

Sabiduría



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Dear Readers,

We are pleased to present the Spring 2015 edition of *Sabiduría*: The Dr. Floyd F. Koch Honors College Peer-Reviewed Journal. The selection process was rigorous, and the standard was high, but after a long process, we selected six manuscripts worthy of publication. We congratulate **Susan Daniels, Maria Valdez Palomino, Rebecca Seide, Jessica Ondrizek, Olivia Lowrey and Neysa Blay** on being the selected authors.

We thank the writers who submitted their work and the peer-reviewers for their tireless work in reviewing the submissions. It is the Honors College students who make *Sabiduría* possible by getting involved in the peer-review process.

Our gratitude is also extended to Marcella Montesinos, and Dr. Matthew Klauza, for their dedication and support.

As each issue of *Sabiduría* is published, we hope the publication continues to grow, improve, and represent the best that the Honors College has to offer. More importantly, we hope more students take advantage of this opportunity in the future.

Sincerely,

Paul Lovelady, Editor
Patricia Medina, Editor

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In keeping with the mission of Palm Beach State College, the purpose of the Dr. Floyd F. Koch Honors College is to provide a challenging and supportive academic environment in which students are encouraged to think critically, demonstrate leadership, and develop ethical standards. The Honors College pursues an interactive learning experience where students acquire a creative and comprehensive understanding of concepts in an interdisciplinary and global context. Palm Beach State Honors students and faculty share a commitment and civic responsibility that extends beyond the classroom to local, national, and international communities.

The Applications of Calculus in Pharmaceutical Sciences

Susan Daniels

In clinical research and development, academic studies, and business realms, calculus is a key part of pharmacy (pharmaceutical drug medicine) science. Pharmacokinetics is the intense and detailed study of the course of time events for drug absorption, distribution, metabolism, and excretion. Pharmacodynamics refers to the relationship between drug concentration at the site of action and the resulting effect, including the time course and intensity of therapeutic and adverse events ("side effects"). The thesis of this research paper is that both pharmacokinetics and pharmacodynamics are key components of pharmaceutical sciences; they are relatively predictable and determinable by the use of accurately applied calculus.

According to Rowland (1995), some key applications for utilizing calculus in pharmacy include the determinations of:

- rates of drug absorption, metabolism, distribution, and elimination in the body,
- making determinations based upon an individual's height and weight,
- contraindications (what medications can be, or can not be, taken with others),
- safe doses of each drug to be administered while considering other drugs taken,
- expectations and estimated limits of results over various time intervals, and
- when establishing forensic and toxicology reports.

Additionally, biostatistics are used to analyze pharmaceutical research data to further assist in the determination of whether drugs are safe or have excessive adverse effects. Statistical tests are performed that concentrate on certain variables of the medication, then calculus is applied as appropriate (Anders, 2008).

In pharmacokinetics, calculus equations describe the rate of elimination where k is the rate constant, x equals the amount of drug remaining, and differentiation means finding the actual rate of instantaneous processes and effects. Calculus in and of itself is the study of instantaneous rates of change (Kahn, 2008).

Another area of pharmacy science where calculus is applied is nanoscience. In this arena,

the focus and goals are to develop drugs that only affect certain areas of the body, rather than killing helpful body cells with the treatment, and there is math behind all of this (Baleanu, 2010). As described by Wartak (1983), calculus is used to determine rates of drug processes in the body, to determine what medications can be taken with others, and to be certain of what doses (strength levels and regimens of dosages) will be most effective, whilst causing the least harm (also known as minimizing side effects).

Pharmacokinetics - the study of the time course of drug absorption, distribution, metabolism, and excretion - is key and utilizes calculus in its determinations. For example, the instantaneous rates of these above measures can be determined by the graphing of functions. More specifically, the area under the curve and critical points, the relative and absolute maximums, and the relative and absolute minimums can be calculated via the math of $y=$ equations. Then, utilizing derivative calculus applications or by simply inputting the information into a graphing device results with tables with the generation of useful data for clinical relevance (Patkar, 2009). Yet, scientists must comprehend the rationales, before properly utilizing the calculators.

As reviewed by Argenio (1991), pharmacokinetics leads to pharmacodynamics where the relationship between an effect or result and the drug's concentration at the site of action. This would include the course of time and the intensity (peaks) of therapeutic and adverse effects. For example, an integral can be used to calculate the total drug concentration in the blood by integrating an equation for blood plasma concentration versus time. A calculus graph can be used to find such an integral. Data can be used to calculate the expected or actual total drug concentration in the blood by integrating an equation for blood plasma concentration on the y axis (range) and time on the x axis (domain).

Pharmacy doctoral students (both PhD and PharmD students alike) must have a working knowledge of math concepts, particularly calculus and statistics. Those who continue into academic or research careers must absolutely understand and continue to utilize these calculus applications in the understanding, instructive communication (teaching), and furthering of pharmaceutical science.

Rescigno (2004, pp 2) stated the following:

This book has its origin in my experience as a teacher of pharmacokinetics in many universities in four different continents. It was not my intention to write a popular book; what distinguishes this one from many others on the same subject is its large use of algebra and calculus. For this I make no apologies; in fact a serious study of pharmacokinetics without the help of mathematics is, in my opinion, impossible.

According to Rescigno, pharmacy professionals working in research and development and/or academia utilize the following mathematical concepts of calculus:

- Functions and graphing,
- Linear and non-linear models,
- Limits, including limits at infinity, infinite limits,
- Derivatives of first and higher order, differentiation formulas, rates of change, the chain rule and implicit differentiation, related rates, differentials,
- The definite integral, substitution in integration, related equations,
- Applications of integration to finding area, volume, and average values,
- Turnover, the dilution factor, and clearance,
- Inverse functions, exponential and logarithmic functions, and applications of these functions, time parameters,
- Matrix equations and vectors, and
- Bioavailability and bioequivalence.

According to Kallen (2011), biostatisticians, pharmaceutical research scientists and pharmaceutical analysts can evaluate the pharmacokinetics such as absorption, PK curve, and elimination in order to determine whether drugs are safe or have adverse effects. Statistical tests are performed that concentrate on certain variables of the medication. Many parties are interested in these results, including - but not limited to - the F.D.A., health care practitioners who will be prescribing the drugs, medical science liaisons (whom are hired to disseminate this information to medical doctors, clinical trial leaders, pharmacists, sales team trainees in the pharmaceutical industry, and insurance and formulary evaluators), insurance company management and evaluation executives, health management organizations (HMOs and PPOs), lead scientists and chief executive officers (CEOs) of pharmaceutical and biotech companies, and financially interested shareholders.

For a specific example from the above list, let's focus on insurance companies. These are typically for-profit businesses. They hire personnel - often medical doctors and pharmaceutical doctors - to strategically evaluate pharmaceutical medications on many factors including cost effectiveness and patient health effectiveness - which are also both co-related in a business perspective. With regard to the latter factor being evaluated (efficacy for patient health improvement and efficiency of patient health maintenance), there is extremely important and heavy reliance on the scientific data that was achieved via calculus for drug pharmacodynamics and pharmacokinetics. In short, applications of calculus are used for discerning the science. Then, that scientific data is used for determining cost effectiveness by insurance companies. This helps the personnel analyze and evaluate their medical drug options for their clients and subscribers (end-users such as patients), then present their clinical findings and conclusions to financial managers within the insurance organizations. Then, formulary and coverage decisions are made and policies are put into place. Similar practices are done by Health Management Organizations (H.M.O.s) and hospital networks. As Bluman (2006) explained, the accurate, precise use of mathematics helps to run a business efficiently and successfully.

According to Frompovich (2014), however, the calculus of pharmaceuticals can sometimes be big business in "Big Pharma" and with more than patient safety always at the forefront. These large pharmaceutical manufacturers are also, in majority, for-profit businesses with shareholder obligations to meet. It is a fact that there are business and sales models in most any industry and trade. This is not a problem; capitalism and fair enterprise are beneficial to our economy and society. However, pharmaceutical drugs are not widgets or simply units of "x" miscellaneous goods product. When it is in the field of medicine - human healthcare and life sustainability - then that end-using patient welfare should ideally come before profits and shareholders. The mission statement of a big pharmaceutical company may include ethical notions such as patient and human health beneficiaries being of utmost important to them, but this does not always appear to be held as priority when considering the underlying calculus behind their company annual reports and desire to profit.

When profits and shareholders are in the mix, unfortunate cases of human greed, kickbacks,

sales quotas, and even fraud can become quietly intertwined into the mix of managing scientific data on various levels. This is not nearly always the case but it has been known to happen (Borrell, 2009). This may include the cherry-picking of clinical data, pressuring and even indirectly terminating relationships with medical doctors involved in clinical trials where the data being submitted is not of preference to corporate goals, incentivizing physicians to submit favorable data with continued work (grant money and professional speaker payments), and deciding which studies and data sets are concealed (left as private data or on file only within the company) versus which ones are actually submitted to the F.D.A. to be reviewed and released to the public in a timing strategy to be favorable for profits. Eventually, additional adverse effects are typically discovered in extended patient populations and longer durations of drug administration to patient population sets. The side effects may range from trivial inconveniences to life threatening reactions or significant health complications such as new comorbidities. There are however methods in place for healthcare professionals to try to detect and prevent any misrepresentation or misunderstandings of clinical trial data (Zink, 2014). There is a nonprofit group called the Association for the Accreditation of Human Research Protection Programs (A.A.H.R.P.P.) in Washington, D.C., which provides an independent evaluation of an organization's ethical standards and oversight (Borrell, 2009). Yet, to date, not all research centers and contributing physicians have applied for accreditation with this service. Perhaps accreditations such as this will become more in demand or even a requirement for preventative maintenance of medical ethics in clinical studies and reviews.

Yet, sometimes new branded drugs may be submitted then come to market with F.D.A. approval without absolute, full disclosure of all possible risks learned from each phase of clinical trials. Thus, class action lawsuit activities and whistle-blowing events may occur later, but the pharmaceutical corporations and their shareholders have already had opportunity to largely profit (and yield even further dollar returns by investing those profits) far above and beyond what they pay in damages, settlements, et cetera. The calculus here is in the acknowledgment of the possibility and occurrence of concealments or manipulations of data which then skews the ultimate calculations in favor of their company fiscal goal endpoints. This is not pleasant, but it is interesting. Calculus is still applied in pharmaceutical

sciences, and should normally be accurate, but, as elaborated on by Zink (2014), it has not always been clinically submitted and/or marketed with complete and accurate data.

