

# Impostor feelings and academic decision making: an anchoring vignette approach\*

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## Abstract

The Impostor Phenomenon (IP) refers to the psychological experience of individuals mistakenly perceiving themselves as incompetent, despite external evidence of their success. Research has highlighted the prevalence of impostor feelings within academic settings, particularly among women. To better understand the gender gap in academia, our research questions explore the role of IP, gender, and support systems as potential predictors of students' decisions to study further, using a South African university student sample. Anchoring vignettes are used to improve the comparability across survey responses. Consistent with previous research, our findings confirm that women report higher levels of impostor feelings compared to men. Moreover, we observe a significant negative association between impostor feelings and the likelihood of students pursuing further studies. Interestingly, men with intense IP levels are more likely to opt out of studying further compared to women with intense impostor feelings. Additionally, individuals with mentors in their field of study are more likely to study further relative to those without mentors. These findings are reinforced when participants advise whether fictional characters in hypothetical situations should study further: characters experiencing high levels of impostor feelings are more frequently advised against studying further.

**Key words:** Impostor phenomenon, gender, anchoring vignette

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\*The authors report there are no competing interests to declare.

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# 1 Introduction

The Impostor Phenomenon (IP) occurs when individuals believe that they are not as competent as they are perceived to be. These individuals, referred to by Clance and Imes (1978, p. 1) as "impostors", experience a disparity between their own perceived competence and how others perceive them. Impostor feelings can have a significant impact on an individual's productive capacity, as these people are more likely to experience burnout, stress, and reduced job performance compared to those who do not have impostor feelings (Bravata et al., 2020).

Numerous studies have found that women tend to experience impostor feelings more frequently than men (e.g. Cowie et al., 2018; Jöstl et al., 2012). Additionally, impostor feelings are prevalent among individuals belonging to minority groups (Bravata et al., 2020). Consequently women, especially in male-dominated professions, may be more prone to impostor tendencies relative to men.

The setting of higher education provides a pre-employment focus to determine whether there is a gender difference in the decision to study further due to impostor feelings. Decisions about further study directly affect human capital accumulation for individuals. This in turn has economic consequences, since a lower education level negatively affects the wage earned in the future (Abel & Deitz, 2014). For example, a salary report for economists shows that PhD economists earn more income than economists without a PhD (McClung & Edwards, 2022). Therefore, following studies finding that emotions and perceptions play a crucial role in other economic decisions (Andreoni, 1990; Gneezy et al., 2014; Lerner et al., 2004)<sup>1</sup>, we are interested in whether IP is related to the decision to study further.

Since the feminist movement gained momentum in the 1970s, the integration of women into the workforce has occurred across various fields (Kahn, 1995). However, the economics discipline continues to face challenges in achieving gender equality (Lundberg & Stearns, 2019), with limited representation of women in top positions (AEA, 2019). Economics exhibits a similar level of female representation to the Science, Technology,

Engineering, and Mathematics (STEM) fields, which are widely acknowledged for their inadequate female representation. This lack of diversity not only impacts the range of perspectives considered in policy-making (Lundberg & Stearns, 2019), but also hampers the development of innovative solutions to address existing problems (Bayer & Rouse, 2016). Further, research has shown that exposing female students to female faculty members increases the likelihood of female students choosing to major in economics (Porter & Serra, 2020) and STEM fields (Zeldin & Pajares, 2000).

This study aims to examine the association between impostor feelings and academic decision making. Considering that women in the field of economics may experience higher levels of impostor feelings compared to men, this may be one explanation contributing to the underrepresentation of women in economics. Dlamini and Adams (2014) suggest that South African academia has an underrepresentation of women in senior positions. Since this underrepresentation problem is not specific to the economics discipline, we consider a range of fields of study instead of limiting our analysis to economics. This investigation is important because individuals might refrain from pursuing further studies as a result of experiencing impostor feelings, despite these feelings not aligning with their actual competence (Clance & Imes, 1978).

The paper is structured as follows: we briefly discuss the related literature and its relevance to each of our research questions in section 2. Then we describe the materials and methods in section 3. Section 4 presents the results and finally, the discussion is in section 5.

## 2 Related literature

The Impostor Phenomenon (IP) refers to "individuals that are successful by external standards but they have an illusion of personal incompetence" (Clance & Imes, 1978, p. 1). Generally, individuals with impostor feelings have limited confidence in their capabilities and are less satisfied with their performance than those without impostor feelings (Thompson et al., 2000). Individuals with impostorism often associate their

success with luck instead of with their competence and intelligence (Chrisman et al., 1995).

Usually, impostor feelings are estimated with a self-report survey instrument, the Clance IP Scale (Clance & Imes, 1978). However, with survey instruments individuals "often understand the same survey question differently" due to different backgrounds or perceptions (Hopkins & King, 2010, p. 2). For example, in the healthcare sector, individuals have different thresholds for an objective health status, leading to survey respondents using self-reported categories in different ways (Grol-Prokopczyk et al., 2011). To overcome this challenge, studies have used anchoring vignettes to "make them [respondents' answers] comparable" (Kristensen & Johansson, 2008, p. 4) as the vignettes give individuals a fixed reference point against which to benchmark their own experience.

**Research Question 1:** *Clance and Imes (1978) developed a survey instrument for assessing IP where self-reported survey responses include an element of subjectivity. We use anchoring vignettes to give a clear reference point for levels of impostorism, thereby improving the comparability of responses across participants. We explore the similarity between these measurement approaches for assessing IP.*<sup>2</sup>

The literature includes evidence of the effects of IP. A systematic review notes the positive relationship between high IP levels and burnout, stress, and reduced job performance and job contentment over time (Bravata et al., 2020). Moreover, people with impostor feelings exaggerate the number of mistakes they make relative to those without impostor feelings (Thompson et al., 2000), which can perpetuate the burnout and stress that individuals with impostor feelings face.

Women are more vulnerable to impostor feelings relative to men (e.g. Cowie et al., 2018; Cusack et al., 2013; Jöstl et al., 2012). Langford and Clance (1993) argue that societal gender norms dictate that women have more responsibilities than men, where women are expected to excel in all roles. They propose that this might stimulate impostor feelings. Bravata et al. (2020) note that impostor feelings are more prominent when an individual is a member of a minority group in a field. Traditionally, women have a low representation in STEM domains, economics (AEA, 2019) and academia (Dlamini &

Adams, 2014).

The IP literature includes studies based on the academic environment. Jöstl et al. (2012) show that the academic environment can positively predict impostor feelings due to common setbacks such as demotivation. Using interviews, Hutchins and Rainbolt (2017) find that academics experience scrutiny from reviewers and conference participants, where questioning their expertise triggers impostor feelings. Further, academics experience uncertainty regarding their professional legitimacy as the publish or perish environment stimulates impostor feelings (Hutchins & Rainbolt, 2017). Doctoral students also experience publishing pressure (Horta & Li, 2022) which can heighten impostor feelings.

