Abstract:

There have been many studies examining barriers for students from underrepresented groups advancing in Astronomy, which include test anxiety, impostor syndrome, stereotype threat, sexual harassment, discrimination, etc. While the statistical and theoretical investigation of these issues are important, it is also important to hear from those who are actively experiencing issues such as these. In this White Paper, I will describe my personal experience as an undergraduate Astrophysics major trying to pursue academics and research while facing several exceptional barriers and setbacks. It is well understood that Astrophysics is perceived to be a “difficult” major when compared to social sciences or even various STEM majors. It has come to my attention that astrophysicists are held to a standard that they must “know everything,” or that, “math must be so easy” for them because of how rigorous the courses are. The automatic assumption is that people could only pursue this major if they meet a socially set standard of intelligence. This creates the notion that, by definition of being in this major, these stereotypes must apply to them. The need to live up to these societal stereotypes enhance an already competitive environment. Thus, when one is struggling or cannot meet these socially set expectations, it could lead to an erosion of initiative, confidence, and aspiration. My intention is to not only make these issues less “theoretical” and more “experiential,” but also normalize discourse regarding mental health within the Astronomy community, in the hopes of drawing closer attention to the actual impediments of future astronomers like myself.
The Public Misrepresentation of Anxiety

Due to the misrepresentation of anxiety in social media (Television, YouTube, Instagram, etc.), society has been shaped to believe that it is not a subject of concern. Anxiety, portrayed by social media, represents those who suffer with the disease as teenagers self-diagnosing themselves with this generalized case of anxiety, or small instances where these teenagers appear overwhelmed and nervous. Self-diagnosis means that these individuals have not sought out professional help or a health professional has not diagnosed them. It is very common to experience occasional anxiety. However, having an anxiety disorder includes repeated instances of fear and terror that can escalate within minutes, and these episodes of terror begin to impact daily life (American Psychiatric Association). This misrepresentation perpetuates the idea that anxiety as a whole can be used as a synonym for nervousness. Anxiety is misunderstood in the public eye, but through eliminating the ignorance and increasing discourse regarding mental health, people can learn and reduce their ignorance surrounded the illness. Anxiety is an umbrella term that encompasses a variety of other panic and trauma related disorders such as social anxiety, phobias, a result of a previous trauma, separation anxiety, etc (American Psychiatric Association). Public illustrations of people self-diagnosing themselves has become so prevalent that those diagnosed with some form of anxiety get forced into the shadow of those who self-diagnose.

Young influencers on social media, specifically Instagram and YouTube, as well as large corporations (Urban Outfitters, Amazon, etc.) have been creating merchandise that attempts to normalize these disorders by making the discourse seem “trendy” when mental disorders became integrated with adolescent fashion. Urban Outfitters struck a debate about mental illness by producing merchandise that states “Eat Less,” or, “Depression,” which mocks the illnesses Anorexia Nervosa and Depression. Anorexia is a subset of anxiety that results from obsessing over appearance mixed with a feeling of lack of control in one’s life (American Psychiatric Association). This not only makes the topic seem laughable, but industries are profiting off minorities by capitalizing on mental illness. In a way these activities increase the overall discourse of mental illness in society. However, it does not exemplify the struggles of those who are officially diagnosed. Those who struggle with Anorexia experience many health complications, such as gastrointestinal difficulties, impaired immune system, muscle weakness, impaired healing, and fainting (American Psychiatric Association). The complete misconception of mental disorders in media viewed by teens and young adults spread negative messages across these younger generations.

The lack of discourse regarding mental health produces a misconception of what these disorders are, and the severe impact it has on the lives of people who have been diagnosed. This false misrepresentation in media not only builds a false narrative that mental health has insignificant impacts on one’s, but also orchestrates the notion that mental health discourse is taboo.