Many pharmaceutical companies, such as Eli Lilly, Pfizer, and Proctor and Gamble, have faced legal reprimand in the *aftermath*. For example, in late 2004, Merck Pharmaceuticals was forced to recall Vioxx because of the heart attack and stroke risks that eventually became tremendously apparent after over 20 million Americans had been taking it long term. In fact, per Reinberg (2011):

The U.S. Justice Department said Tuesday that the drug company Merck will pay \$950 million to resolve investigations into its marketing of the blockbuster painkiller Vioxx, which was pulled from the market in 2004 after studies revealed the drug increased users' risks of heart attack and stroke. Merck will pay \$321.6 million in criminal fines and \$628.4 million as a civil settlement. The company will also plead guilty to a charge of marketing Vioxx as a treatment for rheumatoid arthritis before the U.S. Food and Drug Administration granted such approval, the *Associated Press* reported. (para 1-2)

Additionally, as detailed by Consumers United (2004):

The Food and Drug Administration estimates that Vioxx may have contributed to 27,785 heart attacks and sudden cardiac deaths between 1999 and 2003. The estimate is based on the number of prescriptions issued for Vioxx between 1999 and 2003. David Graham, the associate director for science in FDA's office of drug safety, made the estimate based on 92.8 million U.S. prescriptions for Vioxx between 1999 and 2003. It's part of a study Graham conducted in cooperation with Kaiser Permanente. Merck pulled Vioxx, a popular pain reliever widely used by arthritis patients, off the market in September, saying it was "putting patient safety first" but the *Wall Street Journal* reported earlier that company officials had fought for years to protect the highly profitable drug and to keep news of the health risks quiet. Vioxx was a big moneymaker for Merck, generating about \$2.5 billion in yearly sales. In his study, Graham's team examined records for 1.39 million members of Kaiser Permanente, including

26,748 who took Vioxx and 40,405 who were on Pfizer's Celebrex, another COX-2 inhibitor (para. 1-5).

The study found that high doses of Vioxx, or rofecoxib, tripled risks of heart attacks and sudden cardiac death. Graham planned to present the findings at an epidemiology conference Aug. 25, but his supervisors said the results were "too preliminary" and recommended that the study be submitted first to a medical journal so it could undergo peer review or be presented at the conference with an alternative FDA opinion. When the study was presented Aug. 25, the abstract said, "[T]his and other studies cast serious doubt on the safety of rofecoxib ... and its use by physicians and patients at doses exceeding 25 milligrams." When Graham submitted a revised, final version to FDA on Sept. 30, FDA's announcement of the study's release did not mention specific data on cardiovascular risks (para. 6-7).

Twenty million Americans had taken Vioxx by the time Merck withdrew it. The F.D.A.'s estimated number of deaths correlated to Vioxx is equivalent to about half the number of recorded American casualties of the Vietnam War. Feeley (2011) put it bluntly:

Merck Sharp & Dohme will plead guilty to one count of misbranding Vioxx, the company and U.S. prosecutors said yesterday. The company will pay a \$321.6 million criminal fine and \$628.3 million to resolve civil claims that it sold Vioxx for unapproved uses and made false statements about its cardiovascular safety (para. 2).

Improper applications of calculus (data withheld or inaccurately represented, and therefore not included fully in the further, future safety calculus data computations) can eventually lead to allegations and implications for a giant drug company, but also for people who may suffer in their well being or even lose their lives earlier than otherwise not taking the product. Berenson (2007) stated:

The settlement does not end the government investigations that Merck faces, which include both civil and criminal inquires from several states and the Justice Department. But for Merck, which has already spent more than \$1.2 billion on Vioxx-related legal fees, the settlement will put to rest any fears that Vioxx lawsuits might bankrupt the company, or even have a significant financial impact. While eye-popping, the

settlement payment represents less than one year's profits for the company, the third-largest American drug maker. (para. 13-14)

Later, State News Services of New York (2012) published:

Attorney General Eric T. Schneiderman today announced that he has secured a settlement with Merck Sharp and Dohme Corp., resolving civil and criminal charges that the pharmaceutical giant marketed its drug Vioxx for uses not approved by the United States Food and Drug Administration (FDA), and misrepresented the cardiovascular safety of the drug. As part of the multi-state and federal agreement, Merck will pay a total of \$615 million in civil damages and penalties to compensate Medicaid, Medicare and other governmental healthcare programs... (para. 1)

And as Cockburn (2012) pointed out:

There was a fair amount of news coverage after the recall, but it was pretty slim considering the alleged 55,000 death toll. A big class-action lawsuit dragged its way through the courts for years, eventually being settled for \$4.85 billion in 2007. Senior FDA officials apologized for their lack of effective oversight and promised to do better in the future. The Vioxx scandal began to sink into the vast marsh of semi-forgotten international pharmaceutical scandals (para. 3-4).

Berenson (2007) also confirmed the 4.85 billion dollar payout from Merck over some 27,000 lawsuits of wrongful death lawsuits. Not only is calculus utilized in determining extremely important information for evaluation of drugs for efficacy and safety, but also is utilized in a pharmaceutical business perspective. Of course, not all individuals within corporations act unethically, but it does happen and it boils down to an end goal, for good or for bad, to protect or increase profits. The direct ways for a company to directly raise their profit are by either reducing costs or increasing revenues, or both. In calculus, profit equals costs subtracted from total revenue. So, in the corporate business of Big Pharma, with shareholder obligations and corporate ladder opportunity or even intimidation and job retention at stake, the heat can be high. The calculus remains steadfastly accurate, purely black and white, yet the numbers inputted into the calculus equations - if skewed by inaccurate data collection, omissions,

or derailed methodology - may suffer various gray areas. It could be from sheer human error or motivated by selfishness trumping big-picture ethics. The calculus in mathematics itself however remains accurate and reliable. Any source of error is in human input. Marketing invokes perceptions, whereas the science of accurately inputted calculus yields realities.

On this calculus notion of “big business” in “big pharma,” pharmaceutical and other industries utilize the graphs and data derived via calculus (described prior, including pharmacokinetics and pharmacokinetics) to analyze a drug’s safety versus efficacy. Critical points, area under the curve, rates of change, maximums and minimums in patient data sets: All of these factors and more are involved in the marketing and ultimate success or failure of a drug as it relates to a corporation. It also relates to the perceived risk/benefit ratio for the physician making the decision of prescribing the drug to a patient. Some physicians are reluctant to readily prescribe a new drug until long term studies are published with more statistics to support the ratio of safety to efficacy. Pharmacists further evaluate this ratio based on known contraindications of poly-pharma (multiple, various medications) or patient-personal characteristics such as size, lifestyle, and any co-morbidities such as diabetes, heart disease, hypertension, and other human conditions.

This report concludes that the applications of calculus in evaluating pharmacokinetics and pharmacokinetics are integral in traditional pharmaceutical sciences (clinical and academic) as well as in the business spectrum of pharmaceutical sciences (industry and sales). The study of pharmaceutical science is dynamic and fascinating; the utilization of calculus makes the studies and results also logical and predictable given that the data sets are accurate and not manipulated. The application of advanced mathematics and science helps to continue the quest for new and improved evidence-based, ethical medicine, which is exciting not only from scientists to shareholders, but - most importantly - to end-user patients’ lives and well-being.

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About the author- Susan Daniels

Susan Daniels is presently a pre-Pharmacy student in the Palm Beach State College Honors Program where she serves in several school and community leadership and volunteer capacities. She will be pursuing her Doctorate of Pharmacy, as well as continuing in her passions for life long



learning and development, philosophy, intellectual and emotional integrity, ethics, perseverance, evidence-based medicine, scientific research, and progress. Ms. Daniels believes that "Knowledge includes recognizing what we don't know. Character is demonstrated in seeking and building knowledge. And wisdom is found in understanding and applying what we do know."

The Effects of Antidepressant Drugs on the Brain

Maria Valdez Palomino

Depression is a common mental disorder. It affects more than 350 million people worldwide and is a leading cause of disability (World, 369). Although the most popular treatment is prescribing antidepressant drugs, research has shown that these drugs harm the brain more than they benefit it. Antidepressants regulate neurotransmitters such as serotonin, dopamine and norepinephrine; but in doing so the medication disrupts the chemical balance of the brain. Neurotransmitters are brain chemicals that communicate information throughout our brain and body. They do not function independently of one another. Current antidepressants act on neurotransmitter systems by affecting three distinct processes: Neurotransmitter degradation, neurotransmitter reuptake, and neurotransmitter binding (To et al. 102). One of the first neurotransmitters to emerge is serotonin. Only 5% of serotonin is found in the brain, the remaining amount is distributed throughout the body (Gilman, 635). Disrupting this chemical not only damages the brain but also other organs such as the heart, stomach, and liver. No one knows what impact decades of SSRI use might have on those organs (Barber, 58). This research seeks to determine what the long term effects of antidepressant drugs are on the organism, and to provide substantial proof that they are a counterproductive therapy for a disease that affects so many.

Two types of antidepressants are often prescribed. Selective Serotonin Reuptake Inhibitors (SSRIs) work by slowing down or blocking the sending neuron from taking back the already released serotonin. The serotonin is available in the synapse for a prolonged period of time and is more likely to send the message of well-being to the next neuron. Examples of SSRIs include Prozac, Zoloft, and Effexor. Prozac (fluoxetine hydrochloride) is an oral drug used for treating depression, bulimia, obsessive-compulsive disorder (OCD), panic disorder, and premenstrual dysphoric disorder (PMDD). Prozac may cause nausea, fast uneven heartbeat, loss of coordination, headaches, anxiety, insomnia, drowsiness, trouble breathing, unusual bleeding, fever, seizures, vomiting, diarrhea, and loss of appetite. The list of adverse effects is longer than the list of the conditions it claims to treat. Another problem is the fact that antidepressant

drugs are frequently prescribed in conjunction with another drug to attempt to subdue the side effects of the former. For example, Prozac is almost always prescribed with a sedative such as benzodiazepines because it causes anxiety.

Another type of antidepressant is Monoamine Oxidase Inhibitors (MAOIs). These are first generation antidepressants. MAO is an enzyme that breaks down neurotransmitters. The inhibitors work by blocking the enzymatic function so that the neurotransmitters increase in amount in the synapse, and are more likely to regulate and stabilize mood. There are two types of MAO. MAO-A promotes catabolism of epinephrine, norepinephrine, serotonin, and melatonin while MAO-B has an affinity for trace amines and phenylethylamine. MAOIs pose a threat to the organism by inhibiting the breakdown of tyramine proteins. High levels of tyramine may cause a hypertension crisis and in turn the patient may suffer a Transient Ischemic Attack (TIA) also known as a ministroke.

