

# The Quiet Crisis of PhDs and COVID-19: Reaching the financial tipping point.

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## Research Article

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## Abstract

Before the COVID-19 crisis, existing high levels of financial concerns amongst PhD students increased their vulnerability to disruptive events. Impacts from the pandemic have increased their financial stress to the point that may result in many being forced to exit research studies. An exodus of doctoral students now would impact our future research capacity. The effects of the unfolding crisis on research students at a research-intensive Australian university was documented by a group of doctoral candidates who received 1,020 survey responses from their cohort. Here we show that the pandemic has severely affected research candidates and argue that these results have notable implications for a future research workforce. We found that 75% of students expect to experience financial hardship as a result of the pandemic. Consequently, 45% report being pushed beyond their financial capacities and expect to be forced to disengage from their research within six months. Comparative pre-COVID data from an Australian national survey, reports research student disengagement of 20% over four years. The 25% increase of expected disengagement, in a much-reduced period, signals a deeper PhD crisis. Swift intervention is required to avert substantial impacts to the pipeline of research talent.

## Introduction

An April 2020 survey of 1020 research students on how the COVID-19 crisis impacted them provides a stark warning for institutes that rely on a robust research workforce. Pre-COVID- 19 studies into the doctoral candidate experience show that many students were already experiencing financial concerns (Lauchlan 2019; Universities Australia 2018; Sverdlik et al. 2018). In a 2017 Australian national survey, 57% (n=5874) of research students reported finances to often be a “source of worry” (Universities Australia 2018). New data reported on here (the Sydney COVID impact data) indicate 75% of research students are now expecting to experience “financial hardship” as a result of the pandemic. Types of hardships respondents expected to experience included inability to pay for accommodation, medicines, utilities, meals, and carer responsibilities. A consequence of so many students unable to afford living necessities is that nearly half (45%, n=454) expect to be forced to disengage from research within the next six months. Such a severe disruption to the research community may have longer-term consequences for essential advances in innovation and knowledge development crucial to governments, corporations, and universities.

The primary data reported on here came from a survey conducted by several PhD candidates at a research-intensive university in Australia. They sought to document the research students’ experience of a disruptor unique in the lived experience of research organisations. Our analysis of that data in context of pre-COVID-19 studies of the research student experience indicate the pandemic has pushed students to a tipping point that may cause a decline in the global research workforce.

## Value of PhD candidates to the workforce.

PhD students play a pivotal role in economic growth, innovation, and knowledge advancement (OECD 2019). Prior to the pandemic, the total fiscal impact from research and development (R&D) in the eight leading universities in Australia contributed \$24.5 billion per annum to the economy (Conlon et al. 2018). Productivity spillover of university research in Australia results in every AUD\$1 invested contributing AUD\$10 to the economy (Conlon et al. 2018). Spillovers include collaborations between universities and organisations, internationally published findings, and contribution of highly-skilled graduates to a global research workforce (Conlon et al. 2018). The workforce outside of academia is increasingly employing doctoral holders and relies on a continual supply of graduates; by 2015 the United States saw more than half of PhD graduates employed by government and businesses (McCarthy and Wienk 2019). University research outcomes are reliant on the work contributions of PhD candidates (Horta et al. 2018); in Australia, research students make up 57% of university teams. As the world emerges from the pandemic, it will rely heavily on the work of researchers from many fields to develop strategies and innovations for rebuilding economies, health systems and social structures.

## The PhD crisis waiting to happen.

Research students have been existing in a state of financial precarity for years (Sverdlik et al. 2018; Guthrie et al. 2018; Evans et al. 2018). Precarity is characterised by living with persistent insecurities around employment, income, and living necessities; a state that increases vulnerability to major disruptive events such as a pandemic. Living in financial precarity is similar living on the edge of a financial cliff, replete with all the anxieties and health disorders that brings. Most studies into the experience of students in higher education are focused on the very different journey of coursework students3 despite large increases in the number of PhD candidates in the last two decades (OECD 2019; Universities Australia 2019; Norton et al. 2018). Specific research into doctoral studies evidences experiences marred by isolation, high anxiety, severe depression, and other psychiatric disorders (Evans et al. 2018; Levecque et al. 2017; Virtanen et al. 2017; Woolston 2019) as well as increased physical health impacts (Kernan et al. 2011; Juniper et al. 2012). Less research has been conducted on the financial instability of doctoral candidates and how that impacts their ability to complete their degree, though this work is growing (Sverdlik et al. 2018; Gururaj et al. 2010; Beasy et al. 2019; Ampaw and Jaeger 2012).