Functioning with Mental Disorders

I have been officially diagnosed with PTSD (Post Traumatic Stress Disorder) by a psychiatrist, and as a result of this I was also diagnosed with a severe anxiety disorder. A common definition used by those suffering with anxiety describe it as ones’ nervous system trapped in the “fight or flight” response to danger. Your body constantly feels as if it is under attack by a nonexistent entity, and this fear does not have an off switch. The severe anxiety causes me to tremble uncon-
trollably, hyperventilate, have irregular sleep patterns, and gives a constant sense of impending danger (American Psychiatric Association). PTSD causes me to have difficulty concentrating, memory loss, constant avoidance of doing anything where one of my triggers (anything that kick starts a flashback of traumatic events [American Psychiatric Association]) might be, uncontrollable trembling, and dissociation (American Psychiatric Association). The umbrella definition for dissociation is that it is a mental process that causes a lack of connection between the brain and a person’s thoughts (Mental Health America). The specific type of dissociation I experience is called “psychogenic fugue.” This means that I experience symptoms of amnesia, loss of one’s identity, and the constant need to flee my current residence due to fear (Mental Health America). Each symptom impacts me in a different way, but they work as a unit to throw obstacles in my path.

The most important symptom I would like to address is the uncontrollable trembling. A tremor is a constant involuntary muscle contraction that occurs in various parts of the body (NINDS). This symptom causes my entire body to tremble in a way that mimics the trembling of an elderly person with Parkinson’s. It is disabling because it affects my work performance and ability to complete daily tasks (NINDS). This also limits my ability to stand for long periods of time and write. Because of the excessive trembling, even while taking prescribed anti-anxiety medication, I still have trouble standing up in any situation. I have fallen in the bus while getting out of my seat. I have fallen standing up from a chair at the dinner table. I also have fallen on people trying to manipulate my way through a crowded lecture hall. The area where the trembling impacts me the most is my writing. Doing any form of timed writing test is difficult for me because my hand will involuntarily tremble to the point where I have to put the pencil down and let my hand relax again. Taking physics midterms and finals are a huge stressor for me because I physically cannot finish the tests within the allotted time frame. When I am studying I am forced to take long interval breaks because I physically cannot complete practice problems without my hand shaking a few minutes after I begin to write. At first I thought these trembles were induced by test anxiety, because I would quite literally shake with fear whilst taking my physics exams. However, I soon realized that it is part of my everyday life as a result of PTSD and severe anxiety. Tremors are not only debilitating, but also very embarrassing. Having to explain to people why I just fell or could not eat my food properly due to my hand shaking, causes me to reveal the cause of the condition, which most people diagnosed with it would choose to keep hidden to the public eye. As a result I failed all of my physics exams for an entire quarter.

Coupled with the constant trembling, I also experience obstacles when I have to concentrate. My brain is constantly cluttered with unnecessary worries. Sometimes they take over and I cannot keep my current thought on track. When I am taking exams the trembling and lack of concentration contribute to my inability to complete these tests. I cannot read or sit through lectures without these intrusive thoughts harassing my brain to pay attention to them. Occasionally, these intrusive thoughts are a trigger for me and that will cause me to have a panic episode. These episodes have no boundaries and sometimes happen at extremely inconvenient times. A panic attack is characterized by experiencing a large amount of terror and loss of control even though the fear is not tangible and exists only in the brain (NIMH). In times of panic, I shut down and become very immobile to the point where all I can do is lay down somewhere and let the trembling take over, or until a friend can take me to Urgent Care. I had a panic episode 10 minutes before my Oral Final for a Japanese class I took last quarter. I began to dissociate and became muted. I could not process a thought. I began to stutter because the tremors caused my voice to shake. The only words I was able to muster out were, “大丈夫じゃない。” (I am not okay). I inevitably ended up failing.
that oral exam.

This inability to concentrate collaborates with psychogenic fugue and tremors to create my own personal pit of despair. The best way for me to explain the feeling of psychogenic fugue to a person who has never experienced it is to make a collection of comparisons. Imagine waking up in the morning and leaving for work or school but you left your brain at home and your body is running on autopilot. That is what psychogenic fugue feels like. It is comparable to feeling like there is a thick fog engulfing your brain and your brain becomes lost in the fog. It is that feeling when you first wake up in the morning and you blink your eyes and wash your face to feel more awake, but that early morning groggy feeling lingers. Similar to entropy, psychogenic fugue is relentless.

