Disclosure decisions: Exploring the concealable stigmatized identities of science instructors

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Think back to your undergraduate science instructors...

What did you know about them personally?
What identities did they hold that you remember?
How did their identities make you feel, if anything?
Instructors with similar identities to students serve as powerful role models

- Having a same-gender instructor improved women’s levels of scientific confidence\(^1\)
- PEER\(^2\) students with an instructor of the same race persisted in the major\(^3\)
- Role models of the same race or gender improve self-efficacy\(^1,4\)

\(^1\)Cotner et al., 2011; \(^2\)Asai, 2020; \(^3\)Rask & Bailey, 2002; \(^4\)Shin et al., 2016
What do we know about instructor identities that we can’t see?

- Instructors hold many identities that are invisible
- **Concealable stigmatized identities** (CSIs) are invisible or can be kept hidden and can carry negative stereotypes\(^1\)

\(^1\)Quinn & Earnshaw, 2013
Brainstorm as many potential CSIs as you can think of whose representation might impact science undergraduates.

Concealable stigmatized identities (CSIs) are invisible or can be kept hidden and can carry negative stereotypes.
Concealable stigmatized identities

- LGBQ+
- Low-income background
- International student
- Depression
- Struggling academically
- Trans/non-binary
- Anxiety
- Community college transfer student
- Religious affiliation
- First-generation status
Students report CSI role models would be beneficial

“Having somebody else [who is a scientist with depression] tell me, ‘Hey. I am successful, and I still suffer from depression,’ [would show me] that you can succeed even with this extremely difficult thing weighing you down.”

Cooper et al., 2020
Students report CSI role models would be beneficial

“I think I would feel more comfortable in a class where an instructor identified as queer, because I can relate to them on a different level. I think that if I think a professor might be queer, then I can also [feel seen] as a queer person.”

Cooper & Brownell, 2016
Students report CSI role models would be beneficial

“One of my professors a couple of semesters ago was Jewish and she put (on the syllabus) that we’re not going to have class on certain days because she was observing religious holidays. And I felt much more comfortable telling her that I wouldn’t be in class one day because it was over Easter.”

Barnes et al., 2021
Students report CSI role models would be beneficial

LGBQ+

Community college transfer student

Low-income background

International

Religious affiliation

First-generation status

Anxiety

Cooper & Brownell, 2016

“I think I would feel more comfortable in a class if an instructor identified as asexual, because it would be nice to know that somebody feels the same way I do, which right now, would be very rare.”
Overarching research questions

To what extent are role models with concealable stigmatized identities (CSIs) impactful for all students?
Concealable stigmatized identities

- LGBQ+
- Low-income background
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LGBTQ+ undergraduates in STEM

• Academic STEM is unwelcoming and unfriendly in nature for LGBTQ+ individuals
  
• LGBTQ+ students report a lack of role models
  
• LGBTQ+ instructors often conceal their identities because they worry about consequences and perceive few benefits

Four-year STEM retention by LGBTQ+ and trans/gender non-conforming status

Figure from Maloy et al., 2022 CBE-LSE

1Patridge et al., 2014; 2Cech & Waidzuna, 2011; 3Cooper & Brownell, 2016; 4Cooper et al., 2019
What is the impact on all students of an instructor revealing her LGBTQ+ identity and to what extent students think it is appropriate? Do outcomes differ by student identity?

- An LGBTQ+ instructor agreed to reveal her identity at the beginning of the semester in her upper-level biology course
- Collected data over two terms
- Research-intensive institution in Arizona
  - Institution is not considered particularly LGBTQ-friendly or LGBTQ-unfriendly

Busch et al., 2022
Instructor reveals LGBTQ+ identity in less than 3 seconds

Never again mentioned LGBTQ+ identity in class

Proud member of the LGBTQIA community

Busch et al., 2022
Instructor reveals LGBTQ+ identity in less than 3 seconds

Never again mentioned LGBTQ+ identity in class

Survey students who remember instructor coming out

8 weeks

Do you remember your instructor revealing her LGBTQ+ identity?