The issue of financial precarity in doctoral candidates is complex due to varying program structures not just in different nations, but also due to the different research economies amongst science and humanities disciplines. The financial situations of research students are tied to a range of factors including access to grants, scholarships, and loans; as well as supplemental employment opportunities available within academia (i.e. teaching) and externally. The ranging questions in studies of financial impacts on doctoral progress, differing financial foci, and diverse site contexts, does present challenges in direct comparisons; however, it's clear that increased financial concerns negatively impact completions (Gururaj et al. 2010; Ampaw and Jaeger 2012; Mendoza et al. 2014).

Despite varying doctoral formats, financial concerns are prevalent in research student cohorts globally. In the 2019 Nature survey of over 6,000 doctoral students, 75% of respondents ranked the statement “The difficulty of maintaining a work/life balance” and 67% ranked “Financial worries after my PhD” in their top five concerns (Lauchlan 2019); results consistent with the 2017 survey (Woolston 2019). No specific question was asked in that study about current financial concerns, but the findings did show that of the 19% of respondents that indicated having an additional job, more than half (53%) said it was to make ends meet (Lauchlan 2019). The Nature report also stated that funding and work-life balance were key barriers to pursuing an academic career (Lauchlan 2019)

In a 2017 Universities Australia survey, 54% (of 6,206 research students), indicated their financial situation to be “often a source of worry” (Universities Australia 2018) (Fig.1). These similar results to the Nature survey suggest that data collected in Australia (an economically high-ranking OECD nation (McGagh and Wenham 2016) may be representative of the doctoral experience in other OECD countries. In Australia, 65% of research students receive some form of scholarship, bursary, or stipend (Universities Australia 2018); generally, the highest value stipends are government-backed, three-year centrally-funded scholarships. Fewer than 36% of domestic students receive one of these centrally-funded scholarships (Bentley and Meek 2018) which held a consistent median value of AUD\$26,600 from 2016 to 2019 (Universities Australia 2018; Norton et al. 2018); an income considered at or below the Australian poverty line (Melbourne Institute Applied Economic and Social Research 2019; Davidson et al. 2020). The situation necessitates most students find additional sources of income although, up to 41% indicate that supplementary work adversely affects their research (Universities Australia 2018).

That PhD students have been living with financial instability is not news to any academic involved in research training. What should be of interest to the broader community, is the extent of current pandemic impacts on this group. By understanding how the pandemic has affected doctoral candidates’ financial situation, we can see how this impacts research progress. Our findings provide evidence that more students are reporting severe financial stress, expecting to be forced to disengage, and consequently the pipeline of supply of new graduates into R&D may be disrupted.

## **A snapshot of PhDs at the peak of a pandemic.**

During the peak of the pandemic in Australia, several PhD students at a large research intensive university became concerned at the impact on their cohort. These students decided to collect real-time data to report to their university management. The survey was advertised to all enrolled research students at the University of Sydney, but word of mouth spread quickly and additional doctoral students from many other Australian and international universities responded. Over 1,000 students responded within the first 24 hours. A quarter of the total cohort of University of Sydney research students responded within 72 hours. That response rate carries a message itself: the students wanted to talk about their experience of COVID-19.

The resulting dataset and internal report to the university senior management clearly indicated a more serious impact was occurring than many had realised. The snapshot into the doctoral student experience of the pandemic provided a real-time insight into a shift that was occurring. The data showed that many research students had reached a tipping point and that a potentially large proportion of them were expecting to be forced to abandon their work due to financial hardship. We realised the message needed to be communicated more widely within the research community, particularly to policy-makers in graduate research education and education ministers in governments. Our analysis looks not only at this snapshot in time during a major pandemic, but places it in context of pre-COVID studies of the doctoral experience. The shift caused by the pandemic highlights the precarity the students were already existing in.