One of the physiological manifestations of the side effects of antidepressants is serotonin syndrome. It is a potentially life threatening drug reaction that causes the body to have too much serotonin. Symptoms include shivering, diarrhea, muscle stiffness and, in severe cases, it can be fatal. As previously stated, 95% of the chemical serotonin moves throughout the body. When present in abundance it may cause muscle spasms, restlessness, ataxia, and confusion (National, 7272). A region where serotonin is mostly present is in the gastrointestinal lining, where it acts as a signaling mechanism for the brain and modulates the rhythmic movements kneading food through the stomach and the intestines. A disruption in this process may cause food to move very quickly and promote bleeding in the lining of the stomach. The intestines are also affected because the speedy movement of food inhibits the ability of intestinal cilia to absorb nutrients leading to malnourishment of the subject. In a study designed to investigate the anatomic effects of serotonergic compounds, researchers at Thomas Jefferson University found that high dose, short-term exposure to SSRIs in rats was sufficient to produce swelling and kinking in the serotonin nerve fibers (Kalia et al.). Damaged nerve fibers affect every one of the brain processes. Francis Crick, Nobel Laureate in Biochemistry stated: "You," your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of

nerve cells and their associated molecules. As Lewis Carroll's Alice might have phrased it: "You're nothing but a pack of neurons" (Barber, 83).

If we are nothing but a pack of neurons then these drugs are affecting everything that we are. Improper brain development and function have also been proven. Clinical doses of haloperidol and olanzapine over 17-27 months duration in macaque monkeys have been shown to cause 8%-11% shrinkage in tissue weight (indicating cell death) throughout the brain (Dorph-Petersen et al. 1649). If these medications are given to children or teens to treat their depression before their brains have been fully developed then the damage could be catastrophic. Their brains would not reach maturation and cell death would inhibit certain functions necessary for wellbeing and survival. The death of certain cells that help control movement and coordination can lead to tremors and trouble walking and moving. This is known as Parkinson's disease. Parkinson's is associated with the elderly but the consumption of antidepressant drugs may lead to an onset case of the disease. Reports show that there are other movement disorders caused by antidepressants such as akathisia. It is the feeling of inner restlessness or severe agitation. Patients often describe it as an urging and unpleasant sensation that makes he or she want to jump out of his or her skin. It is also associated with aggression and increased violent behavior. Akathisia is even given specific attention in the Diagnostic and Statistical Manual of Mental Disorders (DSM).

Antidepressant drugs not only affect the anatomy and physiology of the brain but also the mind. "The bases of mental illness are chemical changes in the brain...There's no longer any justification for the distinction between mind and body or mental and physical illnesses. Mental illnesses are physical illnesses" (Satcher). Antidepressants cause amotivational syndrome, a condition with symptoms that are clinically similar to those that develop when the frontal lobes of the brain are damaged. The syndrome is characterized by apathy, uninhibited behavior, lack of motivation, and a personality change similar to the effects of lobotomy (Marangell et al. 1059). Part of the mind feels as if it is not there. One does not want to do anything and the things that used to bring happiness and purpose turn into annoyances. One merely exists. Antidepressant drugs have blunt effects on our emotions to some extent. They have been recognized to cause episodes of depression and

mania. Mania is dangerous because it is characterized by lack of impulse control and a feeling of indestructibility leading the patient to commit acts he or she normally would not. These include impulsive conduct, hyper sexuality, and rapid speech without thinking of the repercussions of one's words. Severe depression is also dangerous. Antidepressants such as Prozac or Paxil raise cortisol levels in human subjects. Cortisol in turn is associated with depression, weight gain, immune dysfunction, and memory problems. These drugs may work in theory but they are counterproductive. They may increase the availability of serotonin in the synapse but in turn they increase cortisol levels and upset the delicate balance of chemicals in the brain. An exacerbated depression leads to suicidal thoughts. The risk of suicidal behavior is increased in the first month after starting antidepressants, especially during the first nine days (Jick, 338). This is the ultimate and most dangerous side effect of antidepressants.

Patients who are willing to stop taking their medication after reading about the dangers of antidepressants face another complication. The SSRI group has withdrawal symptoms which include vividly visual hallucinations of flashing lights, inability to walk, and electric shock like sensations in the brain (Glenmullen, 10). Some patients may experience nausea, nervousness, and insomnia upon stopping Prozac. These symptoms quickly disappear if the patient starts to take his or her antidepressants again, causing the patient to become dependent on them if he or she does not wish to have these symptoms. Most people stay on the medications because they do not wish to fight through the discomfort of withdrawal. Since antidepressants disturb the chemical levels in the brain, the body grows accustomed to the new level of neurotransmitters. Modifying these levels too fast or too often may heighten withdrawal symptoms. MAOIs also cause withdrawal discomfort. The abrupt discontinuation of Monoamine Oxidase Inhibitors reverses any progress made from the pre-treatment state. It is as if they had never been taken. All they leave behind is the damage but none of the benefits the patient needs. There is some hope for those willing to endure this uncomfortable period of time. Most drugs are out of the human system within the span of a week, except for Prozac. Prozac can take up to a month to be fully out of the system. The damage may be done but any further deterioration of the brain and other organs can be prevented if the patient chooses to stop.

Antidepressants don't eradicate the conditions they claim to treat. They only make life bearable for the patient. It is the responsibility of the physicians prescribing the antidepressants to weigh the pros and cons of the medications. The symptoms of depression must be proven severe enough in order for them to prescribe these dangerous drugs. Psychological therapy, group therapy, and other options should be the first choices of treatment. Antidepressant drugs should always be the last resort because they have been proven to be more harmful than helpful. There is a difference between depression and major depression. Major depression involves a chemical imbalance in the brain, not just a few symptoms. A symptom checklist should be completed and clinical judgment should be practiced. As Barber states:

I can say that a highly experienced and expert clinician can instantly identify major depression when they see it. It is immediately detectable to people who know what they are doing. It is an advanced physiological state of despair that one can see in the patient's eyes, in their slow movements, in the sense that they are in physical pain, in the fact that they often have not slept or eaten for days, in their lack of humor, in their proximity of death and dying in their conversation (that is if the patient is talking) and surrounding their very presence, in the obvious fact that they do not presently want to be awake, or alive. There is no covering up; they exude naked and pure pain, like a wounded animal. There is absolutely no pretending that everything is ok. All pretense of normalcy goes out the window (111).

Antidepressant drugs should only be prescribed for patients such as the ones described by Barber. They are not for the overly stressed college student who is sad because he or she cannot afford a brand new car. We live in a materialistic world where medication has stopped being a means of healing, and has taken a more corporate aspect. It is all about business and who can sell the most prescriptions without regard to the lives that may be negatively affected. Psychotherapy has been pushed aside to make way for a bigger, better, and more profitable option - drugs. Pharmaceutical companies want to profit no matter the cost to the patient, but it has been proven that this cost is a very high price to pay for a feeling of well-being that can be achieved through other methods.

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"WHO | World Health Organization." WHO | World Health Organization. Bulletin 369, 19 November 2014

About the Author - Maria Valdez Palomino



a normal life.

Maria Valdez Palomino will graduate from the Dr. Floyd F. Koch Honors College, in spring 2015, and transfer to the Harriet L. Wilkes Honors College, at Florida Atlantic University, in Jupiter. Maria plans to pursue a Bachelor of Arts with a concentration in Neuroscience and Behavior in preparation for medical school. Her ultimate career goal is to become a pediatric psychiatrist and to help children with mental disorders lead

The Eugenics Movement and its Modern Day Counterpart

Rebecca Seide

Anna teared up in silence. She thought to herself, "I don't belong here". The door slowly opened and the doctor appeared, but to Anna he was nothing more than an undertaker. "Patient 1006" the doctor called out. Anna froze in fear and spoke softly "patient 1006, that is I". Anna screamed, "no! I was just stressed! It was only a break down due to lack of sleep. It happens to everyone, please, please I don't want to die!" Anna was forcibly dragged to a dark room and as such became another victim lost to the pages of history. Anna was found to be "unfit" by the state due to her recent mental break down, which was deemed as hysteria, therefore, she was deemed as "unfit" to live.

This sounds like a piece from a science fiction novel, but the scenario of Anna actually has many truths. To deem certain individuals lives more valuable than others has already occurred in history: the eugenics movement, which sought to improve the human race. The eugenics movement was very popular at the turn of the century, from the late 1800s through the mid-1900s. Though discredited, many aspects of the

movement still persist today. Eugenics echoes through modern times in the sense that many common beliefs parallel those of eugenicists; and some modern practices reflect those of the eugenics movement.

First of all, to fully comprehend how the eugenics movement has influenced modern society, one must first explore the history of eugenics. Eugenics is defined as the “science concerned with improving a species, especially the human species, by such means as influencing or encouraging reproduction by persons presumed to have desirable genetic traits” (The Free Dictionary). The science of eugenics has its roots in Social Darwinism. Charles Darwin’s theory of natural selection gained immense popularity in the Victorian era. Darwin’s theory, also known as “survival of the fittest,” profoundly affected the way of thinking in the 19th century. Darwin’s theory didn’t have any implications for the way humans should live; nevertheless, it was applied to society (Perring). One strong proponent of social Darwinism was the progressive psychologist and anthropologist Francis Galton. Galton believed that Social Darwinism should be further applied to the human race as a whole. In 1883, Galton combined the roots of the Greek word for “good” and “origin” to create the term “eugenics” (People & Events). Eventually, eugenics became a very popular movement worldwide. The movement expanded to areas such as Canada, west and northern Europe, North and South America, and England, which exported its eugenics beliefs to its colonies (Perring). The movement was so popular throughout the United States that a committee on eugenics was formed by the American Breeders Association in 1909. The committee had many prominent societal members such as inventor Alexander Graham Bell, evolutionary biologist Vernon Kellogg and influential psychologist Adolf Meyer. Also, the eugenics record office was funded by the powerful Harriman family, the Rockefeller family and the Carnegie Foundation (Perring). The movement was not just accepted by extremists, but also moderates and others from diverse backgrounds. Eugenics was equally embraced by socialists and conservative traditionalists because eugenics’ core values appealed to many people’s beliefs at the time.