**Research Question 2:** *In developed countries, women are more prone to experience impostor feelings relative to men (Cowie et al., 2018; Cusack et al., 2013; Jöstl et al., 2012). We test whether females report higher levels of impostor feelings relative to males in our developing country sample.*

**Research Question 3:** *Impostor feelings are more prominent when an individual is underrepresented in an environment (Bravata et al., 2020). As a result, we test whether Black respondents have more frequent IP experiences relative to non-Black participants as Black academic personnel numbers do not accurately represent the national race demographic in South Africa (Breetzke & Hedding, 2018).*

The American Economic Association (2019) conducted a professional climate survey, revealing a significant gender imbalance, with a ratio of two men to each woman below the age of 54. This ratio becomes even more skewed in older age groups, where the gender ratio reaches six men to each woman (AEA, 2019). In South Africa, there is a concerning "leaky pipeline" phenomenon in economics, where the proportion of female enrollment declines at the master's (46%) and doctoral (40%) levels (Department of Higher Education, 2020).<sup>3</sup> Furthermore, female academic economists predominantly occupy low ranking academic positions: the share of women in academic posts by level is Junior Lecturer (92.1%), Lecturer (54.4%), Senior Lecturer (32.8%), Associate Professor

(37.9%) and Professor (30.4%) (Hitchcock, 2019).<sup>4</sup>

The gender gap in economics encompasses income disparities and different levels of job satisfaction (Ceci et al., 2014). Women also report being socially excluded and facing discrimination (AEA, 2019). Ginther and Kahn (2021) show that women face a 15% lower likelihood of being promoted to associate professor even after accounting for factors such as citations, publication records, and grants. Lundberg and Stearns (2019) argue that this disparity can be attributed to differential treatment. Hengel (2022) finds that only 4% of female-authored papers are published in top economics journals and that women experience longer review processes, controlling for the writing standard of the paper.<sup>5</sup>

Gender equality is important to economics. According to May et al. (2014), there are notable differences in policy recommendations based on gender: 1) women tend to prioritise issues such as poverty, healthcare, and unemployment more than men do; 2) women generally support higher minimum wages compared to men; 3) men are more likely to attribute the gender pay gap solely to differences in human capital. These findings emphasise the need to consider diverse perspectives when formulating policies, recognising the sometimes contrasting viewpoints of men and women (Lundberg & Stearns, 2019).

Furthermore, the presence of women in faculty roles signal that women can successfully pursue careers in traditionally male-dominated fields. Porter and Serra (2020) find that exposing female students to female mentors increases the likelihood that they will switch their major from humanities to economics, controlling for academic ability. Such access to female role models is essential in addressing gender imbalances and maintaining a steady representation of women in male-dominated fields.

**Research Question 4:** *As women are still a minority group in economics (AEA, 2019) and academic economics in South Africa (Hitchcock, 2019), we test whether impostor feelings are more common for female economics students relative to male economics students.*

Recently, studies have observed that feelings play a role in economic decisions (Andreoni, 1990; Lerner et al., 2004; Meier, 2022). Research on IP shows that the academic

environment can trigger impostor feelings (Hutchins & Rainbolt, 2017; Jöstl et al., 2012). Given this connection, the academic environment is an appropriate setting to determine whether impostor feelings correlate with decision making about human capital accumulation.

**Research Question 5:** *aims to investigate predictors of individuals deciding to study further. In our study there are four predictors to explain the students' decision to study further. i) We explore the relationship between IP levels and the decision to study further. As Jöstl et al. (2012) argue that the competitive nature of academia can increase impostor feelings, we hypothesise that the respondents' IP level is negatively correlated with their decision to study further. ii) We investigate whether a gender effect is present with the relationship between impostor feelings and the decision to study further. As academia has a low female representation (Hitchcock, 2019), we hypothesise that females with high IP levels are less likely to study further relative to males with high IP levels. iii) We determine whether students in the economics field are less likely to study further relative to other students, as the climate for females in economics is poor (AEA, 2019; Ceci et al., 2014; Ginther & Kahn, 2021; Lundberg & Stearns, 2019). iv) We build upon our vignette approach by also investigating whether the above mentioned relationships (i-iii) hold when respondents advise fictional characters (with similar characteristics to the respondent) in hypothetical situations. This approach helps to control for unobserved individual differences (e.g. financial constraints and other responsibilities) that might affect respondents' own decisions about further study.*

According to social cognitive theory, individuals are more inclined to participate in tasks when they have confidence in their ability to succeed (Zeldin & Pajares, 2000). Consequently, women may actively choose not to pursue further studies or a career in fields like economics due to the false belief of their incompetence in tasks related to the field.

However, there are instances where women enter a field despite perceiving themselves as less capable, often attributed to the presence of role models and supportive peer relationships (Zeldin & Pajares, 2000). In the context of economics, the lack of appro-

priate role models can hinder women and minorities from entering the field, as explained by Bayer and Rouse (2016). Moreover, research by Boustan and Langan (2019) identify a positive correlation between the representation of women in faculty positions and the presence of female students. This suggests that female role models can serve as a source of inspiration for other women to succeed. A study by Porter and Serra (2020) find that when female students are exposed to female economics faculty members, they are more likely to choose an economics major over a humanities major. Furthermore, Ginther et al. (2020) determine that a two-day workshop designed to connect early-career female academics with mentors and peers in economics increases the likelihood of women entering tenure-track positions.

**Research Question 6:** *Research in developed countries has found that support systems can encourage students to persist in environments where students are underrepresented (Boustan & Langan, 2019; Ginther et al., 2020; Porter & Serra, 2020; Zeldin & Pajares, 2000). Therefore, we hypothesise that participants with impostor feelings are more likely to study further when a support system (supportive peer group and mentor within their field) is present, relative to participants that do not have support. We consider this relationship separately when individuals advise fictional characters in hypothetical situations. This attempts to account for unobserved differences on an individual level.*

Our research contributes to the literature in two ways. Firstly, we determine whether impostor feelings are associated with the willingness to pursue further education. Understanding such connections can inform targeted policy interventions to improve the rate of further studies among competent students who experience impostor feelings. To the best of our knowledge, the literature does not have many cases of using developing countries as a context to study these relationships.<sup>6</sup> Secondly, our survey incorporates anchoring vignettes for three reasons: (i) when individuals contemplate their own decisions about pursuing further education, numerous factors come into play, including personal and financial considerations, and specific outside options. Vignettes act as a robustness check to isolate the relationship between impostor feelings and the decision to pursue further

studies from the other factors. (ii) Since participants subjectively interpret survey questions, their responses may not be directly comparable. The incorporation of anchoring vignettes addresses this concern by providing participants with a reference point against which they can assess their own impostor feelings. This approach improves the comparability of answers across participants (Chevalier & Fielding, 2011; Kristensen & Johansson, 2008). (iii) Our use of vignettes is motivated by the findings of Exley and Kessler (2019), who discover that women tend to evaluate their own performance more negatively than men. However, this performance gap diminishes when women evaluate the performance of other women. With vignettes, we aim to enable a more objective evaluation of scenarios.