## Methods

The Sydney COVID Impact data reported here were collected from 6th–9th April 2020 via an online survey. The survey received 1076 replies from research students, 1020 responses from University of Sydney students, and 56 from students at other universities in Australia and abroad. The 1020 University of Sydney students provided their ID numbers and a detached list of student numbers only were sent by the doctoral students collecting the data to the University for verification. After verification it was determined that the response number represented 24% of the total research student cohort as at April 2020.

Respondents were self-selecting research students, and broadly demographically representative, incorporating 300 international and 713 domestic students, as well as 843 full-time and 177 part-time students. The original survey and de-identified data is available at  
<http://doi.org/10.25910/5ed06563d9d79>

In our analysis, we considered only the 1020 responses from the University of Sydney students as they were the only respondents that had been verified. Some questions were not mandatory, as such not every respondent answered all questions. Where that is the case, the number of responses to the question is reported else the percentage of the entire 1,020 verified Sydney students is given.

In questions where respondents were allowed to indicate multiple selections, for example in the candidature impact question, we counted all instances of a negative selection of a single respondent and converted that to either a 1 (at least one negative response given) or 0 (no negative response given). That means that when calculating the overall disengagement number each respondent is only given a value of 1 in 1,020 regardless of how many negative responses they indicated. The reason was to understand the proportion of the cohort expecting to disengage from studies on a whole.

In our discussion we have compared the Sydney COVID Impact data with pre-COVID data on doctoral students. Whilst the exact questions asked are not the same, therefore no statistical tests can be run, comparisons can be made.

The data were collected in the early phase of the COVID-19 pandemic in Australia. Government mandated social distancing restrictions had been rolled out progressively over the previous three weeks, with many organisations severely impacted from 26th March. There was a global, heightened sense of anxiety during the survey period which may have affected some responses.

## Results

### Living and financial impacts of COVID-19

The Sydney COVID impact data shows that 75% (of 888 respondents) expect to experience financial hardship as a direct result of the pandemic (Fig. 1). Almost a fifth of respondents (154 out of 853 respondents) indicated the pandemic had already resulted in them unable to afford necessities such as utilities, internet connection, and medicines, or they anticipated this impact within 6 months. Additionally, 11% (of 849 respondents) had already gone without meals or expected to in the next six months as a result of the pandemic. Of those with carer responsibilities, 19% (of 844 respondents) indicated they could no longer meet the financial cost of supporting others or expected to experience this within 6 months.

Much of the financial impact was driven by changes to supplementary employment, that is income in addition to scholarship stipends. Changes included job losses (18% of 996 respondents), work and income reduction (19%), and workload increases without increased pay or even less pay (Fig. 2). Many also said they had undertaken unpaid teaching work to bring courses online for coursework students. Some respondents said they had become entirely reliant on their scholarly stipends or they were living on their partner's income.

In Australia, most universities cap extensions for centrally funded scholarships at 6 months after the initial 3 years, but 66% of respondents indicated they would need an extension of funding beyond that due to COVID-19 impacts on their research. Scholarship holders were concerned their stipend would cease long before they had completed their degree due to pandemic related delays to their research.

Many (29% of 858 respondents) had already been unable to meet accommodation costs or expected to face this within 6 months. An additional 30% (of 1008 respondents) had already, or expected soon, to be forced to find alternative accommodation. Notably, 5% (of 983 respondents) were already, or expected to be soon, experiencing homelessness as a result of the crisis, with 24% unsure if they may face this. If this 5% is indicative of the whole Australian research student cohort, potentially over 3,300 doctoral candidates may face homelessness in the coming months.

### Impact to candidature

Many respondents indicated they may be forced to disengage with their studies due to the impacts of the pandemic. Disengagement ranges from blocks of extended leave, through suspension of studies, to

complete withdrawal from candidature (Fig. 3). Actual or potential disengagement from candidature as a result of the pandemic was indicated by 45% of all 1,020 Sydney respondents. The extent of expected disengagement was similar among science-based and arts-based students. It is important to remember that most students do not move directly from active enrolment to withdrawal; when students take suspension of studies or leave of absence, not all return and some end up ultimately withdrawing. Perhaps the most telling figure is that only 18% (of 899 respondents) agreed with the statement “I do not believe that the COVID crisis will have any impact on my candidature”.