Next, eugenicists’ beliefs appealed to a great audience in the west especially because it addressed many of their social concerns. Eugenics at its core seeks to improve mankind, and one key aspect to eugenics improvement is to deem certain traits as “fit” and “unfit”. “Armed with charts, photographs, and even human skulls, [American eugenicists] were there to provide the visual and mathematical support that rendered racism scientifically valid and politically viable” (Ordovery 9). They further justified their dogma through the belief that almost all traits are innate: “‘nature, not nurture,’ has been raised to the rank of [their] dogma” (Boas 472). So traits and acts that were seen as undesirable such as sexual promiscuity, alcoholism, masturbation, being handicapped, or being mentally ill were seen as hereditary and “unfit” for society. Also being a racial minority and an immigrant also meant one was “unfit.” “Those considered most worthy of rearing children were couples who were middle class or upper class Nordic-Teutonic whites. Racial minorities and ethnic immigrant groups were typically classified as unfit; also the poor and physically handicapped, whose problems were classified as hereditary” (People & Events). With regard to the mentally ill, they were afflicted by a wide range of mental illness such as “dementia praecox,” or today known as schizophrenia, “mongolian idiocy,” now seen as Down’s syndrome, and the most dangerous but important was “feeble-mindedness” (Mental Illness). The perceived danger of “feeble-mindedness,” which was considered very low I.Q, was often linked to sexual promiscuity. Criminality and social dependency was feared because the “feeble-minded” individual “could potentially ‘pass for normal’ and reproduce with normal people. This was the case of Martin Kallikak, a normal man who fathered an allegedly corrupt line through his union with an attractive, but ‘feeble-minded’ girl” (Mental Illness).

In addition, not only was mental illness seen as purely hereditary but also contagious. In the U.S. there was a gripping fear of immigrants. To add to the fear of the average American, Harry Laughlin, the director of the Eugenics Record Office, claimed through numerous records he found that a large number of immigrants were insane (Mental Illness). David Starr Jordan, a

biologist, pacifist and the founding president of Stanford University, once stated what many Americans at the time felt, which was, “no community was ever built up of thieves and imbeciles” (Perring). So the “unfits” of society were ultimately seen as unwanted junk and burdens to mankind as a whole. But eugenicists not only shed light on what were seen as social issues, but they also had solutions to them. Consequently, eugenics had a massive appeal not only because they voiced many racist, sexist, nativist, and xenophobic concerns but more importantly because it provided an explanation to them. Eugenics is not only notorious for its beliefs, but also for the practices that were carried out in the name of eugenics. The eugenics movement was divided into two strands: positive and negative. Advocates of “positive” eugenics believed in promoting the reproduction of those who were considered “fit,” and part of the “fit” classes (pbs.org). On the other hand, those who supported “negative” eugenics sought to discourage and suppress the reproduction among those they deemed as “unfit” or “inferior stock” (People & Events). One example of negative eugenics was the case of Dr. Harry Haiseldon. In 1915, Haiseldon sparked some controversy because he withheld medical treatment for a “defective newborn,” treatment which could have saved the infant’s life. Haiseldon, saw no need to save the infant because it was “unfit,” and therefore should die (Shaddock 1). Haiseldon’s case was controversial, but back then he reflected the majority of public opinion. While Haiseldon and other “negative” eugenicists supported the killing of “defective” babies, others believed that they should have never been born. Another great example of “negative” eugenics was that of the early birth control movement and its prominent supporter Margaret Sanger. Sanger is given credit for coining the term “birth control” and also for the founding of the American Birth Control League, which was an early name for today’s Planned Parenthood (Kuglar). Margaret Sanger allied herself with the popular eugenics movement perhaps to further promote birth control. Sanger once stated publicly that “birth control is nothing more or less than the facilitation of the process of weeding out the unfit [and] of preventing the birth of defectives” (pbs.org). Also on another

occasion Sanger wrote, “[b]irth [c]ontrol is not merely of eugenic value, but [it] is practically identical in ideal, with the final aims of [e]ugenics” (Sanger 5). The “final aims of eugenics” was racial purity and many still feel that Sanger and other advocates targeted black women especially because they were seen as “undesirables.” Some African Americans believe that Sanger’s motive was not to aid black women but to eliminate future black generations (pbs.org). Sanger believed also that, “As an advocate of Birth Control, I wish to take advantage of the present opportunity to point out that the unbalance between the birth rate of the “unfit” and the “fit”, admittedly the greatest present menace to civilization, can never be rectified by the inauguration of a cradle competition between these two classes” (Sanger 5). Sanger’s end goal with birth control was not to increase woman’s reproductive autonomy, but instead it was a means of overall population control (Kuglar). Some eugenicists did not support Sanger and birth control, and feared that “fit” women may use it. However, some eugenicists did support her but they feared too “that the ‘unfit’ would not use the methods properly, thus sterilization was often promoted as the best option to limit their numbers” (People & Events).

To continue, in recent history many often associate mass sterilization with Nazism, and rightly so, but arguably many of the Nazis’ practices during World War II were inspired by the United States (Perring). In fact, eugenicists Harry Laughlin estimated that about 10% of the U.S population was “unfit” (Perring). Also in 1922, Dr. B.A. Owens Adair said that sterilization was “the only method by which the river of life may be purified” (Ordover 133). The mentally ill were especially targets for sterilization: “the mentally ill were considered ‘genetically inferior’ and eugenics and warped interpretations of Darwin’s theories suggested that mental illness could be eliminated through social engineering” (Hughes). A large victory for eugenicists was in the passing of the 1924 Johnson-Reed Act which dealt with immigration, and Buck vs. Bell (1927), in which the supreme court upheld sterilization as constitutional (Ordover 9). Carrie Buck, who was said to be “feebleminded,” was raped and

begot a child, and was ordered to be sterilized due to her sexual promiscuity and “feeble-mindedness”. Oliver Wendell Holmes, who served as an associate justice of the Supreme Court commented that, “[i]t is better for all the world, if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind...Three generations of imbeciles are enough” (Perring). Sterilization in the U.S was legalized in 1913 and persisted until the 1950s. Many at the time believed that to cure a mentally ill woman, one had to remove her ovaries because it was associated with “wandering uterus syndrome” and “hysteria” (Perring). Mentally ill males were often castrated. In 1898, Dr. F Hoyt Pilcher, who worked in an institute for “feeble-minded” children in Kansas, got permission to castrate 58 boys (Perring). California and Kansas had some of the largest numbers of sterilizations. In Kansas, reportedly about 2,851 patients, including 779 “feeble-minded” and epileptic, were sterilized before it became illegal (Perring).

In Europe, the birth place of the eugenics movement, methods such as sterilization were commonplace. The most notable country that practiced eugenics was Nazi Germany. In 1935, the Nuremberg laws were passed to protect German blood. One of these laws was to outlaw marriage and any other extramarital affair between Aryans and Jews. They also passed marital health laws in which one needed a marriage certificate, and the applicant could not be racially damaged, feeble-minded, or have any other racially contagious disease (Perring). Nazi Germany took the U.S sterilization practices to a new extreme. In 1933 the Nazis began sterilization of general “undesirables” like the disabled, blacks/Afro Germans, alcoholics and habitual criminals (Perring). The Germans also practiced euthanasia. If an individual was considered undesirable they could go into a euthanasia center and end their life voluntarily, or the state would do it for them. Euthanasia began with small children. Doctors had to report to the state if a child suffered from idiocy, Down’s syndrome, blindness, deafness, epilepsy, any deformities, or suffered from some kind of

paralysis. The euthanasia started with children who were three years of age and the number steadily rose to include all disabled children. It is estimated that around 5,000 children were killed during the duration of the program. Euthanasia soon spread to adults (Perring). The T4 program murdered at least 70,000 adults between 1939 and 1941. The Nazis used the technologies from the T4 program in concentration camps. “The final solution,” as it was called, to the “undesirable” problem was to simply kill them in concentration camps (Perring). After World War II, when the world learned of the Nazis’ horrific crimes, such as the Holocaust, and the eugenics movement was finally discredited.

Due to the past crimes associated with the eugenics movement, modern day society has made progress. Many today would like to believe that modern society has transcended the ignorance of the past, but this is untrue. In fact, many of the beliefs that existed in the eugenics movement still persist today. The terminology regarding people with learning disabilities or significantly low I.Q has changed from terms such as “feeble-minded” and “idiot” to words like “special,” which has begun to take on a negative connotation like its predecessors (Perring). Plus, the mentality of “survival of the fittest,” which stems from the father of eugenics, Social Darwinism, is still widely used today in society, so that term and way of thinking has never quite died out. An example of this would be the treatment of those who are poor and mentally ill. The poor and the mentally ill are often looked at as “growing burden[s] on society” (Mental Illness). With regard to the poor, many in a socialistic welfare state like the U. S. view those of low income as being inherently lazy, and living off of taxpayer dollars.

While a few may believe that poverty is an environmental issue, quite a growing number echo the eugenic dogma of poverty being inherently genetic. In 1994, political scientist Charles Murray commented to a reporter from the New York Times, stating that: “people were no longer poor because of social barriers, but rather because of their inherent lack of intellectual prowess.’ This argument, appealing to some precisely because it obviates any societal

obligation toward the disfranchised [poor], has strong precedent within the eugenics movement...The problems of population are no longer regarded [as] essentially economic but mainly biological" (Ordover 51). This is just one clear example of how society often views the poor; the belief that poor people are poor because they are innately incompetent is a clear sign of eugenics thinking. Also, Americans' concern toward immigrants didn't start with the eugenics movement, nor did it disappear with it. The eugenics movement exaggerated many Americans' fear of immigrants, but in recent years the fear has persisted, especially after 9/11. This type of xenophobic attitude includes more than a fear of terrorism, but racism, as it did in the eugenics movement. Ophthalmologist John Tanton had a confidential memo that warned against immigrants, especially those from Latin America. He believed, like a quite a few Americans, that they would eventually take over the U.S. (Ordover 54). As in the eugenics movement, many believe that more immigration into the U.S will hurt national pride or affect U.S racial and cultural identity. A poll conducted in 2014 found that " 70 percent of Americans – including 86 percent of Republicans – say illegal immigrants threaten traditional U.S. [beliefs] and customs, as well as jeopardize the economy" (Miller). Such as it was in the time when the eugenics movement flourished, many still view immigrants as an inherent threat to the U.S. These negative social views also extend to those who are handicapped. Those who are handicapped argue that disability is not intrinsic; it is extrinsic because of how people view and treat them differently (Perring). Like those who are poor, immigrants, or are mentally ill, a person with a physical disability is often perceived as socially dependent and just another weight on society (Perring). Science has made great strides in recent decades, especially in the field of genetics, but like the eugenicists of the past many scientists who study genetics have a tendency to view all aspects of human beings, such as beauty and health, from a purely genetic point of view. For example, more money is being spent on finding a gene(s) that makes an individual homosexual than on breast cancer and AIDs research (Ordover 88). Trying to place all aspects of a person into a genetic box is

dangerous and shadows eugenicist thinking. The fact that society still deems certain people and traits as "undesirable," or as "burdens" reopens the door for many eugenics beliefs to persist.

