



Navigating Toxic Work and School Environments

Gaslighting in STEM

What is Gaslighting?

Gaslighting is a form of psychological manipulation in which a person or a group covertly sows seeds of doubt in a targeted individual, making them question their own memory, perception, or judgment, often evoking in them cognitive dissonance and other changes including low self-esteem. Using denial, misdirection, contradiction, and misinformation, gaslighting involves attempts to destabilize the victim and delegitimize the victim's beliefs. Instances can range from the denial by an abuser that previous abusive incidents occurred, to the staging of bizarre events by the abuser with the intention of disorienting the victim.

The term originated from the British play *Gas Light* (1938, but originally performed as *Angel Street* in the United States) and its 1940 and 1944 film adaptations (both titled *Gaslight*).

Gaslighting is incredibly pervasive in society, used by anyone from individuals to advertising agencies to manipulate. While some people who gaslight do so consciously, many who gaslight lack awareness that they are employing this form of psychological manipulation.

Another form of gaslighting, which I'll call second-hand gaslighting, occurs when someone who has been gaslighted continues gaslighting other people with this false information or perspective. For example, let's say someone suffering from health issues due to overconsumption of sugar has been convinced by gaslighting tactics of advertising agencies that drinking soda will make them happy. Second-hand gaslighting would occur when this person, then, proceeds to convince others that soda will make them happy too. Second-hand gaslighting is, perhaps, less easy to detect since you may trust this source more. While you may question a company promoting their product, you may trust a close friend promoting the same product even if the gaslighting message is the same. This method of advertising, called "testimonials", is an accepted and common tool to market products and services; it is not intrinsically malicious (perhaps a product does work well!), however, in some cases it can be manipulative in a dangerous way.

Identifying gaslighting, whether it is first-hand or second-hand, can be difficult, especially when the person or entity performing the gaslighting is skilled at doing so, or multiple trusted sources are performing gaslighting. As a woman who was socialized to put unquestioned trust in authority such as parents, teachers, and priests, I did not understand or was aware I was being gaslighted until I experienced mental and physical health symptoms and began questioning why I was getting sick. The good news is that once you are aware of what gaslighting looks like and feels like, you can recognize it and make choices to avoid or limit any illness or trauma.

If, throughout this unit, you realize that you are being gaslighted, please remember that **it is not your fault** that you are a victim of this. If this material is triggering for you, causing you to feel strong negative emotions, please take a break and return to it when you feel well.



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Included in this section are the following to help you identify 4 common sources of gaslighting in STEM and a resource to help you start learning more about how to recognize and heal from gaslighting.

1. The Truth Behind Promoting “Inspiring Women in STEM”

If you google “inspiring women in STEM”, lists of articles and resources populate the browser. From companies to colleges to government organizations to STEMfluencers on social media, every organization or person working in STEM seems to have this common mission: to inspire people, but especially those underrepresented in STEM, to pursue STEM education and careers in order to educate the public and promote diversity.

Throughout my career, I have been encouraged to do extra work in order to “inspire” others to pursue STEM education and careers. As an undergraduate physics student, I remember my professors giving me opportunities to do outreach in order to inspire people underrepresented in STEM, like women and people of color, to pursue a STEM education and career. I participated in teaching science demonstrations at the department’s open house. I gave talks, such as at the grand opening of the Los Angeles Unified School District’s Sally Ride Center for Environmental Science. I worked as a tutor for Upward Bound: Math and Science, which provided college preparatory summer classes for high school students. After each experience I felt like I was making a difference and that if we, people in STEM, continued to do the “good work” and inspire underrepresented people in STEM, eventually STEM would be diverse and inclusive. I was blind to what was really happening.

It wasn’t until graduate school, when I got more serious about learning about informal education (education outside of a classroom environment), that I learned how most of the outreach I spent so much of my time performing was actually ineffective. I will not describe in-depth why it was ineffective here, but, in short, it was ineffective because an hour or two with a person doing a science demonstration does not leave a lasting impact in the majority of cases.

I started asking questions like “[why is there so much emphasis on outreach in order to inspire others if it is ineffective at educating and promoting diversity?](#)”

The answers I found led to many epiphanies that still leave me shocked and in awe at the deep rooted gaslighting that nearly everyone, organizations and individuals, in STEM is perpetuating.