### 3 Materials and methods

#### 3.1 Sample and data collection procedure

University of Pretoria<sup>7</sup> students were invited to participate in a survey on how feelings affect decision making. The survey was distributed to current students as an invitation to participate using two university-based samples. One invitation was published as an announcement on the undergraduate and postgraduate economics courses on the university's Blackboard learning management system platform, 'ClickUP'. The other was posted as an Instagram story on the '@life\_at\_tuks' page.<sup>8</sup> This page is independent of the university but posts content related to the university, and students commonly follow this page. Survey participants needed to be a current student.<sup>9</sup> The students were made aware that the survey was anonymous and that participation was completely voluntary.

The survey asks about respondents impostor feelings using anchoring vignettes and the Clance IP instrument. Decisions about further study are included for the respondent and fictional vignette characters.

A total of 482 students participated in the survey, of whom 328 were females, 146 were males, and five reported non-binary genders. The non-binary group was too small to consider separately in our analysis, and three participants chose not to disclose their gender. Given our interest in gender, we therefore removed these eight observations from

the sample, yielding 474 students. Of the participants, 98.3% disclosed their ethnicity as follows: 49.5% Black, 4.3% Coloured, 6.2% Indian/Asian, 38.1% White, and 0.2% Other. Table 1 displays the descriptive statistics for the demographic characteristics of the participants.<sup>10</sup>

Table 1: Descriptive statistics for demographic variables

	Obs	% sample
<b>Type of invite</b>		
Blackboard	384	81.01
Instagram	90	19.99
<b>Demographics</b>		
Age $\leq 21$	316	66.67
Female	328	69.20
Asian/Indian	30	6.33
Black	238	50.21
Coloured	20	4.22
Other	1	0.21
White	180	37.97
Prefer not to say (race)	6	1.27
<b>Year of study</b>		
Undergraduate	437	92.19
First	289	60.97
Second	93	19.62
Third	55	11.60
Honours	21	4.43
Masters	12	2.53
PhD	4	0.84
<b>Field of study</b>		
Economics degree	53	11.18

The total number of observations is 474.

## 3.2 Study design

### 3.2.1 Anchoring vignettes

Surveys inherently involve a level of subjectivity as participants interpret survey concepts, making perceptions challenging to measure and compare directly (Chevalier & Fielding, 2011). For example, individuals may have varied interpretations of what constitutes a "good" level of objective health (Grol-Prokopczyk et al., 2011).

To address this issue, anchoring vignettes are used, which are brief descriptions of hypothetical situations related to the research question. Participants can use these vignettes as reference points to answer questions. By providing all participants with the same vignettes, a common benchmark is established, facilitating objective responses

and comparability among participants (Chevalier & Fielding, 2011; Gupta et al., 2010; Kristensen & Johansson, 2008). Moreover, Evans et al. (2015) argue that vignette designs provide insights regarding factors affecting decision making, which may be difficult to measure in real-life situations as confounding variables occur. In the case of vignettes, Evans et al. (2015) propose that results from the vignettes should generalise to real-life situations that survey respondents would encounter to improve external validity.

In our study, we use anchoring vignettes to create two different variables. One variable measures the level of impostor feelings experienced by an individual relative to hypothetical students described in the vignettes. Another variable determines whether the participants would encourage fictional characters described in a vignette to study further. This second approach aims to investigate whether impostor feelings continue to be a significant factor when respondents are not directly making decisions about themselves. Given the findings of Exley and Kessler (2019) that the gender evaluation gap disappears for women when evaluating other women, we expect that having participants recommend decisions to fictional characters (broadly similar to themselves) will offer insight beyond what we learn from their own decision.

### **3.3 Data**

#### **3.3.1 Decision to study further**

As noted we use two measures of decisions on further study: (i) own decisions and (ii) recommendations to a fictional other student.

The variable *self opt in* takes a value of 1 when respondents report their own intentions to continue studying in their current field and zero if they plan to switch degrees, drop out or find any job.

We use six hypothetical vignette scenarios to determine whether survey respondents would advise fictional characters like themselves (in terms of gender, year, and field of study) to study further. The only differences between the hypothetical scenarios are the levels of IP that the characters experience and the support system available to the character. We realise that participants have different perspectives and factors to consider

when deciding to study further. These vignettes allow respondents to advise characters differing only in their IP level and support system. By comparing these recommendations regarding the decision to study further, we attempt to isolate the relationship between IP, the support system, and the decision to study further. This helps to control for unobserved individual differences.

Table 2 shows the different vignettes that are related to each dependent variable. First, the vignette contains information about a character’s level of IP (No IP or IP) and the respondent advises whether each character should study further.<sup>11</sup> The *other opt in (IP)* variable is coded 1 when respondents advise characters to study further in their current field and zero otherwise. As there are two characters (No IP and IP) participants make a decision for each character (N = 948). These situations are presented to participants in random order.

Table 2: Description of vignettes for *Other opt in* decision to study further

Type of vignette	Dependent variable (1) <i>Other opt in (IP)</i>	Type of vignette	Dependent variable (2) <i>Other opt in</i>
No IP	Peter works hard to feel confident before tests but recently failed an exam. Peter is a postgraduate student and wonders whether he should consider continuing to a PhD in your field of study.	No IP & no support	Peter thinks about the cons of continuing to a PhD after failing. He does not feel comfortable asking his lecturers for advice.
		No IP & has support	Peter tells a nice lecturer about failing and the lecturer explains that the degree is difficult but he is intelligent enough to complete a PhD.
IP	Dennis is a postgraduate student and worries that he is not as competent as his peers. Dennis failed a module and feels like an intellectual fraud. Dennis wonders whether he should consider continuing to a PhD in your field of study.	IP & no support	Dennis is uncertain about continuing to a PhD after failing. He does not feel comfortable approaching his lecturers for advice.
		IP & has support	Dennis tells a nice lecturer that he failed, and the lecturer responds encouragingly motivating him to continue to PhD

Vignettes match the participant’s gender, year of study (first year, second year, final year or postgraduate) and field of study. For simplicity, this table only shows the vignette for a male postgraduate student.

These vignettes are summarised. More detail is available in the appendix in Table A10 or the full vignettes can be found in the supplementary appendix.

Type of vignette refers to whether the vignette contains information regarding impostor feelings only or whether the vignette contains information regarding impostor feelings and the support system available to a student.

*Other opt in (IP)* is a dependent variable where participants recommend the fictional character to continue studying or not when participants only have information regarding the character’s IP level.