As a consequence of many eugenics beliefs that still fester in the human psyche, many appalling modern day practices echo eugenics. Sterilization, a very popular practice during the eugenics movement still exists today. In Vietnam, at least 100 Vietnamese female rubber plantation workers were secretly sterilized: "[they] were told they were having their IUDs checked, and then injected with quinacrine (a drug used for the sterilization of women) without their knowledge" (Ordover 202). Also, in other parts of the world such as China, population control is practiced. This is implemented in China through the one child policy. Having more than one child is strongly discouraged and some parents are fined if they have more than one. What is even more controversial is that it is believed they implement forced sterilizations and abortions on repeat offenders (Moore). Closer to home, sterilization still continues in the U.S. (Stern). Between 2006 and 2010, at least 148 women in a California prison were sterilized illegally without their permission (Campos). Sterilization is not the only population control practiced in the United States; euthanasia is still practiced. In the U.S. euthanasia is done in small numbers and, unlike the Nazis' outright murder, an individual is not forced to take their own life. Euthanasia is still controversial in the U.S. but is legal in a few states like Oregon, and it is heavily regulated by the government. Essentially, if a person has a terminal illness they seek a doctor's help to die on their own terms (Perring). Euthanasia is controversial not just because of its history, but many argue that an individual doesn't have the right to take their own life, let alone ask a doctor to help them do so. Furthermore, there are debates about what doctors should do in the case of unresponsive patients. Consider the case of Jahi Mcmath, a brain dead child whose mother wants to continue treatment but the doctors argue that it is a waste of money, resources, and time because she is no longer alive, and the machines only give her the illusion that she is (Perring). Jahi's case closely resembles that of the eugenics advocate Dr. Haiseldon in 1915. A

case like Jahi's raises the question of "What is the value of a life, and how does one decide who should live or die?" Eugenics tried and still tries to answer these questions. For example, many people would like to think that they view all life as sacred, and each individual has a right to live; but faced with the realization of having a child that is highly likely to be born with Down's syndrome, about 90% of women choose to have an abortion (Perring). This statistic opens the door for one of the most compelling examples of future eugenics: the designer baby.

Perhaps most disturbing is the ability to genetically modify future generations. Genetic engineering is the process of artificially manipulating innate characteristics (Baird 5). Scientists have carried out genetic engineering successfully on rodents that now glow in the dark (Baird 2). Scientists can also change a child's gender. It is believed that soon humans will have the ability to alter numerous genes in their children, and this can have great ethical and societal consequence as a whole.

Modern human genetic engineering entered the scientific realm in the 19th century with the introduction of eugenics. Although not yet technically considered "genetic engineering," it represented society's first attempt to scientifically alter the human evolutionary process. The practice of human genetic engineering is considered by some to have had its beginnings with in vitro fertilization (IVF) in 1978. IVF paved the way for preimplantation genetic diagnosis (PGD), also referred to as preimplantation genetic selection (PGS). PGD is the process by which an embryo is microscopically examined for signs of genetic disorders. Several genetically based diseases can now be identified, such as Down Syndrome, Tay-Sachs Disease, Sickle Cell Anemia, Cystic Fibrosis, and Huntington's disease (Baird 6).

The practices of IVFs and PGD seem like a eugenicist's day dream because technology has finally allowed people to get rid of those "undesirable" genes. If PGD's are a eugenicist's daydream then "human germline engineering" must be a eugenicist's fantasy. The process of PGD only affects the intimate offspring, (Baird 10) but germline, which is a term referencing the sperm and the egg cells, is modification

throughout generations from that offspring (Perring). This route permanently eliminates genes that are deemed "unfit," but with these methods society would have to come to an agreement as to what are "good" genes and what are "bad" genes (Baird 13). As of now, with parents already having the power to select their child's gender remains unregulated: "[t]he FDA, meanwhile only regulates the potential safety and efficiency of these techniques, not their ethical implications" (Ghose). So societies in the future would have the option of finishing what the eugenics movement began many years earlier. The proponents for genetically modify children claim that, "Others see the same technologies as the ability to take charge of our own evolution, to transcend human limitations, and to improve ourselves as a species" (Baird 3). Also proponents arguments mirror eugenicists beliefs of "survival of the fittest" or that only the strong are meant to breed: "[a] great many naturally conceived embryos are rejected from the womb for defects; by screening embryos, we are doing what nature would normally do for us" (Baird). On the other hand, opponents see the practices as a clear form of modern day eugenics. "[T]here is always the looming shadow of eugenics. This was the motivation for some government policies in Europe and the United States in the first half of the twentieth century that included forced sterilizations, selective breeding, and "racial hygiene." Techniques that could be used for designing babies will give us dangerous new powers to express our genetic preferences" (Baird). What many proponents and eugenicists overlook is that fact that, [a]lthough these methods sound attractive, there are serious limitations to their applicability. It is obvious, from a purely biological point of view, that only those features that are hereditary can be affected by eugenic selection. If an individual possesses a desirable quality the development of which is wholly environmental causes, and that will not be repeated in the descendants, its selection will have no influence upon following generations (Boas 471). Perhaps the origins of certain traits will remain forever a mysterious puzzle that man will never be able to solve.

Eugenics is a dark chapter in mankind's history that humans will have to overcome. The popular beliefs of the eugenics movement still persist today, such as viewing certain individuals as societal burdens, and believing that certain "undesirable" traits are purely inherited through genetics. Also, many of the eugenicists' practices still endure in modern times, such as forced sterilization, euthanasia and genetically selecting "desirable" traits for future generations. Perhaps the reason why eugenics seems to endure throughout history is because as long as there are human beings there will always be the desire to aim for some kind of perfection, no matter how warped that perfection may be.

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About the Author - Rebecca Seide



Rebecca Seide will graduate from the Dr. Floyd F. Koch Honors College, in spring 2015, and transfer to Florida Atlantic University. Rebecca will seek a degree in anthropology, followed by graduate school.

Insanity: A Discussion of the Use and the Success Rates of the Insanity Plea

Jessica Ondrizek

On March 30, 1981, at 2:25 P.M., a man attempted to assassinate President Ronald Reagan as Reagan left the Hilton Hotel in Washington, D.C. (Worth, 2001). The would-be assassin, John Hinckley Jr., managed to fire six shots into the crowd before he was brought down by Secret Service agents. There was absolutely no question that Hinckley was the shooter, but the defense and prosecution had differing views on Hinckley's state of mind: the defense argued that Hinckley's behavior was the result of profound mental illness, but the prosecution believed his behavior was not the result of his mental illness (Worth, 2001). The Hinckley case drastically impacted the public's perception of the insanity plea when he was found not guilty by reason of insanity on June 21, 1982 (Worth, 2001). The public was outraged, upset, and believed that Hinckley had escaped punishment for his crimes. The public's response to the Hinckley verdict led to nationwide reform of the insanity defense (Worth, 2001). Despite the reform that took place, the inaccurate belief that the insanity plea is an overused, legal loophole still persists today. The insanity plea, which relies on three major rules, is rarely used by defense teams and is even less likely to be successful, because the concept of insanity is difficult to define.

Insanity, as defined by the Merriam-Webster dictionary, is "a deranged state of the mind usually occurring as a specific disorder (as schizophrenia)" (2014). The definition of insanity in the courtroom, however, differs greatly. Insanity, as defined in the courtroom, is "a mental disease or defect that interferes with a defendant's ability to control his actions or appreciate the nature of his act so substantially that the defendant is not considered to be legally responsible for his criminal acts" (Bergman & Berman, 2011 p. 614). The term "insanity" is used in criminal law to separate the "guilty criminal defendants for whom criminal sanctions are inappropriate from those for whom criminal sanctions are appropriate" (Loewy, 2000 p. 161). When a defendant pleads not guilty by reason of insanity, he does not claim to be innocent; rather, he admits his guilt and claims his behavior was the result of a mental illness (Grachek, 2006).

The words "insane" or "insanity" are frequently associated with psychology. While this association is understandable, these phrases are not psychological terms. Rather, the concept of sanity and insanity are legal constructions. The concept of insanity is malleable, rather than concrete, and it is frequently remade by jurors, judges, lawyers, the public, and the media (Kirwin, 1997). Even though the concept of insanity is malleable, the legal definitions have remained largely unchanged for years.

The insanity plea may seem like a fairly recent addition to the court system, but various forms have actually existed for hundreds of years. An ancient Hebraic law established that lunatics were viewed as "incapable of distinguishing between good and evil or right and wrong" and they "could not be held criminally responsible" (Worth, 2001, p. 17). A form of the insanity defense existed in English common law in the 1200s (Kirwin, 1975), and Henry de Bracton, a 13th century scholar, wrote that madmen lacked criminal intent and therefore "could not be considered criminally liable" (Worth, 2001, p. 17). In 1307, a criminal could be found not guilty if his defenders could prove that his mental capacity was no greater than that of a wild animal (Kirwin, 1975). In the 1600s, Sir Matthew

Hale, the chief justice of the Court of King's Bench, redefined insanity as the lack of free will (Kirwin, 1975).

Today, there are three main rules that are used to determine whether a defendant is insane or not: the Durham rule, the American Law Institute standard, and the M'Naghten rule (Kirwin, 1997). The Durham rule is concerned with "irresistible impulse" (Cornell University Law School, 2014). This rule was decreed in 1954 by Judge David Bazelon, the chief of the U.S. Court of Appeals in the District of Columbia (Kirwin, 1997). This rule holds that a defendant is not responsible for his crime if it was the result of a mental defect or disease, and that he would not have committed that crime if not for that mental defect (Douglas & Olshaker, 1995). This rule was not popular with law enforcement and judges because it gave such a broad definition of insanity (Douglas & Olshaker, 1995), and it was eventually rejected by federal courts (Cornell University Law School, 2014).