If yes

Survey assessing how instructor coming out affected students

Busch et al., 2022

Hiking

Proud member of the LGBTQIA community

Survey assessing

PITCH PERFECT
RQ1: To what extent do students remember an instructor revealing her LGBTQ+ identity?
Finding 1: 91% of students recalled their instructor revealing her LGBTQ+ identity

Busch et al., 2022
RQ2: To what extent did the instructor revealing her LGBTQ+ identity impact students’ experiences in the course?

Why?

Busch et al., 2022
Finding 2: The instructor revealing her LGBTQ+ identity positively impacted students’ course experiences

Busch et al., 2022
What reasons do you think students said that the instructor coming out had a positive impact on their course experience?
Reasons the instructor revealing her LGBTQ+ identity had a **positive impact** on students’ course experiences

It makes the instructor more “human” (46%)

Busch et al., 2022
Reasons the instructor revealing her LGBTQ+ identity had a **positive impact** on students’ course experiences

- It makes the instructor more “human” (46%)
- It fosters an inclusive class environment (26%)

Busch et al., 2022
Reasons the instructor revealing her LGBTQ+ identity had a **positive impact** on students’ course experiences

- It makes the instructor more “human” (46%)
- It fosters an inclusive class environment (26%)
- It helps normalize LGBTQ+ identities (18%)

Busch et al., 2022
Reasons the instructor revealing her LGBTQ+ identity had a **positive impact** on students’ course experiences

- It makes the instructor more “human” (46%)
- It helps normalize LGBTQ+ identities (18%)
- It fosters an inclusive class environment (26%)
- None of my instructors have come out in class before (13%)

Busch et al., 2022
RQ3: To what extent did the instructor revealing her LGBTQ+ identity increase:

- Instructor approachability
- Instructor-student connectedness
- Student confidence
- Student class belonging
- Student science belonging

Student outcome ~ LGBTQ+ status + gender + religion + race/ethnicity + anxiety/depression + semester

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

Instructor approachability

- Strongly disagree
- Strongly agree

71% agree

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

Instructor approachability

- Strongly agree: 53% agree
- Strongly disagree: 64% agree

Instructor-student connectedness

- Strongly agree: 71% agree
- Strongly disagree: 77% agree

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

- **Instructor approachability**: 71% agree
- **Instructor-student connectedness**: 77% agree
- **Student confidence**: 53% agree

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

- Instructor approachability: 71% agree
- Instructor-student connectedness: 77% agree
- Student confidence: 53% agree
- Student class belonging: 64% agree

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

- **Instructor approachability**: 71% agree
- **Instructor-student connectedness**: 77% agree
- **Student confidence**: 53% agree
- **Student class belonging**: 64% agree
- **Student science belonging**: 57% agree

Busch et al., 2022
Finding 3: Most students found specific benefits of their instructor coming out during the course.

More likely to rate higher:
- LGBTQ+
- LGBTQ+ & women

Student outcome ~ LGBTQ+ status + gender + religion + race/ethnicity + anxiety/depression + semester
RQ4: To what extent do students agree with the statement:

I think it is completely appropriate for STEM instructors to reveal that they are a member of the LGBTQ+ community.

Why?
What percent of students do you think thought it would be appropriate for a STEM instructor to come out during class?
Finding 4: Students think that it is appropriate for an instructor to reveal their LGBTQ+ identity

95% of all students agree that it would be appropriate for a STEM instructor to come out in class

Busch et al., 2022
Finding 4: Students think that it is appropriate for an instructor to reveal their LGBTQ+ identity

95% of all students agree that it would be appropriate for a STEM instructor to come out in class

- It empowers the LGBTQ+ community
  - (29%)

Busch et al., 2022
Finding 4: Students think that it is appropriate for an instructor to reveal their LGBTQ+ identity

95% of all students agree that it would be appropriate for a STEM instructor to come out in class

- It empowers the LGBTQ+ community (29%)
- It is a way to get to know the instructor (28%)

Busch et al., 2022
Finding 4: Students think that it is appropriate for an instructor to reveal their LGBTQ+ identity

95% of *all* students agree that it would be appropriate for a STEM instructor to come out in class

- It empowers the LGBTQ+ community (29%)
- It is a way to get to know the instructor (28%)
- It is an important part of the instructor’s identity (19%)

Busch et al., 2022
To what extent are role models with concealable stigmatized identities (CSIs) impactful for all students?