A typical day in my life with psychogenic fugue is as follows: I wake up in the morning and continue on with my daily morning routine. I never eat breakfast. I always forget. I take the bus to campus, but the minute I get there, I have already forgotten how I arrived. I go to class and, because I am not in a cognizant state, I zone out. I complete the activities for the day. When I step out of the room I forget what I learned and what activities we completed. The scenario is different if I forget something in my apartment. When I leave the apartment and then have to return moments later to retrieve the item I had forgotten, I already lost the thought of why I came back home. My brain manipulates me into believing I already went to class. I am very skeptical so I go to class anyway. I do not remember how I got home or what I ate during the day. All I know is that I am suddenly in bed attempting to sleep, and to not wake up six times during the night because my brain is trapped in fight or flight mode and will not allow me to sleep. I constantly journal and make reminder notes to tell myself what I have done or did not do. I forget entire conversations and plans I make with my friends. I will be replying to my friends or instructors and in the middle of the message, forget what I was writing. I am constantly rereading because I forgot what my conversations were about. This paper is one of the most difficult papers I have had to write in my academic career. I keep going back and rereading to remind myself what topic I was focusing on. My lack of ability to focus makes writing for an extended amount of time is a difficult task. My tremors are also trying to inhibit my typing because I am not able to accurately type the keys I want to. Writing seems like a simple task, but imagine writing an important paper in your life and forgetting what you are typing every time you finish a sentence.

For the most part, psychogenic fugue manifests itself as memory loss. However on some days it morphs with the loss of identity and projects this sense of loss onto my close friends. For example, a close friend of mine was recently deployed back to his base in Guam. Naturally, I was worried for him on his trip back and I missed him. After weeks of no communication with him and significant memory loss, my brain took advantage of my incapacitated state and tried to convince me that my friend never existed. For four days I was not cognizant, confused, and distressed. I was thoroughly convinced that my friend was a hallucination. I did not get pulled out of this fog until I opened up to my other friends in a panic asking them if he exists. Imagine having a person that you value and deeply care about, and then your brain convinces you they never existed. Your brain does not delete the time you spent with them but makes you believe they are a figment of your imagination, a hallucination. You believe your brain because when the psychogenic fugue takes over and tricks you into believing they are one of the vivid dreams that you experience because of PTSD. In the life with psychogenic fugue you are constantly in a slight incapacitated state but still on edge and scanning rooms every few minutes looking for potential threats.

Now, this is a part of my everyday life. Being a full-time physics student as well as an under-
graduate student researcher struggling with these barriers makes learning unbearable. A mixture of this constant failure and psychogenic fugue significantly dropped my GPA and put me on academic probation. Because I was stuck in a cycle of constant failure, my transcript became increasingly undesirable, I was ashamed to admit what my GPA was, and I was constantly stressed about being kicked out of the school. I ultimately decided to withdraw from my physics classes mid-quarter and become a part-time student. Education regarding how a reduction or overproduction of specific chemicals affect the brain is crucial to pave the way to understanding the effects mental health has on peoples’ lives. In addition to scientific education of the chemical properties of the mind, society as a whole should be educated on how these chemical imbalances impact person-person and person-self relationships. Reducing coursework and withdrawing from extracurricular activities are not due to students becoming unmotivated, but instead, students falling into a cycle of constant hard-work followed by failure. Our disability is in our brain and is a physical hindrance in our lives. Mental illness not being a visual impairment, people cannot see the disability leads them to disregard the topic and push it under the rug.