The second most common insanity test is the American Law Institute standard (Fisanick, 2012), which was drafted in 1962 (Kirwin, 1997). This test seeks to determine "whether the defendant lacks substantial capacity either to appreciate the criminality of his conduct or to conform his conduct to the requirements of law as a result of a mental disease or defect" (as cited in Fisanick, 2012).

According to the American Civil Liberties Union, the most popular insanity test is the M'Naghten test (Fisanick, 2012). The M'Naghten rule (also commonly spelled as "McNaughton") examines a criminal's ability to tell right from wrong (Schechter & Everitt, 1996). For a defendant to be found insane under the M'Naghten test, the defense must demonstrate that, at the time of the crime, "the party accused was laboring under such a defect of reason, from disease of the mind as not to know the nature and quality of the act he was doing, or if he did not know that he did not know he was doing what was wrong" (as cited in Kirwin, 1997, p. 22).

According to the Cornell University Law School (2014), this rule was established in 1843, after Daniel M'Naghten shot and killed the secretary to the British Prime Minister. M'Naghten suffered from paranoid delusions and he believed the British Prime Minister was conspiring against him. He shot the secretary only because he mistook the prime minister's secretary for the prime minister. At his trial, nine physicians testified that he had a mental illness and that he was insane (Fersch, 2005). He was acquitted of his crime by reason of insanity and was placed in a mental institution for the rest of his life (Cornell University Law School, 2014).

Despite the controversy that surrounded the ruling at the time, the M'Naghten rule became the basis for various insanity pleas, including the American Law Standard and the Durham rule (Fersch, 2005). Approximately one-third of the states in America use some variation of the M'Naghten rule today, (Fersch, 2005), but controversy still surrounds these rules and how they define insanity.

Opponents of the insanity defense claim that many criminals are able to escape long or harsh guilty verdicts by faking mental illness, but research estimates that only one in four or five defendants who plead insanity exhibit signs of malingering (Fersch, 2005). Even when a defendant malingeres, mental health professionals are usually able to identify them. Studies show that mental health professionals (particularly forensic psychologists, who are specially trained to apply psychology to the forensic setting) are ninety-two to ninety-five percent accurate in determining if a defendant is faking mental illness or not (Grachek, 2006).

Research has shown that a majority of Americans have unfavorable opinions of the insanity defense. One study found that eighty-seven percent of the Americans who were polled thought the insanity defense was a legal loophole that allowed guilty criminals to escape punishment (Fersch, 2005). This perception is enforced in the media, because journalists tend to portray the insanity defense in a way that makes the public believe the defendant "is given cab fare and let out of the courtroom door to

prowl the streets again” (Kirwin, 1997, p. 193). This belief is actually inaccurate, as defendants who are found not guilty by reason of insanity are usually confined in mental institutions (Bergman, 2011). In fact, defendants who are confined in mental institutions are often hospitalized for many years; in some cases they are hospitalized for a longer period of time than if they had been found guilty and imprisoned (Bergman, 2011).

Another common misconception is that the insanity defense is overused. In reality, the insanity defense is not as commonly used as the public believes. One reason that the general public may believe that the insanity defense is frequently used is the huge amount of attention that the media gives to high-profile insanity defense cases, particularly multiple-murder cases. Despite the large amount of coverage the media gives to those types of cases, the insanity defense is not popular. In fact, fewer than four percent of multiple murderers have pleaded not guilty by reason of insanity in the past century (Schecther & Everitt 1996). Only about one percent of defendants who are charged with a felony plead insanity (Fisanick, 2012), and a similar study conducted by the National Alliance of Mental Health found that the insanity defense is used by less than one percent of defendants (Fersch, 2005). Another study, conducted in 2001, found that only sixteen of every ten thousand indicted used the insanity plea (Fersch, 2005).

Due to the infrequent use of the insanity defense, the rate of success is extremely low as well. One study reported that the plea is successful only twenty-six percent of the time (Fersch, 2005), while another study found that it is successful in fifteen to twenty-five percent of cases (Fisanick, 2012). Other sources cite that only one in four hundred defendants, or 0.0025% of defendants, is found not guilty by reason of insanity (Fisanick, 2012). Additionally, of the multiple murderers who have implemented the insanity defense in the past decade, only three have been found not guilty by reason of insanity.

The insanity plea may be rarely used because it is so difficult to prove. It is difficult to establish whether or not a defendant is insane

because the psychiatric expert who interviews the accused must determine the defendant’s “state of mind at the split second the criminal act was performed” (Kirwin, 1997, p. 7). If the expert believes the defendant was truly mentally ill at the exact moment of the crime, the defense team must prove by a “clear and convincing standard” that the defendant fits the state’s legal definition of insanity (as cited in Madsen, 2010, para. 5).

Even though the insanity defense is rarely successful, some variables make a defendant more likely to be found insane. One obvious factor is the defendant’s history of mental illness. Defendants who have a history of psychiatric issues and hospitalizations are more likely to be acquitted than a defendant without such a history (Fisanick, 2012). A less obvious factor, and arguably the most influential factor in determining the success of the insanity defense, is prosecutorial consent. One study found that in about one-third of all cases that resulted in a verdict of not guilty by reason of insanity, the prosecution and defense both agreed that the insanity plea was appropriate for the case (Fersch, 2005).

Another major factor is sex, as women are more likely to be acquitted by insanity than men (Kirwin, 1987). One study conducted in Oregon found that twenty-nine percent of women and nine percent of men charged with homicide were found not guilty by reason of insanity (Breheney, Galietta, & Groscup, 2007). Additionally, women who are found not guilty by reason of insanity typically spend less time in psychiatric facilities than men (Breheney et al., 2007). Unfortunately, the victims of a female killer are “usually infants, children, or lovers and spouses” (Kirwin, 1997, p. 254).

Wealthy defendants are also more likely to be found not guilty by reason of insanity, possibly because they can afford to hire more competent lawyers and experts (Kirwin, 1997). There are many other variables that can affect the outcome of a trial: the ethnicity and status of the offender; the prejudices and beliefs of the jury; and the coverage of the press (Kirwin, 1997). Fersch suggests the effectiveness of the psychological testimony and the definition of

insanity that is being used in the state in which the defendant is being tried can both impact the outcome of the trial (2005).

One underestimated factor in the outcome of the trial may be the jury. According to the American Civil Liberties Union, jurors often reject the insanity plea in capital cases, even when the defense presents strong evidence of psychological problems. One possible explanation for this finding is that the jurors are afraid of the backlash they will receive, particularly if the case is a high-profile one (Fisanick, 2012). Another possible explanation is that, despite strong evidence of psychological issues, the jurors believe the defendant deserves to be punished for his crime. After the trial of Albert Fish, a murderer and cannibal from New York, a juror was quoted as saying, "We believed he was insane, but we thought he deserved to die anyway" (Schechter & Everitt, 1996, p. 127).

Even if the defense presents evidence of mental illness, the jury may be reluctant to find the defendant not guilty by reason of insanity because they do not trust the psychiatrists or psychiatric experts involved. A study, conducted shortly after the Hinckley trial, asked the American public what they thought of the high-profile trial. The study found that nearly forty percent of Americans had no confidence in the testimony of a psychiatric expert. Additionally, the same study found that only eighteen percent believed that psychiatrists could accurately determine if a defendant was insane or not (Fersch, 2005).

Despite the media's portrayal, and the public's pervasive belief that the insanity defense is overused and frequently successful, the research discussed in this paper proves that the insanity defense is not what the public believes it is. The public believes the insanity defense is a legal loophole that allows both mentally ill and competent defendants to escape punishment. However, the insanity defense is only used by approximately one percent of defendants, and the insanity plea is only proven in about fifteen to twenty-five percent of cases. Defendants who are found not guilty by reason of insanity are frequently confined to mental institutions for

many years. The insanity defense is more likely to be successful if a defendant is wealthy, female, or has a history of mental illness. Other factors, including the jury, press, and expert testimony, can also influence the verdict. These factors can make the outcome of a trial involving the insanity defense almost impossible to predict. While trials involving an insanity plea can be dramatic and full of surprises, these cases are rarely as fanciful or as successful as society and the media believe them to be.

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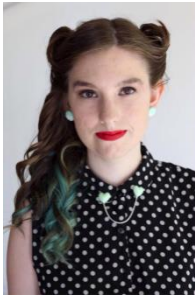
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behavior” (helpingourteenagegirls.org). The recent prominence in the media that this topic has received is bringing to the surface a behavior that has long been considered normal but is actually a detrimental social practice. Although street harassment is not a new phenomenon, the spheres in which it is committed have spread since its inception and prominently include college campuses. The effects of street harassment on college campuses insidiously contribute to a tension that harms the entire campus community and can only be countered through a thorough understanding of the causes, implications, and solutions to street harassment.

About the Author - Jessica Ondrizek



Jessica Ondrizek will graduate from the Dr. Floyd F. Koch Honors College, at Palm Beach State College in the spring of 2015. She will continue her education in Florida, and will pursue her passion for criminology and engineering.

There are many different types of street harassment that apply to the definition used within this paper. For example, LGBT harassment, racial harassment, and religious harassment all apply to the above definition. However, the type of harassment discussed within this paper will be limited to gender-based harassment, which most commonly consists of men harassing women. This specificity implies a social dynamic between the genders that is highlighted and exacerbated in public spaces.

Hey Baby! Come Read my Paper: Street Harassment on College Campuses

Olivia Lowrey

The freedom to enter a public space and proceed unimpeded is a right taken for granted by many, but is a right that is far too often violated. An uncomfortable reality, easy to overlook, is the fact that sometimes a simple act, even a single word, can demolish a person’s comfort in public. One such behavior that can have negative effects in public is street harassment. Street harassment encompasses “a range of harassing behaviors that occur on the street or in other public places including catcalling, sexually explicit comments, unwanted touching, and other unwanted attention and

One of the most valuable perspectives to understand when approaching the phenomenon of street harassment is that of the motives of those who commit street harassment. The explanation of street harassment most commonly accepted in academic circles is that men harass women in public spaces in order to express their dominance and to impress upon women their inequality in the public sphere (Bowman 541). Men use a range of verbal and physical methods including cat calling, pinching, and winking suggestively in order to make the object of their attention uncomfortable. As Dr. Jane Caputi, a Gender Studies professor at Florida Atlantic University explained in an interview, street harassment is used “not to flatter women but to intimidate women and let them know that ... their space is in the home... cleaning up, having babies... that the public sphere is men’s space...and if they intrude into it they will be harassed.”