Even students who do not share the CSI can experience benefits from instructor disclosure.

Students with the identity benefit disproportionally.
Concealable stigmatized identities

- LGBQ+
- Community college transfer student
- Depression
- Struggling academically
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- Anxiety
- First-generation status
- Low-income background
Concealable stigmatized identities

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- Religious affiliation
Overarching research questions

To what extent are role models with concealable stigmatized identities (CSIs) impactful for all students?

To what extent do undergraduates have role models with CSIs?
Specific research questions

1. To what extent do science instructors have concealable stigmatized identities (CSIs)?
2. How does the prevalence of these CSIs among instructors compare to the prevalence among science undergraduates?
Methods

Survey structure

Suite of demographic questions

Reveal to undergraduates

Based on identities
Methods

Survey distribution

• National survey (November 2021)
• Faculty and instructors in science and engineering at research-intensive institutions
  • Emailed all faculty and instructors listed on department webpages
  • 2,097 responses (of ~55,000 contacted)
• Focus on science instructors
  • Defined as: biology, physics, chemistry, geosciences
Identities of interest

• Evidence of stigma, bias, or being underserved in the U.S.
• Considered to be concealable by >70% of individuals with the identity

**LGBQ+ identities:** lesbian, gay, bisexual, queer, asexual

**TGNC identities:** trans, non-binary, genderqueer

**Disability**

**Mental health:** depression, anxiety

**Undergraduate experience:** CC transfer, first-generation college student, growing up in a low-income household, struggled academically

**Addiction**
Research questions

1. To what extent do science instructors have concealable stigmatized identities (CSIs)?
2. How does the prevalence of these CSIs among instructors compare to the prevalence among science undergraduates?
Share your ideas

Which identities do you think will be the most represented among instructors?

**LGBQ+ identities:** lesbian, gay, bisexual, queer, asexual

**TGNC identities:** trans, non-binary, genderqueer

**Disability**

**Mental health:** depression, anxiety

**Undergraduate experience:** CC transfer, first-generation college student, growing up in a low-income household, struggled academically

**Addiction**
Science instructors’ CSIs

Mental health
- anxiety: 35.4%
- first-gen: 29.0%
- depression: 26.7%
- low SES: 19.3%
- struggled academically: 14.6%

Undergraduate experience
- LGBQ+: 5.8%
- CC transfer: 5.8%
- disability: 5.4%
- addiction: 4.4%
- TGNC: 0.8%

percent of all instructors
Research questions

1. To what extent do science instructors have concealable stigmatized identities (CSIs)?

2. How does the prevalence of these CSIs among instructors compare to the prevalence among science undergraduates?
Share your ideas

For which two identities do you predict there will be the biggest difference between instructors and undergraduates?

- anxiety: 35.4%
- first-gen: 29.0%
- depression: 26.7%
- low SES: 19.3%
- struggled academically: 14.6%
- LGBTQ+: 5.8%
- CC transfer: 5.8%
- disability: 5.4%
- addiction: 4.4%
- TGNC: 0.8%
Science instructors’ CSIs

- anxiety: 40.0%
- first-gen: 20.0%
- depression: 0.0%
- low SES: 0.0%
- struggled academically: 0.0%
- LGBQ+: 0.0%
- CC transfer: 0.0%
- disability: 0.0%
- addiction: 0.0%
- TGNC: 0.0%
Science instructors’ CSIs

- anxiety
- first-gen
- depression
- low SES
- struggled academically
- LGBQ+
- CC transfer
- disability
- addiction
- TGNC

percent overall

Science undergraduates at ASU

Public research-intensive Hispanic-serving institution in the southwest U.S.
Science instructors’ CSIs

-20.6% anxiety
-24.3% depression
low SES
struggled academically
LGBQ+
CC transfer

Science undergraduates at ASU

Compositional mismatch

percent overall

2.8x

2.5x

0.0% 20.0% 40.0% 60.0%
Do undergraduates perceive this mismatch?

