the importance of an individualistic conceptualization of substance uses and their related disorders.

Additional research regarding handedness and substance use can benefit social workers in the way they approach their clients. Using a risk and resilience perspective, social workers can identify handedness as a possible risk factor for a substance use disorder. By identifying a new population with an increased risk, the risk and resilience framework approach can be employed for identifying a new predisposing factor, screening, and treatment tactic of substance use disorders. By identifying the possible relationship between handedness and substance use disorders, a new characteristic risk factor may also be identified. As with all risk factors, social workers will also have the opportunity to educate their clients on the possible relationships and concerns. Direct knowledge and education will provide individuals the opportunity for potential increased intrinsic resiliency. Through the risk and resilience framework, implementing protective factors that increase the resilience for a person to be susceptible to substance use disorders due to his or her handedness can also help mitigate the onset of the disease.

**Limitations**

There are strengths and limitations using availability sampling for research. As Monette, Sullivan, and DeJong (2011) state, the advantages of availability samplings are that the samples are appropriate, less expensive, and it would otherwise be difficult to get an exhaustive sample frame from the general population. A disadvantage is that availability samples may not produce representative results and may be hard to replicates.

Since the literature review found very few research studies regarding handedness and substance use, it is recommended to conduct future studies to validate the results found in this one. The participants in the research incorporated many similar demographics as the general public. However, the sample also consisted of a very specific population that was represented in DBT groups. Assignment to the DBT groups is usually accompanied with a mental health diagnosis. The mental health diagnoses of the samples population could be a significant variable and impact the findings of this research study. Future studies should broaden the sample that may be more reflective of the general population. Forthcoming studies are also recommended to focus on samples of those actively participating in an alcohol or drug treatment program. Furthermore, the survey sample included low-risk questions in order to obtain a larger participation. Future studies should expound questioning to help better identify the associations of handedness and substance use.

**Conclusion**

A review of literature has found the ongoing concern regarding substance use disorders throughout the world. The etiology of substance use disorders is greatly debated; however, there are many shared concerns once an individual is diagnosed with a

substance use disorder. Along with continued relapse worries after periods of sobriety, physiological changes in the brain have been well documented and researched.

Handedness is another trait that is associated with diverse brain structure, neurological functioning, and genetics. Ocklenburg et al. (2013) report handedness is the most studied trait surrounding brain asymmetries.

The asymmetries of the brain produce diverse functioning tasks, such as spatial recognition is normally dominant in the right hemisphere, and logic processing and language normally dominate the left hemisphere. Left-handedness has been related with increased relationships in schizophrenia, depression, motivation, certain personality traits, general cognitive ability, language abilities and perception. The findings of this study provide an insight of the possible association of handedness and substance use and link possible neurobiological implications. Continued studies of handedness and substance use could validate this research's findings, and perhaps lead to the identification of another predisposing factor for substance use disorders. Along with the possible identification of a new increased risk population, future treatment approaches could be developed focusing on the dominant brain hemispheres of those assigned to substance abuse treatments.

## References

- (2013). Diagnostic and statistical manual of mental disorders. Fifth ed. *American Psychiatric Association*. Washington, DC: American Psychiatric Publishing.
- Bakan, P. (1973) Left handedness and alcoholism. *Perceptual and Motor Skills (36)* 514.
- Brady, K. T., & Randall, C. L. (1999). Gender differences in substance use disorders. *Psychiatric Clinics of North America*, 22(2), 241-252. doi:10.1016/S0193-953X(05)70074-5
- Brandler, W., Paracchini, S. (2013). The genetic relationship between handedness and neurodevelopmental disorders. *Trends in Molecular Medicine (20)*2 83-90.
- Branch., M. (2011). Drug addiction. Is it disease or is it based on a choice? A review of gene Heyman's addiction: a disorder of choice. *Journal of the Experimental Analysis of Behavior (95)*2 263-267.
- Büttner, A. (2011). Review: the neuropathology of drug abuse. *Neuropathology and Applied Neurobiology (37)* 118-134. Doi:10.1111/j.365-2990.2010.01131.x
- Cairney, J., Schmidt, L., A., Veldhuizen, S., Kurdyak, P., Hay, J., Faught, B., E. (2008). Left handedness and developmental coordination disorder. *La Revue Canadienne de Psychiatrie (53)*10 696-699.
- Denny, K. (2011). Handedness and drinking behavior. *The British Psychological Society*. doi: 10.1348/135910710X515705
- Dyer J., Minton McGuiness, T. (1996). Resilience: analysis of the concept. *Archives of Psychiatric Nursing (10)*5 276-282.
- Encyclopedia of the Human Genome (2005). Handedness, left/right: genetics. Credo: John Wiley & Sons LTD.