It follows logically that street harassment is more common in areas that have changed from being male dominated to mixed gender. This can be evidenced in the high rates of female

harassment in noted areas like the workplace or the military (Caputi). In a study of government employees, 33% of women said they had received sexual remarks multiple times (Fitzgerald 1071) while in a study of female veterans 55% of participants reported that they had been sexually harassed (Skinner et al. 291). This explanation of street harassment applies to college campuses since college education was once restricted to men but has expanded in many countries to include women. This invasion of women in a previously male dominated area can explain the numerous occurrences of harassment that transpire on college campuses (Caputi).

Another possible motivation for street harassment can be explained by a behavior referred to as “Girl Watching” (Quinn 387). This practice involves groups of men sexually critiquing a woman, or sometimes even just a representation of a woman. This behavior is prominent in workplace settings but also in numerous public areas and serves two purposes. The first purpose is that of male bonding and the second is that it provides an opportunity for men to overtly express their heterosexuality to other men (Quinn 394).

Although street harassment and girl watching can include the same behaviors there is a distinction between the two which lies in the context. While street harassment occurs, by definition, in public spaces and may consist of an interaction between only the harasser and the person being harassed, girl watching can happen in a variety of settings and occurs only when there is more than one harasser and does not require the victim to be present. For example, street harassment would typically consist of a man making a comment like “Smile for me sweetheart!” to a girl walking on the street, while girl watching might consist of a group of employees commenting on a co-worker, making comments such as “I know how to show that woman a good time!” Although the behaviors are mechanically different, the motivations behind girl watching, a need to demonstrate to other men heterosexuality and masculinity, may explain one of the social purposes of street harassment.

A common rebuttal to these theories invokes the idea that men are simply complimenting women. The suggestions that present street harassment as a male behavior intended to be oppressive are often attacked as overreactions to what is commonly accepted as men having some harmless fun (Quinn 387). Upon closer inspection, however, these rebuttals disintegrate. In October 2014, a video of a woman undergoing over one hundred instances of street harassment while walking through New York City brought national focus to the feelings of average women. The prominently negative reactions of women triggered by this street harassment awareness raising propaganda (Yan) should smother any doubts men have about the reception that their comments are receiving. The idea that men are only trying to compliment women degrades further within a college setting. According to a survey conducted of students at Palm Beach State College (PBSC), 88% of students (both male and female) surveyed expressed that street harassment is not intended to complement.

Unfortunately, men, who usually do not have to undergo the uncomfortable experience of street harassment, often have difficulty empathizing with women on this issue. Their limited knowledge of the damaging effect of street harassment may be caused by the fact that they are not often recipients of harassment and that, even when they are harassed, it is doubtful they feel equally as threatened by a female harasser as women do by male harassers (Anderson). Furthermore, men are often ignorant of harassment against women since street harassment is not often committed against a woman who is in the company of another man. Amanda Hess, an editor for Slate magazine, has written about this phenomenon and noted that it may result from the reluctance of harassers to approach women when they are in the company of a man. She describes that after a friend of hers refused a man’s attentions at a party by claiming that she was married, “We agreed that she had said this because aggressive men are more likely to defer to another man’s domain than to accept a woman’s autonomous rejection of him.” (Hess). This dynamic places women in the uncomfortable situation of choosing between harassed independence and constricting

dependence when entering public spaces. Since continuously maintaining a boyfriend, family member, or bodyguard near at all times is unfeasible and unrealistic when attending classes at a university or college, women must make the decision to allow the possibility of exposing themselves to damaging remarks and behaviors when they decide to pursue post-secondary education.

The next facet of street harassment that is integral to the understanding of this phenomenon is the effect that street harassment can have, not only on its victims, but on society as well. Street harassment can have multiple damaging psychological and physical effects upon its victims including emotional damage due to non-resistance, objectification, restriction in public spaces, and, in extreme cases, physical harm. It has been suggested that non-resistance can lead to feelings of disempowerment and low self-esteem while resistance to street harassment can have positive psychological effects. Victims of street harassment also begin to associate their bodies with shame and humiliation after repeated harassment. Additionally, victims will subconsciously internalize sentiments of low self-worth which damage their self-image and may lead to feelings of discomfort with their own sexuality (Bowman 535-40).

More actively negative consequences to street harassment can include physical harm. "Street harassment can sometimes escalate" states Dr. Caputi. She explains that it is possible that "many physical attacks actually begin with some kind of verbal harassment." There is even some evidence that street harassment is used by sexual predators as a type of "rape testing" (qtd. in Bowman 536). Depending on the level of resistance in the response of the victim an aggressor may identify the individual as a likely candidate for further molestation (Bowman 536).

These effects, although disturbing, are not surprising. A result of street harassment that may be less intuitive, however, is that those who are harassed are not the only victims. Men and society are also damaged. By cat calling, whistling, and pinching, many men do not realize that they are alienating women by skewing

women's perceptions of men (Bowman 540-42). Professor Bowman elaborates on this point by stating "it is difficult for a man, however well intentioned, to address an unfamiliar woman on the street without evoking some suspicion or fear in her" and that street harassment "contributes to distrust and hostility between the sexes" (540). Thus street harassment can elicit a distrustful and suspicious environment with diverse consequences, provoking an estrangement between men and women which should be of concern, especially on college campuses.

Street harassment that occurs on college campuses has recently become a topic of discussion on street harassment awareness raising websites. One such website, Hollaback! conducted a survey of college students in which 67% of students surveyed said that they had experienced street harassment on campus, while 23% said that "harassment prevented attendance in class/social activities" (Harassment on College Campuses). In a similar survey of PBSC students, conducted in order to confirm the existence of street harassment at PBSC, 40% of female students stated that they had experienced street harassment on campus, while 56% of those students stated that being cat called made them feel uncomfortable. The climate of discomfort that is constructed as a result of street harassment does not correlate with the sense of community that should be natural on college campuses.

Students on college campuses, however, might not fully appreciate the dangerous motivations behind street harassment. Although students are confronted with street harassment regularly, in the survey of college students at PBSC when asked "Why do you think street harassment is committed?" responses included flippant comments such as "because people are stupid" and "people have nothing better to do" and "men trying to get with someone". This playful attitude towards a behavior that is clearly making students feel uncomfortable implies that students underestimate or are unaware of the damaging motivations that engender street harassment. It seems that students have become desensitized to a problem that has come to be considered a

socially acceptable, although unfortunate, behavior. These perceptions are, in some ways, as dangerous as the harassment itself.

Another area which recent discussions of street harassment have highlighted is the lack of administrative support provided by colleges. Hollaback!'s survey of college street harassment revealed that 55% of college administrators consider their response to street harassment to be insufficient (Harassment on College Campuses). Since only 17% of students report harassment (Harassment on College Campuses), this lack of initiative on the part of the administration may come from an ignorance of the problem, or from a desire to remain untainted by the stigma of sexual harassment. The reasons for colleges to refrain from aggrandizing any administration-stemming anti-harassment activities or initiatives are apparent. The fact that resistance to sexual harassment is necessary implies that it not only exists on campus, but is extreme enough to necessitate action. Understandably therefore, colleges are reluctant to draw attention to harassment on campus and be identified, labeled, and criticized as a college with sexual harassment problems (May).

One of the most valuable ways in which activists are contributing to ending street harassment is by "making street harassment an issue" (Kearl 185). In her book *Stop Street Harassment, Making Public Places Safe and Welcoming for Women*, Holly Kearl claims that raising awareness can be done on many levels "sharing your story in person or online...holding a local event, producing a documentary, or creating an art project." (165). Multiple websites have sprung up to meet this demand including StopStreetHarassment.com and Hollaback!. Hollaback! has even created a popular app for smartphones that enables users to track areas where incidents of street harassment are high and share their stories (Clark). The evident popularity of this app demonstrates how willing women are to take action against street harassment and how meaningful and psychologically necessary it can be to share experiences of street harassment.

Equally as important as raising public awareness is the need to educate women on the best way to react to a harasser when faced with one. "Every situation is different" claims Mr. Smith, Security Manager at Palm Beach State College "Under most circumstances it's best to walk away." If a woman responds to her harasser a situation may escalate from bad to worse and by reacting may create an unsafe environment. Within public spaces a best course of action may be elusive, on college campuses the best course of action is clear. "We [security] can be called at any time...any call that we're asked to look into, we're going to go see if we can find this person" (Smith). Women who face street harassment on campus should report the incident immediately to security. On college campuses, an employee who commits street harassment can be fired and consequences for students vary from counseling to more severe actions. If harassment becomes physical, the repercussions against both employees and students can be very harsh (Smith).

Another important step to combat street harassment is to enlist "male allies" (Kearl 185). With the help of men who are aware of the dangers of street harassment, incidents of harassment can be diminished, especially since this is a male perpetuated situation. Not only can men educate others on this topic, but they can also intervene when necessary to help a victim who is being harassed. A mixed-gender approach to ending street harassment has other advantages including positive feelings of unity between men and women.

Seemingly innocent calls of "Hey baby!" take a more sinister meaning when the actual implications behind these statements are explored. Men's intentions, either conscious or unintentional, to suppress women's movement in the public sphere can be detrimental to those affected. Not only women, but also men themselves are harmed, creating an uncomfortable social atmosphere. The effects of street harassment can be seen on college campuses, and they create an unhealthy situation that can distract students from the real purpose of college: education. This discouraging situation can be countered, however, by a strong unified

response from both women and men to educate and intervene on the topic of street harassment.

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About the Author -
Olivia Lowrey

Olivia Lowrey will graduate from the Dr. Floyd F. Koch



Honors College, at Palm Beach State College, in the fall of 2015. She hopes to travel the entire world before the age of thirty in addition to double

majoring in psychology and economics.