First, I want to say that for some people a role model did, in fact, successfully inspire them to pursue an education or career in STEM. This does happen. A famous example is of Gwynne Shotwell, the current President and COO of SpaceX: when she attended a women in STEM panel, she liked how the mechanical engineer dressed and decided to pursue mechanical engineering because she wanted to be like her. Stories of being inspired and then reaching career success, like Gwynne’s, however, leave out the details of the time in between the inspiration and the success as well as the unspoken privileges these people have.



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Let me explain my epiphanies around (1) how “inspiring” harms the people it attempts to help, and (2) why companies and organizations continue to use this ineffective messaging.

Gaslighting: People must be inspired to pursue STEM.

Saying people need to be inspired to take an action assumes that **these people must be externally inspired** to take that action; they would not take that action based on their own internal decision or their own agency.

As a young woman, I had chronic self-doubt and low self-esteem due to people telling me that they knew what was best for me. Girls and young women are underestimated and undervalued in society. They are stereotyped to be shallow, superficial, and naïve, and often treated as objects, as bodies. This stereotyping and underestimation qualifies the notion that girls and women must be inspired to pursue STEM education and careers (because they don’t know what is best for themselves). While I only mention women here because my experience with this is as a woman and I can only speak to my own experience, other underrepresented groups in STEM are subject to similar stereotyping and underestimation.

The Truth: People can make their own decisions regarding what is best for them.

When I share with people that I work in STEM, many ask why I chose to pursue a career in STEM. While it seems like a harmless question, I have felt that many ask this from a perspective where they assume a woman like me wouldn’t be interested or smart enough in STEM subjects. Is it a misconception that in order to be working or learning in STEM you must have interest, passion, and genius-level intelligence. **The truth is that you do not need any of these things to pursue an education or career in STEM; you only need to make that decision to pursue STEM, and follow through.**

People who choose to pursue an education or career in STEM do so for a variety of reasons. They could like the subject, be great at science and math, want to grow their wealth, be under pressure from their family, want the status that comes with the job title of scientist or engineer, or want to prove to themselves or others that they can accomplish a challenge. No matter what their reason, they should feel like they belong and not be questioned, doubted, or harassed for being in STEM based on that reason.

Since many people have asked me why I have chosen to pursue a career in STEM, I, in turn, have asked many people why they have pursued STEM too. I have received many different replies. I once asked a friend of mine why he pursued his PhD in mechanical engineering. He stated that his family pressured him to become an engineer, but he was more interested in sociology. When I asked him if people ever told him he does not belong in STEM because he does not have a passion for it, he said no. This interaction reaffirmed to me that the questioning and doubting I received was unfounded; it did not matter what other people thought of the decisions I made for myself, and I am fully capable of making the best decisions for myself.

When we look at the messaging around “inspiring women to pursue STEM”, we see that the majority of messages are based on kindling women’s interest and passion as well as need for status, rather than for other reasons to pursue STEM careers like financial gain. I will not go too in depth analyzing this; I will let you do that on your own. My point is this: the messaging perpetuates that one must be interested and passionate about STEM in order to



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pursue a STEM education and career, and that women and girls would only be interested in STEM if someone inspires them to be interested or passionate. This robs women and girls of their autonomy and agency, and disempowers them, which is the opposite effect that these campaigns state to promote.

Why do Companies and Organizations Seek to "Inspire" People to Pursue STEM?

It is common knowledge that many STEM fields are not diverse. Because there is a lack of diversity, companies and organizations like academia and government establish programs and policies to try to increase diversity. One tool used by these organizations and institutions is public relations (PR) campaigns aimed at "inspiring" people to pursue careers in fields that are not diverse. **These PR campaigns are misleading at best and a form of gaslighting at worst.** They perpetuate harmful stereotypes and distract from actual issues that result in the lack of diversity.

PR campaigns and outreach intended to "inspire" people have these harmful effects:

1. Silences other approaches to addressing issues underrepresented minorities in STEM face.
2. Places the burden on the underrepresented minority to change themselves in order to "fit in" to a system that was not designed to include them.
3. Perpetuates the toxic belief that to pursue STEM careers and education you must be interested, passionate, and/or a genius.
4. Pushes underrepresented minorities who are already in STEM careers and education to feel like they must continually do extra work to promote how passionate and inspired they are in order to prove themselves worthy of being in the field.
5. Centers debates regarding lack of diversity on whether or not certain demographics of people are interested or capable in STEM fields, rather than on actual systemic and cultural issues preventing those groups from entering and thriving in STEM fields.