- Fraser, M., W., Richman, J., M., Galinsky, M., J. (1999). Risk, protection, and resilience: toward a conceptual framework for social work practice. *Social Work Research* (23)3 131-143.
- Goldman, D., Gabor, O., Ducci, F. (2005). The genetic of addictions: uncovering the genes. *Nature Review Genetics* (6)7 521-532.
- Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dufour, M. C., Pickering, R. P. (2004). The 12-month prevalence and trends in the DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 2001-2002. *Drug and Alcohol Dependence*, 74(3) 223-234.
- Greene, R., Galambos, C., Lee, Y. (2003). Resilience theory: theoretical and professional conceptualization. *Journal of Human Behavior in the Social Environment* (8)4 75-94.
- Koob, G.,F.,Volkow, N., D. (2010). Neurocircuiti of addiction. *Neuropsychopharmaology* (35) 217-238.
- Lefrancois, G. R. (1993). The lifespan. Belmont, Calif: Wadsworth Pub. Co.
- Leshner, A. I. (2001). Addiction is a brain disease. *Sciency and Technology* (17)3 75-80
- Leyton, M. (2013). Are addictions diseases or choices? *Psychiatry Neuroscience* (38)4 219-221.
- Luntz, S. (2006). What causes addiction? *ProQuest Education Journal* (3)74 6-7
- Milberg, S., Faraone, S., V., Biederman, J., Chu, M., P., Feighner, J., A. (1999). Substance use disorders in high-risk adolescent offspring. *The American Journal on Addiction* (8) 211- 219.



- Monette, D. R., Sullivan, T.J., DeJong, C.R. (2011). *Applied social research. A tool for the human services* (8th ed.). United States of America: Brooks/Cole.
- Nutt, D. (2013). Addiction lifestyle choice or medical diagnosis? *Journal of Evaluation in Clinical Practice* (19) 493-496.
- Ocklenburg, S., Beste, C., Güntürkün, O. (2013). Handedness: a neurogenetic shift of perspective. *Neuroscience and Behavioral Reviews* (37) 2788-2793.
- Powledge, T., M. (1999). Addiction and the brain. *Bioscience* (49)7 513-519
- Satel, S., Lilienfeld, S., O. (2014). Addiction and the brain-disease fallacy. *Frontiers in Psychiatry* (3)141 1-11. doi:10.3389/fpsy.2013.00141
- Staley, M. (2013). Scientists discover genetic basis for handedness. *University Wire* (9)
- Stewart, M., Reid, G., Mangham, C. (1997). Fostering children's resilience. *Journal of Pediatric Nursing* (12)1 21-32.
- Stinchfield, R., Owen, P. (1998). Hazelden's model of treatment and its outcome. *Addictive Behaviors* (23)5 669-683. PII S0306-4603(98)00015-X.
- Stinson, F. S., Yi, H. Y., Grant, B. F., Chou, P., Dawson, D. A., Pickering, R. (1998). Drinking in the United States: main finding from the 1992 national longitudinal alcohol epidemiologic survey (NLAES) U.S. Alcohol Epidemiologic Data Reference Manual, Vol. 6, 1<sup>st</sup> ed. NIH Publication No. 99-3519.
- Sun, T. Walsh, A. (2006). Molecular approaches to brain asymmetry and handedness. *Nature Reviews Neuroscience* (7)8 655-672.
- Witkiewitz, K. (2008). Lapses following alcohol treatment: modeling the falls from the wagon. *National Institute on Alcohol abuse and Alcoholism*. 594-604.