Substance Abuse: Understanding Addiction as a Disease

Neysa Blay

Over the past decades, an evident stigma has been attached to drug addicts. Public perception commonly disregards the scientific data concerning the origins and development of substance abuse and proceeds to pass unfounded moralistic judgment on the addict. Addiction is a genetically predisposed disease of the body and the brain; therefore, does not represent a lack of will power or an unwillingness to control the behavior. Understanding that addiction is a chronic disease that certain people are predisposed to have, and that causes impulsive decision making, could have far reaching consequences to our legal system and to recovery programs

Renowned psychologist, scientist, and public servant Alan L. Leshner has led and participated in extensive drug use related studies as director of the National Institute on Drug Abuse. In his article "Addiction is a Disease, and it Matters"

published by the scientific journal *Science*, Leshner states, "Addiction is actually a chronic, relapsing illness, characterized by compulsive drug seeking and use" (45). Advances in psychology, neuroscience, and behavioral science have shown that the compulsion of drug seeking is a consequence of brain structure alteration and the underlying reason for which addicts continue their substance abuse, regardless of the well-known health related and criminal consequences. Evidence shows that once the brain structure has been altered, the addict is no longer in control of his impulsive behavior, contrary to popular public belief. Leshner explains, "We need to face the fact that even if the condition initially comes about because of a voluntary behavior (drug use), an addict's brain is different from a non addict's brain" (46). The addict's first use can certainly come in a completely voluntary manner; nevertheless, a predisposition to become a chronic drug user exists. Once the individual uses the drug his brain function modifies. Consequently, prolonged drug use by the individual causes brain function modification that persists long after the individual has stopped taking the drugs. This scientific fact sheds light on the perception that an addict lacks self-control and helps to educate the general public that the addict, unnecessarily, suffers from a chronic impulse-driven disease. Understanding that addiction is a chronic disease is an important first step in diminishing the social and criminal impacts that drug abuse has on society.

Scientists have long suspected that personality traits such as impulsivity, thrill-seeking, and antisocial behavior go hand in hand with drug addiction. The interrogative remains as to whether these characteristics are present before the drug use, or if they are the results of long-term drug abuse. Dr. Jeffrey Dalley and his colleagues of the Neuroscience Department at Cambridge University have provided insight into this problem through a complex experiment involving rats conducted in 2007. Dr. Dalley's research involved analyzing rats' brains for natural levels of dopamine receptors, and testing for the development of impulsive behavior. After testing their impulse behavior through the retrieval of treats after a cue, researchers divided the rodents into two groups: normal and

impulsive. They found that the impulsive animals, which would not wait for the signal, had fewer D2/3 receptors in comparison to the other rats. In reference to the impulsive rats, Dr. Dalley states, "These animal models support the existence of a 'vulnerable phenotype' that predisposes to drug addiction" (1353). After measuring their dopamine receptors, researchers found that the rats' brain structures were significantly different, and this could determine their predisposition to drug abuse. The team proceeded to attach the rats to a machine that would allow them to self-administer intravenous cocaine. The rodents would receive a dose after pressing a lever. Dr. Dalley explains, "Our study provides experimental evidence that high levels of impulsivity can antedate the onset of compulsive drug use and, thereby, emphasizes the importance of preexisting impulsivity observed in addicts" (1354). Evidence shows that the rats with the low dopamine receptor levels became chronically addicted to the cocaine, and the normal rats would ration their cocaine to last longer. The impulsive animals learned to administer the drug more quickly than the other animals to the point where the impulsive ones were using at twice the rate of the normal rats.

An integral part of the addict's behavior is the continued impulsive drug use although the addict has a clear understanding of the dangers and disadvantages of this use. The reason for this misconduct is the difficulty of the addict to resist the impulses of the drug use. Dr. Alan Stacy, specialist in social and personality psychology from the University of Southern California, took a deeper look into this behavior through several cognitive studies on both normal and addict subjects. Dr. Stacy claims, "The essential idea is that behavior is partly governed by automatic processes that often exert their influence outside conscious control" (292). This influence is called implicit cognition, and it refers to unconscious influences such as knowledge, perception, or memory that influence a person's behavior without any conscious awareness of these influences. Alongside The IVO Addiction Research Institute in Netherlands, Dr. Stacy performed a Dual-Process model experiment to study automatic motivational and emotional stimuli. Research has already proven that the brain

changes as a result of drug abuse revealing that the impulse system becomes sensitized to the drug and the cues that might predict the availability of the drug or the moment of use. Dr. Stacy performed a picture association experiment during which he randomly showed the subjects cue cards with words written in specific colors. The individuals were asked to read the color instead of the word. Results showed that drug users had intense difficulty in concentration when reading a word related to their drug use. For example, a card with the word cocaine written in red color provoked stimuli in the brain of the addict, and not in a non-addict subject. Dr. Dalley performed another associative test during which the individuals were shown two pictures simultaneously in a computer screen, one drug related, the other not. The pictures disappear after a small interval and a target cue appears in either the drug related picture or the neutral one. Dr. Stacy states, "Drug abusers more rapidly detect target stimulus when it replaces a drug-related picture than when it replaces a neutral picture" (294). These exercises are compatible with the belief that drug users react differently to their conscious awareness, and their actions are driven by impulse. Many researchers, such as Dalley, agree that implicit cognition in drug users opens a window to mechanisms in human behavior that contribute to the development of addiction. This behavior persists and worsens with continuous drug use making it extremely difficult for the addict to control the impulsivity.

The scientific evidence that proves that addiction is disease of the brain has been a great accomplishment for the scientific community. Nevertheless, these discoveries have become counterproductive for the legal system. Criminal and Mental Health Law expert, Dr. Stephen J. Morse, agrees that although these discoveries are important scientifically, they are missing the element of environmental influences that contribute to drug use. In his article "Addiction, Genetics, and Criminal Responsibility", Morse states, "to raise the issues most starkly and most sympathetically to the view that biological causation may play an excusing role, it is assumed that addicts are not responsible for becoming addicted" (167-168). The danger of this

problem relies on the fact that a great number of individuals facing criminal charges, or arrested for crimes are addicted or drug users. For this reason it is important to assess the legal responsibility of addicts, whether their condition is biological or not, because addiction as a disease cannot exempt criminals from their actions. In accordance with the law, a person is criminally responsible for his action if his actions are accompanied by an appropriate mental state. Therefore, it can be vehemently argued that addicts are not responsible for their criminal actions because, due to their drug use or dependence, they are not in the appropriate state of mind to be accountable. Addiction cannot and should not be an excuse for criminal acts. In light of this issue, Morse suggests the law maintain a level of sympathy for the biological argument of addiction, but adopt a generic partial responsibility in which the individual accepts a lower level of punishment for his criminal actions. He calls this suggestion "Guilty But Partially Responsible". Morse states, "this proposal would lump together defendants of disparately impaired rationality, and consequently, different responsibility" (198). This suggestion would mean that a person could be charged with a variation of the crime committed or be given a lesser sentence. This methodology would allow the law to accept the argument of biology without trivializing accountability for criminal action.

According to neuroscience findings, the theory of addiction is presented based on the assumption that all addicts are alike. Since genetics is also a factor in the predisposition and development of addiction, every addict possesses a variety of personality traits and patterns. Renowned psychiatrist and neurologist, Dr. Charles O'Brien, from Harvard University, argues that in order to treat an addict in an efficient manner, it is important to apply a treatment plan that adapts to the addict's specific circumstance. O'Brien states, "an understanding of addiction requires addressing all three of these classes of variables (interaction of agent, host, and environment), treatment and prevention efforts that fail to consider all three have not been successful" (3277). The mechanisms involved in the reward system of the brain vary greatly from

the genetic aspects, reason of use, brain structure, to environmental circumstances. All of these elements are to be considered when choosing a treatment program for the addict. Because most of the drugs abused create a physical dependence, treatment programs focus on detoxification; therefore, after care treatment is rapidly discarded leaving the addiction practically untreated. Detoxification, nevertheless, is imperative in addiction to alcohol and benzodiazepines because withdrawal from these specific substances can lead to death. In his article "Evidence-Based Treatments of Addiction", O'Brien emphasizes the urgency of efficient treatment plans due to pre-existing psychiatric disorders, or disorders caused by drug use that should be treated independently from the substance use. O'Brien argues, "Treatment for addictive disorders may begin with detoxification, but the key to successful treatment is the long-term prevention of relapse by behavioral and pharmacological means" (3279). It is important that these approaches be combined, and not rely solely on the behavioral part by disregarding the possible need for medication. Even though many drug use disorders have great similarities, many specific combinations of elements should be addressed individually. Long-term treatment seems to be the most successful so far, for it improves physical status as well as mental, social, and occupational functions. Since currently there is no cure for addiction, it is imperative to concentrate on the part of the treatment that concentrates on relapse prevention.

Popular perception has wrongfully deemed addicts as deficient in self-control. It is wrongfully believed that addiction is a choice rather than a disease, and that addicts are unable to quit because they lack the self-will to do so. Due to advancements in technology and science, new theories about drug abuse are being presented to study this issue further. It has been scientifically proven that drug use causes alteration in the brain structure and the user's personality. Research has also shown that some people are genetically prone to develop addiction. These studies have presented a challenge for law makers and enforcers because they could be used to excuse the criminal

behavior of some drug addicts. Rather than focusing on the partial guiltiness of the drug addicts' behavior, it is far more important to focus on their wellbeing and their journey back to a normal, healthy life. As difficult as it can be to overcome addiction, there is always hope in treatment for the addict. The recovery process should involve individual profiling, care and support. In order for this process to have an increased chance of success, the need for more accurate education about addiction is imperative.

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About the Author - Neysa Blay

Neysa Blay is currently studying Business at Palm Beach State College. She will transfer to Florida Atlantic University to complete a bachelor's in Business Management with a minor. Personal experiences have led her to become interested in drug addiction and treatment options. She is expected to graduate in 2017 and become a successful recording artist.



Sabiduría Staff

Paul Lovelady, Editor

After graduating from Palm Beach State College, Paul Lovelady intends to transfer to Florida Atlantic University where he will pursue Bachelor's and Master's degrees in Economics, with a minor in English/ESL. His long-term goal is to teach Economics at the Gabriele D'Annunzio University in Pescara, Italy.



Patricia Medina, Editor

Patricia Medina will graduate from the Dr. Floyd F. Koch Honors College, at Palm Beach State College, in spring 2015, and transfer to Stetson University in the fall. She will seek dual degrees in Communications and Political



Science with an ultimate goal of becoming a White House Press Secretary. Patricia is also the student trustee for Palm Beach State College, editor-in-chief of Beachcomber, the student newspaper of

Palm Beach State College, on the SSS TRiO Debate Team, a member of Phi Theta Kappa, a member of the Human Trafficking Committee, a Model Legislature participant, and is on the 2015 All-Florida Academic team. Patricia is a recipient of the 2015 Kent Cooke Transfer Scholarship.