*Other opt in* is a dependent variable where participants advise the character to study further when participants have information about the level of impostor feelings and the support system.

Following this, the vignettes give additional information relating to the IP level and support system of the fictional character. Again, the individual advises each character whether or not to study further for four cases (No IP & no support; No IP & has support; IP & no support; IP & has support). The *other opt in* variable is coded 1 when respondents advise characters to study further in their current field and zero otherwise. The order in which these situations are presented to participants is randomised.<sup>12</sup>

### 3.3.2 Measures of IP

Clance and Imes (1978) created a 20-item survey to measure impostor feelings. As this survey measure was created some time ago and relies entirely on subjective self-evaluations, we also consider an alternative vignette measure.

Table 3: Description of vignettes used to evaluate *Self IP (vig)*

Degree of IP	Vignette
No IP	Maria performs well academically and finds economics-related tasks easy and feels confident before tests and presentations.
Mild IP	Grace performs well academically and can complete economics-related tasks easily but she feels nervous to ask questions in class because she worries that her peers will think that the question is stupid.
Moderate IP	Tina performs well academically but worries that she obtained the mark out of pure luck and doubts whether she can repeat past success.
Intense IP	Carol performs well academically but feels like her academic success has been a result of some kind of error. This makes her feel like she has tricked her peers into thinking that she is intelligent.

This table shows the vignettes related to capturing an individual's level of impostor feelings which is used as an alternative measure to Clance and Imes (1978) survey instrument.

These vignettes are adjusted to match the participant's gender, year of study (first year, second year, final year or postgraduate) and field of study. For simplicity in this table, we show the vignette that is displayed to females.

Degree of IP shows what degree of impostor feelings the fictional character has in the vignette.

We describe four characters in a vignette, where one fictional person does not have impostor feelings, and the remaining three characters have mild, moderate and intense impostor feelings. The vignettes are summarised in Table 3. The vignette provides a reference against which participants can benchmark their own impostor feelings. The respondent ranks how comfortable they are in their field of study relative to the characters.

When the respondent is more comfortable than all of the characters then *Self IP (vig)* returns a value of 0, indicating that the respondent does not have impostor feelings. A value of 4 corresponds to all of the characters being more comfortable than the respondent, pointing to a high level of IP. The character names were deliberately chosen so as not to clearly designate race to reduce assumptions about the race of the character.<sup>13</sup>

The *Self IP (Clance)* variable relates to the Clance Impostor Phenomenon Scale (Clance & Imes, 1978). The survey gives a minimum score of 1, indicating that a respondent has a few impostor feelings. A value of 2 shows that individuals have moderate impostor experiences and a value of 3 indicates that individuals have frequent impostor feelings. The maximum score is 4, representing a respondent with intense IP experiences.<sup>14</sup>

*Self IP (def)* relates to a simple self-report indicator measure of impostor feelings. In this case, the impostor syndrome definition was given to respondents with a question asking whether the respondent relates to feeling like they do not belong in their degree due to impostor feelings. A value of one indicates that a respondent agreed with the statement and zero elsewhere. This question was asked after all of the other IP related questions, so as not to bias other responses.

Table 4: Descriptive statistics

	N	Mean	Std. Dev.	Min	Max
<b>Decision to study further</b>					
Self opt in	474	0.753	0.432	0	1
Other opt in (IP)	948	0.839	0.368	0	1
Other opt in	1896	0.828	0.377	0	1
<b>Measures of IP</b>					
Self IP (vig)	474	1.956	1.007	0	4
Self IP (Clance)	474	2.641	0.728	1	4
Self IP (def)	474	0.513	0.5	0	1
<b>Academic demographics</b>					
Failed (self)	474	0.247	0.433	0	1
Mentor (self)	474	0.241	0.429	0	1
Peer support (self)	474	0.513	0.5	0	1

### 3.3.3 Academic demographics

The survey used yes/no questions to determine whether the respondent has failed a module in their academic career (*Failed (self)*), whether they have a mentor in their field

of study (*Mentor (self)*) and whether they have a supportive peer group (*Peer support (self)*). Failing a module is common and relatable as 25% of this student sample has failed a module, however, failing a module does not imply a broader lack of competence as 42% of postgraduate students have failed a module in our sample. The correlation between *Mentor (self)* and *Peer support (self)* is 0.114 and is significant at a 5% level. Of the sample of individuals with a mentor, 62% have peer support and of the sample of participants without a mentor, 48% have a supportive peer group. This could indicate that some individuals are better at building support networks (comprised of peer support and a mentor) generally than others.

The descriptive statistics are summarised in Table 4.

### 3.4 Empirical strategy

#### 3.4.1 Do IP feelings, gender and mentors predict studying further for the respondent?

We aim to understand how IP, field of study, gender, mentors and peer support are correlated with studying further for respondents. We estimate a logit model:

$$self\ opt\ in_i = \alpha_0 + \beta_1 Self\ IP\ (vig)_i + \beta_2 economics_i + \beta_3 female_i + \beta_4 Self\ IP\ (vig)_i \cdot female_i + \beta_5 peer\ support\ (self)_i + \beta_6 mentor(self)_i + \gamma \mathbf{X}_i + \epsilon_i$$

*Self opt in* is an indicator variable for each individual  $i$  and returns a value of 1 when the respondent reports intending to study further and 0 otherwise. Our *Self IP (vig)* variable benchmarks IP against our vignette range of IP and ranges from 0 (no impostor feelings) to 4 (intense impostor feelings). *Economics* is an indicator variable to identify participants that are enrolled in an economics degree and 0 otherwise. *Female* is a dummy variable to distinguish between gender where males are the reference group. *Peer support (self)* returns a value of 1 when respondents state that they have a supportive peer group and 0 otherwise. Similarly, *Mentor (self)* is coded as 1 when the respondent has a mentor within their field of study and 0 otherwise. Lastly, the matrix of control

variables  $\mathbf{X}_i$  includes the individual's level of study (postgraduate or undergraduate), race, age and whether they have failed a module before.

### 3.4.2 Do others' IP feelings and support predict for these others to study further?

We use a simple regression model to observe the relationship between fictional characters' IP feelings and respondents' advising these characters ("others") whether to study further. This is based on responses to the two vignettes where only IP levels vary (one has IP feelings and the other does not have IP tendencies).

$$other\ opt\ in\ (IP)_{it} = \alpha_0 + \beta_1 other\ IP_t + \epsilon_{it}$$

The dependent variable *other opt in (IP)* for individual  $i$  in vignette  $t$  returns a value of 1 when a respondent advises the character to continue studying and 0 otherwise. *Other IP* is coded as 1 when the character in vignette  $t$  has impostor feelings and 0 elsewhere.