These PR campaigns become gaslighting tactics especially when they distract from the actual issues that result in the lack of diversity. They convince people that the reason underrepresented minorities are not working or learning in STEM fields because they do not have the interest in these fields, rather than actual reasons including:

- Toxic educational and workplace environments where harassment and discrimination persist, causing people physical and mental health issues as well as less opportunity and career advancement.
- Lack of support and resources for students and professionals such as child care services, mental health services, clear and accessible information about scholarships and opportunities, affordable housing, etc.
- Biased hiring and promoting processes
- High cost of higher education
- And much more!



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Organizations and institutions do not advertise these issues in those PR campaigns! They often do not release information related to these issues, especially ones related to organizational culture, because of lawsuit risks. **It is much easier for these organizations and institutions to tell underrepresented minorities that they need to change to fit into the organization because it shifts the burden from the organization to the individual.** The organization does not need to change, the individual people do. The organization in this approach frees itself of blame or of being problematic, and centers the underrepresented minority as problematic because they incorrectly claim this person is not interested or inspired enough to pursue a STEM education or career.

The rhetoric that underrepresented minorities in STEM must be inspired to pursue education and careers in STEM has become so accepted that individuals who belong to underrepresented minority groups are also taking on this burden of working to inspire others. Today you can find professors, industry professionals, and students in STEM on social media and on the news working as individuals to inspire the next generation of STEM professionals. While I know the majority of these people have great intentions and seek to serve as role models and mentors, which is a part of what is needed, **their message serves as second-hand gaslighting when they share the same rhetoric that organizations and institutions use without acknowledging the many other issues causing a lack of diversity.**

I was one of these people seeking to inspire others through self-promotion. I thought that I was helping by doing outreach and sharing my journey publicly. In reality, I was seeking a type of approval and validation that I belonged in STEM because I felt like I was an imposter and alone; I felt like an outsider in my field because of my minority status. Every time I was harassed, I felt the need to work harder to help and inspire others because I needed help myself.

I want to clarify something here: self-promotion is critical for career advancement, and is not a morally bad endeavor in and of itself. **Self-promotion is not problematic.** What is problematic is promoting the harmful rhetoric that underrepresented minorities must be inspired to pursue an education and career in STEM through your own self-promotion.

Please DO talk about your amazing accomplishments, advocate for yourself, provide resources, and connect with others at different parts of their journey.

However, if you want to help increase diversity in STEM fields, self-promotion may not be the most effective strategy; self-promotion in this case is akin to the same PR strategies used by organizations and institutions to distract from the real, underlying issues that cause a lack of diversity.

Know that if you are an underrepresented minority in your STEM field, by simply existing in that space you are making positive change!



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2. Mental Health Resources at Universities and Workplaces

Let me share a story about my experience with mental health resources at a major research university:

When I started suffering from depression in graduate school, I went to see a therapist. The university provided mental health counselors for students at no added cost. I did not know what to expect since it was my first time seeing a therapist. After my conversation with the therapist, I was not sure how that service would help me. I went back a second time, but decided to stop going since I did not feel like it helped me.

A year later, I started experiencing horrible stomach pains and saw a gastroenterologist. The medication prescribed did not help, and examinations performed did not show I had an illness. I was diagnosed with visceral hypersensitivity. I told my graduate advisors (my bosses) about my stomach pains, and one recommended I take a break from my PhD program for a quarter, and the other recommended I stop eating processed foods and practice yoga like she did. I decided not to take a break from my PhD program, but I did start being more mindful on a daily basis.

A month after practicing mindfulness, I realized that my stomach pains occurred after I was harassed by my professors or colleagues. I began meditating regularly, and my stomach pains stopped. (yay!)

The harassment, however, did not stop. A year later my graduate advisor forced me to leave my PhD program. I won't discuss many details here, but at one point as I was being forced to leave, he and my co-advisor sent me to see a psychologist to "help me" with "my issues". I met with the psychologist several times, and in the end the psychologist would tell me "I would never recommend a student to join your research group with your advisor." He knew I was not problematic; my advisor and the system was.

As I left the PhD program, I saw the Dean of Graduate Student Retention tweet about "recruiting new graduate students!" A week before I had met with her, and she was unable to help me stay and complete my PhD.

It is not a secret that within academia are toxic environments, and people with twisted agendas. I have heard countless stories like my own. If anything like this has happened to you, know that you are not alone.

Universities and workplaces currently work to improve their mental health resources and services for students, especially because of external pressures. For example, surveys show that over half(!) of graduate students suffer from depression at some major universities.