Science instructors’ CSIs

- anxiety
- first-gen
- depression
- low SES
- struggled academically
- LGBQ+
- CC transfer
- disability
- addiction
- TGNC

percent overall

Science undergraduates at ASU
Science instructors’ CSIs

- anxiety: 0.0%
- first-gen: 20.0%
- depression: 40.0%
- low SES: 60.0%
- struggled academically: 0.0%
- LGBQ+: 20.0%
- CC transfer: 40.0%
- disability: 60.0%
- addiction: 0.0%
- TGNC: 0.0%

percent overall

- Reveal to all undergrads
- Do not reveal to all undergrads
- Science undergraduates at ASU
Few instructors reveal concealable stigmatized identities

- 53.3% anxiety
- 49.7% first-gen
- 53.3% depression
- 24.3% low SES
- 16.6% struggled academically
- 16.6% LGBQ+
- 4.0% CC transfer
- 4.0% disability
- 0.0% addiction

Percent overall

- Realized mismatch

Reveal to all undergrads
Do not reveal to all undergrads

Science undergraduates at ASU
Few instructors reveal concealable stigmatized identities

- Anxiety
- First-gen
- Depression
- Low SES
- Struggled academically
- LGBQ+
- CC transfer
- Disability
- Addiction
- TGNC

- Reveal to all undergrads
- Do not reveal to all undergrads

- Science undergraduates at ASU
To what extent do students have role models with CSIs?

Untapped potential for instructors to become role models

- anxiety
- first-gen
- depression
- low SES
- struggled academically
- LGBQ+
- CC transfer
- disability
- addiction
- TGNC

percent overall
Overarching research questions

To what extent are role models with concealable stigmatized identities (CSIs) impactful for all students?

To what extent do undergraduates have role models with CSIs?

What influences an individual to reveal or conceal a CSI?
Why might instructors keep CSIs concealed?

• STEM is said to have a chilly climate\(^1\)
• Depoliticization, the removal of social and political issues from day-to-day STEM work, aims to perpetuate the idea of objectivity\(^2\)
• Perceived stigma may play a role

\(^1\)Seymour & Hunter, 2019; \(^2\)Cech, 2013
Methods

Survey structure

Suite of demographic questions

Reveal to undergraduates

Stigma ratings

Based on identities
Methods: stigma ratings

To be **stigmatized** means to be culturally devalued, prejudiced, or negatively stereotyped due to a particular identity and is influenced by the culture of a particular context.

To what extent do you perceive that identifying as [identity] is stigmatized in the context of academic science and engineering?

- Extremely stigmatized
- Somewhat stigmatized
- A little stigmatized
- Not stigmatized
- I do not know what this identity is
Which instructors perceive greater stigma associated with CSIs?

Ordinal regression

Stigma rating (extremely/somewhat/a little/not) ~ gender + race/ethnicity + age + appointment + (1 | individual)

Gender: man, woman
Race/ethnicity: white, Black, Asian, Latin*
Age: 23- 37, 38-49, 50-59, 60+
Appointment: tenured, tenure-track, lecturer
Which demographic groups do you expect will perceive greater stigma?

**Gender:** man, woman  
**Race/ethnicity:** white, Black, Asian, Latin*  
**Age:** 23-37, 38-49, 50-59, 60+  
**Appointment:** tenured, tenure-track, lecturer
Women perceive greater stigma than men

Women perceive greater stigma than men, with women experiencing 1.8x higher odds of a higher stigma rating compared to men. This is supported by statistical analysis, with a coefficient $\beta = 0.58$ and a p-value $p < .0001$. The data indicates that women report a higher level of stigma across different degrees of perception.
Black and Latin* instructors perceive greater stigma than white instructors

Latino/a/x:
$\beta = 0.33; p < .001$

Black:
$\beta = 0.74; p < .001$

Asian:
$\beta = -0.55; p < .001$
Instructors younger than 37 perceive greater stigma than all other age groups.