Imposter Syndrome as a Result of Societal Standards

Society has a present standard for physicists. Society pushes the idea that for physicists, “math must be easy,” and they “must know everything.” Physics has gained a reputation among STEM and Social Sciences that it is notoriously difficult because of the rigorous courses. Thus, society built the idea that in order to pursue “difficult” majors the individual must be innately “math savvy”. As a result of these beliefs, a social concept forms around these preconceived ideas of the qualities all physicists must have. This social construct of qualities that a physicist must embody has become ingrained into our minds. Those in their undergraduate physics careers were brought up in a society that tells them they had to be born with the ability to solve problems. Thus, when they face/are confronted with their first failure or do not understand lecture for the first time it is a shock. This sparks the beginning of imposter syndrome.

Although imposter syndrome is not officially mentioned in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders), it is recognized amongst psychologists (American Psychological Association). Imposter Syndrome, often paired with anxiety, is the act of comparing oneself to others and lacking the ability to internalize and accept ones success (American Psychological Association). When these undergraduate students are placed in a room believing that they are innately smart and they notice people succeeding while they are unable to, they begin to think, “What is wrong with me?” Society told these students that they should be able to naturally understand physics. However, the public eye never sees the reality undergraduates face after they enter the major. The public is completely oblivious to the amount of problems students practice to be able to solve a specific type of problem that might not even appear on the exam. They are unaware that the students spend hours of studying and have removed any trace of social life to learn and understand the concepts thrown at us. They do not see the self doubt behind a person faking confidence as they present a poster or give a talk. Physics has this stigma behind it that physicists are introverted and lack most of the interpersonal communication skills to adequately collaborate with one another. The public does not see the constant collaboration students who have imposter syndrome partake in to understand a lecture because they realize they cannot succeed alone. Physics, similar to every other major, is a topic that is learned and not innate.
When undergraduate physicists are in their lower division courses they will come across the phrase, “think like a physicist.” We are not told that “thinking like a physicist” is a skill that can be learned. Most of us have never been introduced to the idea of Growth Mindset. Growth Mindset is the belief that with hard work and dedication one can change their most basic abilities (Mindset Scholars Network). Because this is a relatively new idea to us, we live in a bubble of self doubt in our own abilities. The predisposed idea that a physicist must naturally “understand everything”, because the major is “difficult” in comparison to Social Sciences or other STEM majors causes intrusive doubts of self-worth when standards are not met. These intrusive thoughts fuel Imposter Syndrome by causing students to compare themselves to each other and to the social standards for physicists.

I struggle with imposter syndrome and have noticed that others struggling with me fell into a vicious cycle which mostly results in academic failure. Initially, we recognize that we do not meet the social standard for Physicists. We notice other physics students flying through classes with ease while we are not. By the time of the first exam we have studied for days prior, but are frozen and unable to complete the exam. From here there are two paths. The student could either feel hopeless and lose all motivation and ambition for the rest of the quarter, or they decided to study significantly more than the first time. The excessive studying eventually leads to failure because the student will set their mind on passing the class based on the specific test they are studying for. Because they student has placed these expectations on themselves the fear of failure ignites test anxiety, and will devour the student during the exam. during the actual exam. The lack of motivation and feelings of hopelessness contribute to the decreasing quality of work, which will lead to the student not excelling in the class. This solidifies the students’ self fulfilling mindset, that hard-work will not pay off because they believe that despite all their efforts they will not succeed. Thus, the cycle repeats until the student has either given up on the major or becomes overwhelmed from putting all their effort into learning but still failing all their exams. This relentless cycle is a major contribution factor to students “burning out” and losing their motivation to continue on in their physics studies. Imposter Syndrome obliterates any form of confidence the student previously had. Many students like me who are “in the gutter” and look “bad on paper” fear for our future. Some of my peers have decided that they will never be accepted by a graduate program because their transcript is less than adequate and their GPA mirrors the gas prices in California circa 2009, slightly over $2.30 (Vehicle Technologies Office). We believe that our ability to prove our dedication and hard work in the world of physics is silenced by the graduate program application process.