To address mental health, universities and workplaces use a variety of tactics including increasing the number of therapists available to students and implementing wellness courses and programs to teach students healthy coping techniques. Many universities in recent years are advocating for mental health awareness in general.

Recently, I received a newsletter from my alma mater describing the wellness programs now offered to students through the graduate student resource center. From yoga to eating well, many topics were offered in short seminar-style lessons taught by the same psychologist I saw as I was being ushered out. Instead of being overjoyed that the university was taking action to help improve students' mental health, the newsletter outraged me; I knew that these wellness programs were actually the university gaslighting its students who were suffering for the same reasons I suffered in my program.



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Gaslighting: Students and workers need to take better care of themselves and be more healthy in order to improve their mental and physical health.

When universities and workplaces implement mental health solutions such as additional courses, programs, and resources for students and workers, they are only addressing the issue with “band-aid” solutions that will not eradicate or solve the underlying issues causing the health problems. These programs and resources that students and workers must dedicate extra time to utilizing puts the onus on students and workers for solving their mental health issues. It perpetuates the false assumption that the health issues are caused by the students’ and workers’ lifestyles and habits, and that by them changing themselves they can heal themselves.

Of course, in some cases a lifestyle change can improve mental health. For example, by meditating regularly I was able to stop the onset of chronic stomach pains. However, if I was not being harassed in the first place, I would not have had chronic stomach pains or need to meditate to heal myself. Just because a “wellness solution” like meditation or exercise can heal or offset mental or physical health issues, does not mean that the underlying issue for that health issue has been resolved.

By advertising wellness programs and resources, universities and workplaces place the onus on students and workers to heal themselves, implying that the students and workers are problematic. This shifts the blame and the burden of change from the university or workplace and its toxic work environment to the individuals who are powerless in that system. In turn, this gaslights students and workers as well as others familiar with the university or workplace, making them think that the students and workers are the problem.

The Truth: Universities and workplaces implement mental and physical health services and resources for the primary purpose of avoiding lawsuits, not to help students or workers improve their mental health.

When I went to file a formal report against my advisor for his abusive behavior toward me, I found that I had no grounds to make a case. He had offered the universities mental health resources in the form of the psychologist on campus. While he did harass and emotionally abuse me, he did not use words or any indication that he was harassing me based on a protective category like race, sex, gender identity, religion, etc.

I realized that with these resources and programs in place, those in power at universities and workplaces can always plead that they offered support and help through these resource and programs rather than change themselves or the system. This protects them from lawsuits. The law in California states that if a student or worker reports an issue, their advisor or manager must address that issue. Having resources like psychologists and programs like wellness workshops provides an avenue to fulfill this requirement to “address the issue” without actually addressing the underlying issues that cause the health issues in the first place.



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3. Hazing in universities and workplaces.

There are, unfortunately, a variety of overt and subtle systems and processes at workplaces and universities that are damaging to student and worker health. Hazing is one of many common threads embedded in these systems and structures.

Gaslighting: Only the smartest, most passionate, and toughest succeed in a STEM career.

STEM careers are seen as challenging, intellectually and otherwise, and there is a good reason behind it! Many technical problems are challenging to solve, and it takes years of struggle and effort to make breakthroughs, inventions, and advance scientific practice and understanding. Those who are not successful by standard terms are seen to be unintelligent, unmotivated, or too weak to thrive in their STEM career.

The Truth: Nobody is predestined for success, and workplace environment plays a crucial role to promote or stifle your career.

As discussed previously, the majority of people believe that to pursue a STEM education and career you must be interested, passionate, and a genius. This justifies the position that means must be taken to “weed out” those who are not interested, passionate, or genius about STEM. Hazing is one method of removing or forcing new students or workers to conform to the university or workplace culture. This causes an issue: those stereotyped to have no interest in STEM and as dumb or lazy are disadvantaged when it comes to being perceived as capable of success in STEM by the majority in-group. In addition, qualities categorized as feminine are often perceived as weakness, while characteristics of different cultural groups are deemed unprofessional.

Common in male-dominant fields, different forms of hazing are incorporated into the system and are accepted as means to “weed out” or “toughen up” new students or workers. These hazing tactics are actually forms of emotional or physical abuse that can exacerbate and cause mental and physical health issues in students and workers who are subjected to them. While some hazing is more overt, such as the pressure to work extremely long hours in order to prove you are a capable and dedicated, some is more subtle and imbedded in common traditions such as exams, meetings, and department socials.