- 23-37: $\beta = -0.14; p < .001$
- 38-49: $\beta = -0.38; p < .001$
- 50-59: $\beta = -0.63; p < .001$

Stigma rating: extremely, somewhat, a little, not at all.
Appointment type does not affect perceived stigma

Tenure-track: $\beta = -0.02; \ p = .58$
Tenured: $\beta = -0.06; \ p = .08$
Gender, race, and age affect perceived stigma

- Groups that are underrepresented and marginalized in the sciences generally perceive greater stigma (i.e., women, Black, Latin*)
- Stigmatized individuals may be more perceptive of when others are experiencing discrimination¹
- Younger instructors may be more aware of stigma associated with concealable stigmatized identities in the context of science and engineering
- Diversity statements are increasingly a part of lecturer/faculty applications, where applicants describe their diversity, equity, and inclusion contributions and experiences² which may predispose these faculty members to be cognizant of stigma in the sciences
- Older individuals tend to adopt color-blind racial attitudes³ potentially making them less likely to perceive or acknowledge systems of oppression

¹Craig & Richeson, 2016; ²Sylvester et al., 2019; ³Becker et al., 2021
Methods

Survey structure

- Suite of demographic questions
- Reveal to undergraduates - Based on identities
- Stigma ratings
- Reasons to reveal or conceal CSIs - Based on identities
Why do you think instructors are concealing their identities in class?
Why conceal CSIs?

1. I typically do not share this identity **56%**
2. I did not think this identity was relevant to the course content **54%**
3. I had never thought about telling students about this identity **46%**
4. I did not think this identity was relevant to the students in this course **42%**
5. I did not feel like I had a personal enough relationship with the students in this course **38%**
6. I thought revealing this identity to all undergraduates in this course was inappropriate **28%**
7. I was concerned students would have a negative opinion of this identity **21%**
8. I did not know others in the department, such as other faculty or instructors, who had revealed a similar identity **20%**
9. I was concerned it would waste class time **14%**
10. I was concerned it would result in poor course evaluations **14%**
11. I was concerned that I would be subjected to departmental disciplinary action **6%**
12. I was concerned I could be fired **4%**
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Do not recognize benefits
Why conceal concealable stigmatized identities?

- Do not recognize benefits
- Culture of academia

Concern about consequences
Why reveal CSIs?

1. I wanted to **be an example** to my students as someone with the identity **79%**
2. I wanted to be known as a **supporter** of individuals with the identity **69%**
3. I thought revealing my identity to students in this course was **appropriate** **66%**
4. I thought revealing my identity would be **relevant to the students** in this course **58%**
5. I wanted to **serve as a mentor** to students with the identity **56%**
Takeaways

• Revealing CSIs to students may make the instructor more personable and approachable for all students and disproportionately so for students with the specific identity.¹

• Instructors are somewhat representative of the student body but revealing CSIs could increase representation.

• Instructors often reveal CSIs to provide students with a mentor or example of a scientist with the identity.

¹Busch et al., 2022
Implications for instructors

• We can highlight the student-oriented benefits of revealing CSIs in class, such as increasing students’ sense of belonging, feeling more connected to the instructor, and having a science role model.

• Disclosing any information, and especially a concealable stigmatized identity, is a personal decision and not everyone is able to reveal a CSI to their students.

• Instructors can use Scientist Spotlight to highlight scientists with CSIs (https://scientistspotlight.org)¹

¹Schinske et al., 2016
Thank you to

Dr. Katelyn Cooper

Carly Busch

Dr. K. Supriya

Tala Araghi

Jingyi He
• Instructors often do not reveal CSIs to undergraduates because they do not perceive a benefit or do not know others who have.

• Increasing representation of scientists with CSIs can foster a more welcoming environment.

Resources:

- Scientist Spotlights website
- Busch et al., 2022: Positive impact of revealing a CSI to students