World Health Organization (2002). *The world health report 2002: reducing risks, promoting healthy life*. Geneva: Switzerland.

World Health Organization (2014). Resources for the prevention and treatment of substance use disorders. Retrieved from [www.who.int/gho/substance\\_abuse/ea](http://www.who.int/gho/substance_abuse/ea)

Zucker, K., J., Beaulieu, N., Bradley, S., J., Grimshaw, G., M., Wilcox, A. (2001). Handedness in boys with gender identity disorder. *Journal for Child Psychology and Psychiatry* (42)6 767-776.

Zywiak, W., H., Stout, R., L., Longabaugh, R., Dyck, I., Connors, G., J., Maisto, S., A. (2006). Relapse-onset factors in project MATCH: the relapse questionnaire. *Journal of Substance Abuse Treatment* (31) 341-345.  
doi:10.1016/j.jsat.2006.05.007.

Appendix A  
Handedness and Substance Use Survey

1. Age:
  
2. Gender:    Male                  Female                  Transgender
  
3. What hand do you prefer to use when writing or drawing?                  Left                  Right
  
4. Has anyone in your immediate family suffered from an alcohol or drug problem?                  Yes                  No
  
5. Have you ever felt you ought to cut down on your drinking or drug use?  
  
                Yes                  No
  
6. Has someone else ever recommended you may need an alcohol or drug treatment program?  
  
                Yes                  No
  
7. Have you ever participated in an alcohol or drug treatment program?  
  
                Yes                  No

Thank you for your time and participation in this survey.

Appendix B  
**Consent Form**

**University Of St. Thomas**

**Exploring Handedness and Substance Use**

I am conducting a qualitative study that explores possible relationships between handedness and substance use. I invite you to participate in this research. You were selected as a possible participant because of your enrollment in the Dialectical Behavior Therapy (DBT) Skills Group. Please read this form and ask any questions you may have before agreeing to be in the study.

This study is being generated by Bradley Martin and supervised by Dr. Lisa Kiesel, Professor in the School of Social Work at St. Catherine University and the University of St. Thomas.

**Background Information:**

The purpose of this study is to explore the possible relation of handedness and substance use.

**Procedures:**

If you agree to be in this study, I will ask you to do the following things: Sign this informed consent, participate in the Handedness and Substance Use Survey (you may choose to answer all or no questions of the survey, and may request not to continue participation at any time), and place completed survey in the provided envelope that will be sealed after the completion of the last participant.

**Risks and Benefits of Being in the Study:**

The study has minimal risks.

The study has no direct benefits.

**Confidentiality:**

The records of this study will be kept confidential. Research records will be kept in a locked file in my office. I will delete any possible identifying information. All collected data will be destroyed by May 15, 2015.

**Voluntary Nature of the Study:**

Your participation in this study is entirely voluntary. You may skip any questions you do not wish to answer and may stop the survey at any time. Your decision whether or not to

participate will not affect your current or future relations with St. Catherine University, the University of St. Thomas, or your status in your DBT Skills Group. If you decide to participate, you are free to withdraw at any time without penalty.

**Contracts and Questions**

My name is Bradley Martin. You may ask any questions you have to the survey administrator at anytime during the survey. If you have questions later, you may contact me at 651-747-6387. You may also contact the St. Catherine University/University of St. Thomas Institutional Review Board at 651-962 5341 with any questions or concerns.

**You will be given a copy of this form to keep for your records.**

**Statement of Consent:**

I have read the above information. My questions have been answered to my satisfaction. I consent to participate in the study. I am at least 18 years of age.

\_\_\_\_\_  
**Signature of Study Participant**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Print Name of Study Participant**

\_\_\_\_\_  
**Signature of Survey Administrator**

\_\_\_\_\_  
**Date**