Addressing the Fears of “Looking bad on paper”

A major fear that students “in the gutter” experience is coming to terms with the fact that their ability to get accepted into a graduate program has been diminished. When a student is “in the gutter” their GPAs are often low and they have failed some courses causing their transcript to look abysmal. Commonly, graduate schools require the applicant to submit a transcript and their GRE and Physics GRE scores. In addition, they allow applicants to submit a written portion of the application. However, that only allows a student to explain any inconsistencies in their application. Most of us cannot even look at our transcripts without feeling an overwhelming sense of disappointment in ourselves because we know the dismal scores are our fault. Although we
logically realize that we have done all we could given the circumstances that life dealt us, the underwhelming scores feed our imposter syndrome when we fail to meet social expectations placed on physicists. It is possible to suffer academically but succeed in a research environment. However, because transcripts and standardized test scores are prioritized to filter out undesirable applicants, most students who are “in the gutter” are already denied admission before they have the chance to talk about their research and the skills they learned throughout their undergraduate research position.

In addition to mental disorders, many of us undergraduates face other obstacles. Physics has an extreme lack of diversity. Although, Astrophysics in specific has increased its diversity over the years, there still is a pathetic number of women and people of color represented. This lack of representation is an entire trial by itself. As I am a woman of color I have experienced discrimination in my coursework. I have had professors tell me that I do not have the meta-cognitive abilities to succeed in life and that I have no hopes of changing them. Men in my lower division physics classes have asked me if I knew what calculus was. I am not alone in these experiences-it is a common discussion within the groups of marginalized and minority physics majors.

Making Growth Mindset seminars readily available to students is a proactive way of addressing these issues by teaching students basic skills they need to apply to their lives in order to create a more positive and healthy mindset when tackling obstacles in their field. For example, reducing the amount of self deprecating statements and replacing them with positive affirmations can begin training the mind to treat oneself with the same kindness that people should treat others with. Teaching undergraduates that intelligence is not preset and that they have the ability to change their basic set of skills is a crucial step to eliminating imposter syndrome. Teaching undergraduates that life is nonlinear and failure happens is also important. Many students arrive at college with their four year plan in mind, but they are not prepared to face any obstacles that would interrupt their track. They are left to struggle putting together the pieces of their shattered four year plan because that is all they know. Teaching undergraduates that there are multiple paths they can take in life to achieve their aspirations can help prevent imposter syndrome.

The addition of another component, such as an interview process, to the graduate program application process will provide “in the gutter students” with a platform to demonstrate their skills. Qualities such as ambition, passion, and commitment are difficult to express on paper. The transcript only shows failure and withdrawals, and does not project our commitment to the field, nor how passionate and dedicated we are to pursue our ambitions. The current application process often silences us, which creates another obstacle. For example, integrating an interview portion to the graduate program application would provide us with a platform to state our abilities. We gain the ability to express that, despite the bumps in our transcripts and low GPA’s, we are some of the most dedicated and passionate individuals because, despite the hurdles we faced, we more than succeeded in overcoming every single one. Emphasizing the importance of identifying one’s emotions and learning how to confront them will help students be more prepared for the unexpected challenges in their physics careers. Self awareness seminars and talks that educate students about the possibility of burnout and the signs of decreasing mental health could improve collaborations. When people understand their faculty and peers, it becomes possible to diffuse a situation. The awareness of how emotions fuel our interactions with people and the ability to recognize emotions in others will aid in improving communication. When people are cognizant of how they react in response to feeling various emotions, they become more understanding of their peers’ perspective on an issue. Most importantly, if people continue to remain ignorant regarding mental health di-
sorders, we cannot begin to fix them. The real first step that needs to be taken is increasing and normalizing the discourse of mental disorders.
References
American Psychiatric Association et al. 2013, DSM-5
American Psychiatric Association et al. 2017, Good Therapy
Mental Health America et al. 2019, Dissociation and Dissociative Disorders
National Institute of Neurological Disorders and Stroke et al. 2017, NINDS
National Institute of Mental Health et al. 2016, Panic Disorder: When Fear Overwhelms
Kirsten Weir et al. 2013, American Psychological Association
Mindset Scholars Network et al. 2015, Growth Mindset