For a more comprehensive analysis, we explore how a character's support system is correlated with advice to that character to study further. Respondents read four more vignettes (a character having no IP feelings and no support; a character with IP feelings and no support; a character with no IP feelings and a support system; a character having IP feelings and a support system). We estimate a panel logit model to understand how reports of others' feelings of impostorism and the respondent's own IP feelings relate to the advice given to characters to opt into studying further or not:

$$\begin{aligned} other\ opt\ in_{it} = & \alpha_0 + \beta_1 other\ IP_t + \beta_2 support\ (other)_t + \beta_3 economics_i + \beta_4 female_i + \\ & \beta_5 other\ (IP)_t \cdot female_i + \beta_6 Self\ IP\ (vig)_i + \beta_7 self\ opt\ in_i + \beta_8 peer\ support\ (self)_i \\ & + \beta_9 mentor(self)_i + \gamma \mathbf{Y}_i + \epsilon_{it} \end{aligned}$$

The dependent variable *other opt in* for individual  $i$  in vignette  $t$  reports a value of 1 when respondent  $i$  advises the character in vignette  $t$  to opt into studying further and 0 otherwise. *Other IP* is coded as 1 when the character in vignette  $t$  has impostor

feelings and 0 elsewhere, and the *support (other)* variable returns a value of 1 when the character in vignette  $t$  has a support system and 0 otherwise. *Economics* is coded 1 when participants study economics and 0 otherwise. *Female* is coded 1 when participants are female and zero otherwise. *Self IP (vig)* ranges from 0 to 4 indicating increasing levels of impostor feelings for respondent  $i$  and *self opt in* returns 1 when participant  $i$  reports opting into further study for themselves and zero otherwise. *Mentor (self)* is coded as 1 when participant  $i$  reports having a mentor in their field of study, and if respondent  $i$  has a supportive peer group then *peer support (self)* equals 1 and 0 otherwise. The matrix of control variables ( $\mathbf{Y}_i$ ) includes the individual’s level of study (postgraduate or undergraduate), race, age and whether they have failed a module before.

## 4 Results

### 4.1 Comparison of IP measures (RQ 1)

Our first research question compares alternative ways of measuring IP levels: using vignettes and the (Clance & Imes, 1978) survey instrument.

Table 5: Correlation matrix: comparison of IP measures

	Self IP (vig)	Self IP (Clance)	Self IP (def)
Self IP (vig)	1		
Self IP (Clance)	0.451***	1	
Self IP (def)	0.280***	0.413***	1

*Self IP (vig)* ranges from 0 to 4 relating to the participant’s IP level measured with vignettes.

*Self IP (Clance)* relates to the participant’s IP level measured by the Clance and Imes (1978) survey instrument.

*Self IP (def)* returns 1 for respondents self-diagnosing that they feel like an impostor in their field of study and 0 otherwise.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The variable *Self IP (vig)* shows a significant positive correlation with both *Self IP (Clance)* and *Self IP (def)* indicating that these variables do share common elements of IP. However, none of these measures approach a value of 1, indicating that they may capture distinct dimensions of impostor feelings.

## 4.2 Differences in IP levels and Self opt in (RQ 2-4)

Our analysis starts by considering initial relationships between impostor feelings and the decision to opt into studying further by gender, race and field of study.

In line with our expected findings for our second research question, on average females have higher levels of impostor feelings relative to males, the IP difference is highly significant ( $p < 0.01$ ). This result holds true for two IP measures: the *Self IP (vig)* variable that is created from the vignettes as well as the survey instrument (*Self IP (Clance)*). The vignette measure picks up a stronger gender effect relative to the *Self IP (Clance)* but remains in line with common findings from the literature.

We also note that Black students are less likely to study further relative to non-Black students. Black students report higher levels of IP on the vignette measure, but not on the other IP measures (Clance and the simple self-report measure based on the given definition of IP).

Table 6: Descriptive statistics of Self IP measures and Self opt in

	N	Self IP (vig)	z	Self IP (Clance)	z	Self IP (def)	z	% Self opt in	z
Male	146	1.753		2.513		0.513		0.774	
Female	328	2.046	2.836***	2.698	2.317**	0.512	0.975	0.744	0.700
Black	238	2.202		2.663		0.529		0.706	
Non-Black	236	1.708	5.473***	2.618	0.932	0.495	0.464	0.801	2.395**
Econ & Male	21	1.619		2.523		0.667		0.619	
Econ & Female	32	2.094	1.482	2.343	1.277	0.375	2.058**	0.563	0.405

z refers to z values from the Wilcoxon rank-sum test.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Interestingly, males studying an economics specific degree report higher IP feelings compared to females studying economics according to the *Self IP (def)* variables. This difference might be exacerbated by the small sample size of people studying an economics specific degree in our sample and this finding is not robust to the *Self IP (vig)* and *Self IP (Clance)* measures.

### 4.3 Do IP feelings, gender and mentors predict studying further for the respondent? (RQ 5 and 6)

Table 7 reports the relationship between IP levels, the economics field, gender, peer support and mentorship to predict whether a participant plans to study further. A logistic regression models this relationship, and we report average marginal effects.<sup>15</sup>

In column 1, we note that the average marginal effect of IP on the likelihood to study further is negative. That is, as impostor feelings increase, the likelihood of studying further decreases significantly.<sup>16</sup> This finding is in line with our hypothesis that individuals with impostor feelings are more likely to opt out of studying further. This negative relationship between opting into further studies and *Self IP (vig)* remains robust when demographic variables are included in the model, as seen in column 2 of Table 7.

Participants studying economics are not less likely to opt into studying further relative to other fields. The gender indicator variable is also not significant: after controlling for *Self IP (vig)*, men and women do not differ significantly in their reported intention to study further. Postgraduate students are less likely to study further relative to undergraduate participants. Postgraduate respondents already have one or multiple degrees, increasing the likelihood of leaving university to gain experience in the working world. Respondents that are 22 years old or older may encompass a large number of postgraduate students where the opportunity cost of continued investment in education may be higher, given the higher foregone income with a higher qualification, decreasing the odds of further studies compared to younger students.

Column 3 of Table 7 shows the average marginal effects of *Self IP (vig)* by gender. We find that as males have more intense impostor feelings, they are less likely to study further, while females are not less likely to study further as their level of IP increases.<sup>17</sup> This result counters our fifth hypothesis, where we anticipated that women with intense impostor feelings would be less willing to study further relative to men.

Research question 6 speaks to the importance of a peer support system and mentors to encourage students to further their studies. In line with Ginther and Kahn (2021),

Porter and Serra (2020), and Zeldin and Pajares (2000), column 4 shows that after controlling for *Self IP (vig)* and other individual characteristics, participants who have mentors in their field of study are more likely to study further relative to those that do not have mentors.<sup>18</sup> Interestingly, Black individuals are no longer less willing than non-Black individuals to study further after controlling for the presence of a mentor.