## Discussion

### The quiet crisis.

In most research endeavours, generation of new knowledge and technologies are frequently dependent on inexpensive, yet highly-skilled contributions from doctoral candidates. An Australian national think-tank noted that PhD students are frequently a source of “unpaid or lowly-paid research-labour” (Norton et al. 2018). Studies show that research students often feel compelled to undertake unpaid or low-paid work outside of their core research (Cressey 2012), to improve their chances of gaining increasingly rare academic positions (Beasy et al. 2019). The result of systematically facilitating financially precarious behaviour results in a contribution of free or inexpensive labour to the research community. In times of pandemic induced austerity measures, cost-efficient approaches to producing research outcomes such as utilising doctoral candidates for skilled work, may be more frequently employed by organisations struggling to survive deep economic impacts. We have unfortunately become normalised to doctoral candidates often living on minimal incomes, thus it is unsurprising that the additional impacts of the pandemic have resulted in the PhD crisis falling below the radar.

To live in a state of precarity is to be vulnerable to widespread disruptions. When students’ concerns around financial stability shift toward expectations of financial hardship, it should be seen as warning. Every year, doctoral students around the world disengage from research candidature for a wide range of reasons. Our findings suggest the level of disengagement, and the short time-frame this disengagement is expected to occur in, are a signal that something deeper and systemic is happening (Fig. 4).

The 2019 Nature PhD survey (Lauchlan 2019) reported financial related statements in two of the top five concerns of doctoral candidates. The 2017 Universities Australia findings (Universities Australia 2018) indicated just over half of research students find finances to often be *a source of worry*. The 2020 Sydney COVID impact data shows three in four students expect to experience *financial hardship* as a result of the pandemic. Comparing these findings suggests that the intervention of the COVID-19 crisis has increased the number of students suffering severe financial anxieties.

The consequence of so many doctoral candidates expecting to experience financial hardship is a potentially higher than usual impact on candidature progress. The Australian Department of Education, Skills and Training (DEST 2020) reported that from 2010 to 2014, 20.2% of research students had

dropped out or disengaged during the standard 4 year duration. Our findings suggest a much higher disengagement rate during the next six months (Figure 4). If 45% of doctoral candidates at one of Australia's leading universities do disengage within the coming months, it is possible that many will not return. We cannot know the real impact for another four years, thus the findings presented here should be taken as a warning not a prediction.

## What will be the long reach of the PhD crisis?

Here we have provided evidence of the doctoral candidate experience of the pandemic. Our findings indicate that the crisis has exacerbated the financial precarity of doctoral candidates, with many now feeling they must abandon research. We may be witnessing the beginning of a wider systemic disruption to the research workforce that drives our knowledge-based economies. It seems prudent to consider the current experience of doctoral students, and the long-term implications of allowing the current impacts to students to go unchecked. If we do nothing, the potential disruption to research capacity may weaken our societal, public health, and economic recovery. Governments, universities, learned societies, and industry need to produce coherent strategies to address the PhD crisis before it diminishes our research capacity.

## Declarations

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### Contributions

Johnson, R.L. was the lead author and provided analysis and project direction. Coleman, R.A. provided expert advice and editing. Batten, N.H., Hallsworth, D., and Spencer, E.E. provided analysis, comments, and editing.

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### **Competing interests**

The authors declare no competing interests.

### **Ethics**

The pre-existing dataset was accessed by the authors in non-identifiable form. Therefore, the data were not considered personal information and are not subject to New South Wales state privacy legislation or the Australian Federal Privacy Act 1988. Nevertheless, a waiver of consent to use the dataset was sought from the University of Sydney's Ethics Committee and granted under project number 2020/397. To ensure original survey participants could opt-out of any subsequently published findings, the authors ran a short survey which was advertised through various University wide channels. No participants from the original survey selected to opt-out.