Hazing is different from team building or pure intellectual challenges. There are ways to promote teamwork and group-bonding without inducing shame, fear, guilt, or physical injury. And, for those who are already facing bias and discrimination due to minority status in their field, hazing can exacerbate and perpetuate mental and physical health issues, as well as make someone feel even more excluded and alone. Conforming to workplace culture can lead to mental and physical health issues for minorities as it is an emotionally exhausting practice.

Debate this: Are PhD programs a glorified form of hazing?



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4. Professional Development Programs

Have you ever attended a professional development program? This course is a professional development program, in a way. I have attended and even hosted my fair share: resume writing, public speaking, holding effective meetings, interviewing, and more. Professional development programs and events are wonderful, not just for the content of the lessons, but also for the opportunity to meet others in your or adjacent fields.

While most professional development can give you key insights and help you grow your skills and awareness of opportunities in your chosen field, there are some professional development traps some can fall into. These specific professional development opportunities are sometimes easy to spot because they cater to a specific demographic, such as “negotiating skills for women”. Below I explain the nuances and why certain professional development programs do more harm than good.

Gaslighting: Underrepresented groups in STEM need to take extra professional development trainings to succeed in STEM.

When professional development programs are created by majority in-groups in a university or workplace specifically for underrepresented minorities in that workplace, it sends a message that these people need extra training because they are not as qualified based solely on immutable characteristics. In addition, depending on the content of the training, the material can even be lessons on how to “act like a member of the majority group”, promoting conforming to status-quo over any type of inclusion of diverse people and ideas.

The Truth: The systems and structures in workplaces and universities need to change to use every worker or student’s strengths to their advantage.

To explain, I will share an example of a time when I encountered a workplace that did not value my strengths even though I was successful in reaching company goals.

One of strengths is my ability to pull diverse teams to work together toward solutions in a collaborative manner. When my team accomplishes a task, the ownership over who contributed what to the final product is often blurred and unclear because multiple people contributed in different ways. After working this style for several years, I received a low performance review with feedback that I need to be more dominant and take ownership over my specific contributions.

Even though I reached successful outcomes because of the teamwork I employed, my managers did not perceive that I was successful as an individual because I did not exhibit the specific traits they view as successful in my (male-dominant) field: dominance and independence being two. If I wanted to improve these “weaknesses”, I would be tempted to pursue professional development trainings related to those specific traits of being more assertive or dominant. However, due to previous experiences, I realize that working to turn these weaknesses into strengths would not necessarily help my professional career in the ways my managers think it would. *I chose not to view this performance review as a flaw in myself, but as a way in which this workplace was not a good fit for my strengths.*



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For instance, In the past, when I emulate my male counterparts, such as by working hard in isolation or by raising my voice to get my point across in a meeting, I am told to calm down or my work contributions remain invisible. Furthermore, I become emotionally exhausted by acting inauthentically. It is hard to play politics as a woman; you walk a fine line between being too passive and too assertive.

Personally, I have chosen the path to lead by example and be my best self by taking the high road because I want to be able to look back over my career and be proud of what I have accomplished while staying true to myself. If people block my career growth because they do not think aspects of my personality fit the “ideal employee” (even if my work is on time and successful), then I seek alternative work opportunities with people who do support me and value my personality and working style.

Now, I am selective with the professional development programs I choose to attend. I make sure that they are not programs that gaslight minorities into thinking they need to be reformed to fit into the status-quo environment.

While you can contribute toward a positive and healthy workplace culture, it is not your responsibility to change your workplace or university culture. You should always prioritize your health and wellbeing first, which you learned to take into account and why in previous chapters.

What To Do If You Are A Victim of Gaslighting

I really, sincerely hope that you never find yourself as a victim of gaslighting, but, unfortunately, many people gaslight consciously and subconsciously. Yes, many people are not aware that they gaslight since they are used to performing this form of psychological manipulation to get what they want. In the case that you are being gaslighted, it can be incredibly difficult to tell. **I encourage you to seek professional help, such as a therapist or other mental health professional, if you think you may be gaslighted.**

I am not a doctor or mental health professional, so I cannot provide you with direct assistance on gaslighting; that is outside of the scope of this course. I am simply someone who has been a victim of gaslighting, and who is still working to heal the traumas from different incidents I have encountered.

Below is a link to Katie Morton’s video on Gaslighting. I found it helpful in understanding it better and providing actionable advice. **I encourage you to do your own research and learning on gaslighting outside of this course to understand it and how to recognize it better.**

- Katie Morton on YouTube (licensed therapist):
<https://www.youtube.com/watch?v=3O3ZQPezglQ>