Table 7: Average marginal effect: the impact of self IP on self opt into studying further

Dependent variable: self opt in				
	(1)	(2)	(3)	(4)
Self IP (vig)	-0.049*** (0.02)	-0.043** (0.02)	-0.043** (0.02)	-0.036** (0.02)
Postgraduate		-0.204** (0.10)	-0.215** (0.10)	-0.226** (0.11)
Economics		-0.037 (0.07)	-0.036 (0.07)	-0.033 (0.07)
Black		-0.070* (0.04)	-0.069* (0.04)	-0.051 (0.04)
Female		0.005 (0.04)	0.012 (0.04)	-0.000 (0.04)
Age $\geq$ 22		-0.141*** (0.05)	-0.140*** (0.05)	-0.122*** (0.05)
Mentor (self)				0.083** (0.04)
Peer support (self)				0.015 (0.04)
Failed (self)				-0.066 (0.05)
Average marginal effect of Self IP (vig) by gender				
Male			-0.081** (0.03)	-0.070** (0.03)
Female			-0.029 (0.02)	-0.022 (0.02)
Observations	474	474	474	474

Variables are standardised.

*Self IP (vig)* ranges from 0 to 4 relating to the participant's IP level. This variable is standardised. *Postgraduate* is coded 1 for postgraduate participants and 0 otherwise. *Economics* returns 1 for respondents studying an economics degree and 0 otherwise. *Black* is coded 1 for Black participants and 0 otherwise. *Female* returns 1 for female respondents and 0 otherwise. *Age  $\geq$  22* returns 1 for respondents 22 years old or older and 0 otherwise. *Failed (self)* indicates 1 for a participant that has failed a module and 0 otherwise. *Mentor (self)* returns 1 for respondents that have a mentor in their field of study and 0 otherwise. *Peer support (self)* returns 1 for participants that have a supportive peer group and 0 otherwise.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

#### 4.4 Do others' IP feelings and support predict for these others to study further? (RQ 5 and 6)

This section focuses on the advice that respondents give to vignette characters after evaluating a situation where a character has varying levels of IP and different support structures. The vignette ensures that all respondents consider the same IP baseline in deciding whether the character should study further or not. Moreover, these results act as a robustness check to isolate the relationship between IP, support and studying further in an attempt to control for unobserved individual differences.

Table 8: Wilcoxon rank sum test of Other opt in by Other IP level

	No IP	IP	z value
Other opt in %	0.945	0.732	8.912***
Other opt in (no support) %	0.793	0.599	6.494***
Other opt in (has support) %	0.972	0.947	1.986**

No IP refers to characters that do not have impostor feelings.

IP refers to characters that have impostor feelings.

z value is from the Wilcoxon rank-sum test.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

First, a Wilcoxon rank-sum test shows whether the percent of other opt in (the rate at which participants advise the fictional character to continue studying) differs by the impostor levels of the character. From Table 8, it is evident that participants condition their advice to others on the character's IP level: the other opt in rate is significantly smaller when the character has impostor feelings.

Other opt in (no support) % and other opt in (has support) % refers to the vignettes that explain the character's IP levels and support system. When the character has support the respondents are more likely to advise the character with impostor feelings to study further relative to those that do not have a support system. This is also true for characters without impostor feelings. Characters without impostor feelings (No IP) are significantly more likely to be advised to study further than characters with impostor feelings (IP) in both the support and no support scenarios.

Table 9 investigates this in more detail, we test whether respondents are more likely

to advise vignette characters to opt out of studying further if characters have impostor feelings. We also investigate whether support plays a role. For ease of interpretation, we report the average marginal effects of the logistic regression in Table 9.<sup>19</sup>

Table 9: Average marginal effects: the impact of IP on other opt into studying further

DVs:	other opt in (IP)		other opt in			
	(1)	(2)	(3)	(4)	(5)	(6)
Other IP	-0.213***	-0.110***	-0.110***	-0.110***	-0.110***	-0.110***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Support (other)		0.264***	0.265***	0.265***	0.265***	0.265***
		(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Postgraduate			-0.018	-0.018	-0.005	-0.004
			(0.05)	(0.05)	(0.05)	(0.05)
Economics			-0.018	-0.018	-0.014	-0.015
			(0.04)	(0.04)	(0.04)	(0.04)
Black			0.021	0.022	0.031	0.041
			(0.02)	(0.02)	(0.02)	(0.02)
Female			0.019	0.017	0.019	0.016
			(0.02)	(0.02)	(0.02)	(0.02)
Age $\geq$ 22			-0.048	-0.047	-0.034	-0.031
			(0.03)	(0.02)	(0.02)	(0.02)
Self IP (vig)					-0.004	-0.002
					(0.01)	(0.01)
Self opt in					0.084***	0.083***
					(0.03)	(0.03)
Mentor (self)						-0.010
						(0.02)
Peer support (self)						0.026
						(0.02)
Failed (self)						-0.007
						(0.02)
Average marginal effect of Other IP by gender						
Male				-0.152***	-0.152***	-0.151***
				(0.02)	(0.02)	(0.02)
Female				-0.091***	-0.091***	-0.091***
				(0.02)	(0.02)	(0.02)
Observations	948	1896	1896	1896	1896	1896

Column 1 has a dependent variable *other opt in (IP)*, this vignette has no information relating to the character's support system. Two vignettes were used: 1) the character does not have IP; 2) the character does have IP.

Columns 2 - 6 have a dependent variable *other opt in*, where these vignettes have information relating to the character's support system. Four vignettes were used: 1) the character has no IP and no support system; 2) the character has no IP and has a support system; 3) the character has IP and no support system; 4) the character has IP and a support system.

*Other IP* is coded 1 when the character in the vignette has IP feelings and 0 otherwise. *Support (other)* returns 1 when the character has a support system and 0 otherwise. *Postgraduate* is coded 1 for postgraduate participants and 0 otherwise. *Economics* returns 1 for respondents studying an economics degree and 0 otherwise. *Black* is coded 1 for Black participants and 0 otherwise. *Female* returns 1 for female respondents and 0 otherwise. *Age  $\geq$  22* returns 1 for respondents 22 years old or older and 0 otherwise. *Self IP (vig)* ranges from 0 to 4 relating to the participant's IP level. *Self opt in* returns 1 when the respondent studies further and 0 otherwise. *Mentor (self)* returns 1 for respondents that have a mentor in their field of study and 0 otherwise. *Peer support (self)* returns 1 for participants that have a supportive peer group and 0 otherwise. *Failed (self)* indicates 1 for a participant that has failed a module and 0 otherwise.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Column 1 of Table 9 shows the significant negative relationship between *Other IP* and advising others to continue studying. This finding is in line with our hypothesis that respondents are less likely to advise another person to continue studying if that person is reported to have IP feelings.<sup>20</sup>

From column 2 vignettes contain information about the character's IP level and support system. Impostor feelings continue to have a negative relationship with advising characters to study further and remain robust to the inclusion of demographic variables.

Characters that have a support system are more likely to be advised to study further. This variable has a larger coefficient relative to *Other IP* illustrating that a character's support system is a more important determinant of the dependent variable relative to impostor feelings. This relationship remains robust to the inclusion of demographic and academic control variables.

The rate of advising characters to study further does not change by field of study. Also, the female indicator variable is not significant in the model, suggesting that advising characters to continue studying does not change with the respondent's gender.<sup>21</sup>

In column 4 of Table 9, we estimate the average marginal effect of a male and female individual advising a fictional character to study further when the character's IP level varies. Male respondents are significantly less likely to recommend a male character to opt into studying further when this character has impostor feelings relative to female respondents advising female characters. This result remains even when controlling for the respondent's IP levels in columns 5 and 6.

In column 5, we note that a respondent's own reported decision to study further has a significantly positive relationship with advising others to study further.

## 5 Discussion

Our paper explored the Impostor Phenomenon (IP) within the context of academic decision making. By examining the relationship between IP, gender, and support systems, we have contributed to the existing literature on impostor feelings in academia, particularly

in the context of a developing country. We observe the correlation between IP, gender, support systems, and the decision to study further for each participant. Additionally, we use hypothetical situations which provide details about characters' IP levels and support structures only. As other factors (outside options available or financial considerations) are not described in the vignette, individuals therefore advise characters to study further when the two factors of interest for our study (impostor feelings and the support system available to the character) are isolated. When survey respondents report whether they themselves plan to study further, respondents are likely to consider outside options or financial considerations. Using vignettes helps to control for these unobserved individual differences in decision making and to isolate the link between IP, support systems, and the decision to study further.

We are interested in whether the correlation between IP and academic decision making is a possible explanation for the low female representation in economics. However, this relationship may be an issue in other fields too, thereby we do not restrict our sample to economics students.

Anchoring vignettes provide participants with a benchmark against which they can compare their survey responses, thereby improving the comparability of these responses (Chevalier & Fielding, 2011; Kristensen & Johansson, 2008). We use vignettes to create a measure of impostor feelings, denoted as *Self IP (vig)*, and compare this measure with a survey instrument developed by Clance and Imes (1978). Our analysis reveals a positive correlation between the two variables, indicating a similar underlying relationship. However, these measures appear to capture different aspects of impostor feelings, since the correlation is well below one. To ensure the robustness of our findings, we include the *Self IP (Clance)* variable as a supplementary measure alongside *Self IP (vig)*, and our results remain consistent across both measures.<sup>22</sup>

Studies in the developed country context have consistently observed that women experience higher levels of impostor feelings compared to men (Cowie et al., 2018; Cusack et al., 2013; Jöstl et al., 2012). In our sample, we note that women have more intense impostor feelings. Bravata et al. (2020) link minority status to impostor feelings, however,

we cannot attribute these impostor feelings due to women being a minority group as we lack enrollment data for each field and year of study in our sample. Further, we determine whether Black individuals have higher IP levels relative to non-Black respondents. Black academic staff remain a minority group, and not nationally representative of the Black population in South Africa (Breetzke & Hedding, 2018).

Specific to the economics field, we anticipated a pronounced gender effect on impostor feelings, considering the underrepresentation of women in South African academic economics departments. However, our findings indicate that there is no significant gender difference in IP levels or the likelihood of pursuing further studies in the economics field. This could be due to the small sample of students studying an economics degree. While a focus on economics is interesting, the relationship between IP and academic decision-making is not constrained to economics, therefore we investigate this issue in other fields too.

We hypothesised that individuals with high levels of IP have a negative relationship with the willingness to study further. Our results support this hypothesis and are robust to participants advising fictional characters (who share similar characteristics with the participant) when studying further is dependent on the character's IP level.<sup>23</sup> This relationship can be explained by the high levels of scrutiny in academia, specifically the conference and publication environments which trigger impostor feelings (Hutchins & Rainbolt, 2017; Jöstl et al., 2012).

The rate at which males and females opt into studying further does not differ by gender. Considering the notable gender difference in the mean levels of impostor feelings, we expect men to be more likely to study further compared to women. However, when we condition academic decisions on impostor feelings, we find that females do not change their likelihood to study further as impostor feelings intensify. This could speak to the fact that women understand that impostor feelings do not reflect their true competence. On the other hand, males experiencing intense IP levels are more likely to opt out of studying further, relative to males with lower IP feelings. This finding is confirmed with vignettes in Table 9.<sup>24</sup> Despite women reporting a higher intensity of impostor feelings, males are

significantly less likely than females to encourage others to pursue further studies when characters struggle with IP feelings.<sup>25</sup> One possible explanation might be that women are more accustomed to experiencing these feelings, and have had more opportunities to develop strategies for overcoming these feelings, thereby reducing the impact of IP on the decision making process.

Investigating the decision to study further by academic discipline yields no significant differences. Therefore, this does not suggest that women in different disciplines would have higher rates of studying further relative to the economics field because of changes in IP levels. Again, this result is robust to the case where participants advise fictional characters.<sup>26</sup> However, IP is related to stress, burnout and other negative psychological costs which can effect the rate at which a participant chooses to study further. Even though these negative psychological factors should be considered when deciding to study further, perhaps these factors should not deter individuals from entering fields that trigger impostor feelings. Individuals may still succeed in these fields due to the perfectionist (Pannhausen et al., 2020) and high achieving (Clance & Imes, 1978) traits that impostors cultivate. We did not collect data to speak to these issues but it can be an avenue for future research.

Specific to our sample, having a mentor is a more important determinant of studying further compared to impostor feelings. Additionally, our results align with our hypothesis that a support system increases the likelihood of pursuing further studies in the presence of impostor feelings. We observe that individuals are more inclined to advise characters with impostor feelings to study further when those characters have a support system, as shown in Table 8. We expect this result as studies show that mentors have a positive role in encouraging students to persist in environments where these individuals are underrepresented (Boustan & Langan, 2019; Ginther et al., 2020; Porter & Serra, 2020; Zeldin & Pajares, 2000).

In conclusion, our findings support previous research, revealing more intense impostor feelings among women, and the negative impact of IP on the likelihood of pursuing advanced education. Furthermore, the presence of mentors for students emerged as a

significant factor influencing their decision to continue their academic journey. These findings have implications for addressing the gender gap in academia and highlight the importance of support systems in light of impostor feelings.

This paper has some limitations. Our observational cross-sectional dataset does not allow for causal interpretations. Secondly, due to the survey length we could not determine whether there is a difference in advising characters to study further by gender (in our study, the character matched the gender of the participant; however, it would be interesting to investigate the case where the survey participant advises a character with the same gender and a character with a different gender to identify whether there is a gender difference in advising the character to study further). However, future research can investigate this dynamic.

## 6 Notes

1. For example, Meier (2022) shows that emotions help explain within-individual changes in risk attitudes. Edmans et al. (2021) find that asset prices are significantly correlated with the general mood of citizens. Gneezy et al. (2014) observe that people are more likely to donate to charity when they feel guilty about a recent unethical action.
2. All research questions were preregistered on OSF: <https://osf.io/tx62e>
3. Similarly, in the United States, only 32.2% of economics doctorate graduates are female (Auriol et al., 2022).
4. The large share of women in lower positions could suggest that South African universities are trying to improve the representation of women in academia. Female representation is similar in European universities and business schools: women hold 27% of Professor and Associate Professors positions, and occupy 38% of junior-level posts (Auriol et al., 2022). We would hope that as the number of graduates by gender reaches parity, a better representation of women is seen in academia.
5. Conklin and Singh (2022) find that implementing a triple-blind review process can help alleviate the issue of female underrepresentation in publishing.
6. The majority of papers studying the relationship between IP and the academic environment or IP and support systems are set in the United States.
7. The University of Pretoria is a high ranking university and the largest contact university in South Africa. With the help of the National Student Financial Aid Scheme, students with a variety of socio-economic backgrounds are able to study.

This aids the demographics of the university to align with the demographics of South Africa.

8. The data collection for the two samples occurred during the same period. Students were asked to provide contact details (phone number or email address) if they wanted to enter the lucky draw to win a prize. If the same contact detail was provided more than once, then the second observation with the contact detail was excluded. Before the data analysis commenced, all contact details were deleted.
9. The survey was terminated if the participant was not a current student. To encourage students to respond, three randomly selected participants were given a lucky draw voucher prize as a token of appreciation for partaking in the survey.
10. In South Africa, an undergraduate degree spans 3 years. Generally, individuals start their degree when they are 18 years old and would complete this degree by 21 years old, therefore we split the age group into 21 years and younger or older than 21 years.
11. The full version of vignettes are available in the Supplementary Appendix and shortened vignettes with more information are available in the appendix in Table A10.
12. For example, if a survey participant was randomly allocated to the ‘No IP’ vignette first, and then randomly allocated to the ‘support’ vignette; the order vignettes that the individual would see (from Table 2) is 1) ‘No IP’; 2) ‘No IP & has support’; 3) ‘No IP & no support’; 4) ‘IP’; 5) ‘IP & has support’; 6) ‘IP & no support’.
13. We chose names that we knew are used by both Black and White people in South Africa.
14. The Cronbach alpha for the *Self IP (Clance)* measure in our survey is 0.8894.
15. We refer to average marginal effects for ease of interpretation. In the Supplementary appendix, we report tables which display the coefficients from the logistic regressions. Additionally, OLS regressions modelling the same relationship are present in the appendix as robustness checks.
16. As a robustness check, we also find a significantly negative relationship between the Self IP (Clance) and Self IP (def) variables and opting into studying further. These regression tables are available in the supplementary appendix. The average marginal effects of Self IP (vig) on the willingness of a participant to study further (-4.3%) is similar to the average marginal effects of Self IP (Clance) on the willingness of a respondent to study further (-3.7%).
17. This result aligns with using the Self IP (Clance) measure too: we see evidence of a gender difference in the decision to study further: when we interact the Self IP (Clance) measure with Female, males are significantly less likely to study further as IP levels increase, while the same is not true for females.
18. As a robustness check, we find that having access to any kind of overall support (peer support **or** mentor support) has an insignificant relationship with the student’s decision to study further (Table D17). This supports the finding that mentor support specifically, rather than a broad measure of any support, predicts further study.

19. Table C12 which estimates the logistic regression is available in the supplementary appendix.
20. Recall that respondents are presented with two vignettes that differ by the character's IP level only. Participants viewed the character with impostor feelings and the character without impostor feelings in a random order. We added an order control variable to the regression which is insignificant.
21. Participants viewed scenarios where fictional characters matched their gender only.
22. The results that use the *Self IP (Clance)* measure is available in the supplementary appendix.
23. In Table 9, we find that there is a negative relationship between *other IP* and *other opt in*, therefore, when fictional characters have impostor feelings, individuals are less likely to advise these characters to study further.
24. That is, men are significantly more likely than women to advise others to not study further when other individuals have impostor feelings. The results when participants make their own decisions are similar to those in the vignette case when participants are making decisions for others.
25. Respondents only advised characters with the same gender. Therefore, we are unable to determine whether men and women advise male and female characters in the same way.
26. In Table 9, the *Economics* variable is insignificant implying that the decision to study further does not differ by discipline.

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# Appendix A Hypothetical vignettes for dependent variables

Table A10: Description of vignettes for dependent variables

Type of vignette	Dependent variable (1) other opt in (IP)	Type of vignette	Dependent variable (2) other opt in
No IP	[Maria/Peter] dreams of publishing academic articles. At times [she/he] feels stressed, but [she/he] works hard to feel confident before tests. Despite this, [she/he] recently failed an exam. [Maria/Peter] is a [first-year/second-year/final-year/postgraduate] student and wonders whether [she/he] should consider [continuing with the degree/a postgraduate degree/continuing to a PhD] in your field of study.	No IP & no support	[Maria/Peter] is thinking about the pros and cons of a degree in your field of study since [she/he] needs to write a supplementary exam. None of [her/his] friends are studying and cannot support them while completing a degree. [Maria/Peter] does not feel comfortable approaching any of [her/his] lecturers for advice.
IP	[Monica/Dennis] is a [first-year/second-year/final-year/postgraduate] student studying your degree. [Monica/Dennis] worries that [she/he] is not as competent as [her/his] peers as [she/he] sometimes feels demotivated to study. Most of [his/her] peers seem to work fewer hours or not suffer from demotivation. [Monica/Dennis] failed a module and feels like an intellectual fraud. [Monica/Dennis] wonders whether [she/he] should consider [continuing with the degree/a postgraduate degree/continuing to a PhD] in your field of study.	No IP & has support	[Maria/Peter] tells [her/his] academic friends about writing a supplementary exam and [she/he] respond encouragingly as it will give them a chance to understand the work better. [She/He] speaks to a nice lecturer about having to write the supplementary exam and the lecturer explains that the degree is difficult but [she/he] is intelligent enough to complete the degree.
		IP & no support	[Monica/Dennis] does not know whether [she/he] should continue with [her/his] degree in your field of study since [she/he] failed the elective module. [Monica/Dennis] does not feel comfortable approaching any of [her/his] lecturers for advice. None of [her/his] friends are at university, so [her/his] friends do not understand the pressure of academia and cannot be a support system to them. Therefore, [she/he] cannot ask for advice or rely on friends throughout [her/his] degree.
		IP & has support	[Monica/Dennis] tells a lecturer that [she/he] failed, this lecturer responds encouragingly and motivates [her/him] to continue with [her/his] degree in your field of study. [His/Her] academic friends also encourage them to [study further/continue with their current degree]