### **Availability of data and material**

The dataset analysed for this paper is available on the University of Sydney Data Repository at <http://doi.org/10.25910/5ed06563d9d79>

Open comments have not been included in the public dataset to ensure privacy. Correspondence and requests for de-identified open comment data should be addressed to Rebecca Johnson via email at [Rebecca.johnson@sydney.edu.au](mailto:Rebecca.johnson@sydney.edu.au)

### **Code availability**

Not applicable.

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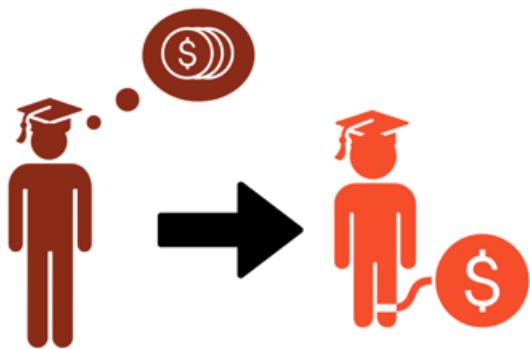
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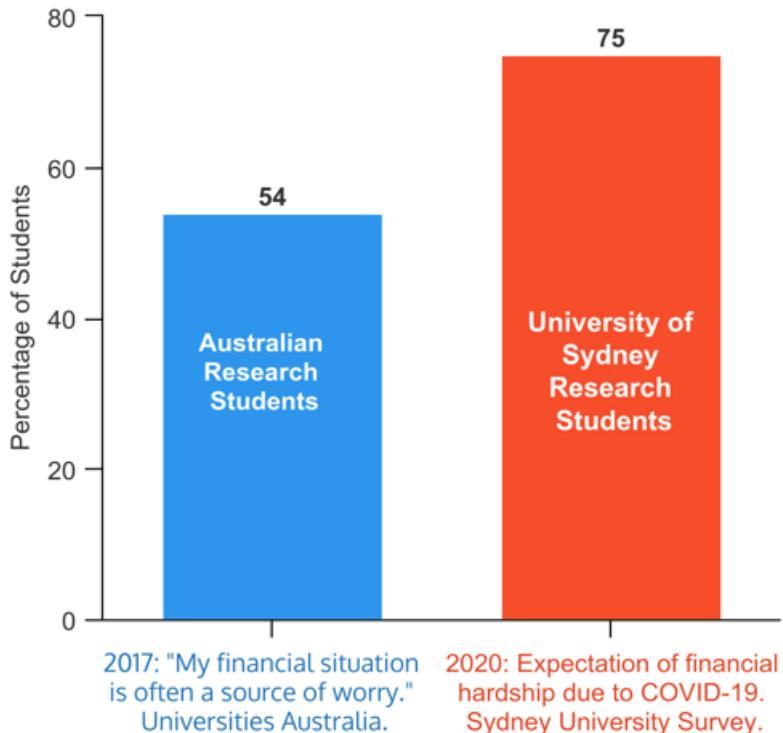
## Figures



## Changing Financial Concerns



21% increase from "worry" to "hardship"



**Fig.1 | Comparison of Australian research students attitudes to their finances prior to and during the COVID-19 pandemic.**

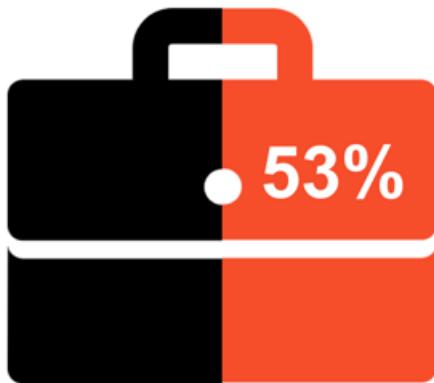
The 2017 study was conducted nationally by Universities Australia<sup>1</sup>. The 2020 data were collected by doctoral students at the University of Sydney in April 2020. It is important to note the questions were not the same; the 2017 question asked about finances being a "source of worry", whereas the 2020 survey asked about expectations of financial hardship. A 21% increase on the total Australian research student cohort at 2018 enrolments represents over an additional ~ 14,000 research students. The comparison suggests that in Australia, the intervention of the pandemic may push a large number of doctoral candidates into experiencing financial hardships.

## Figure 1

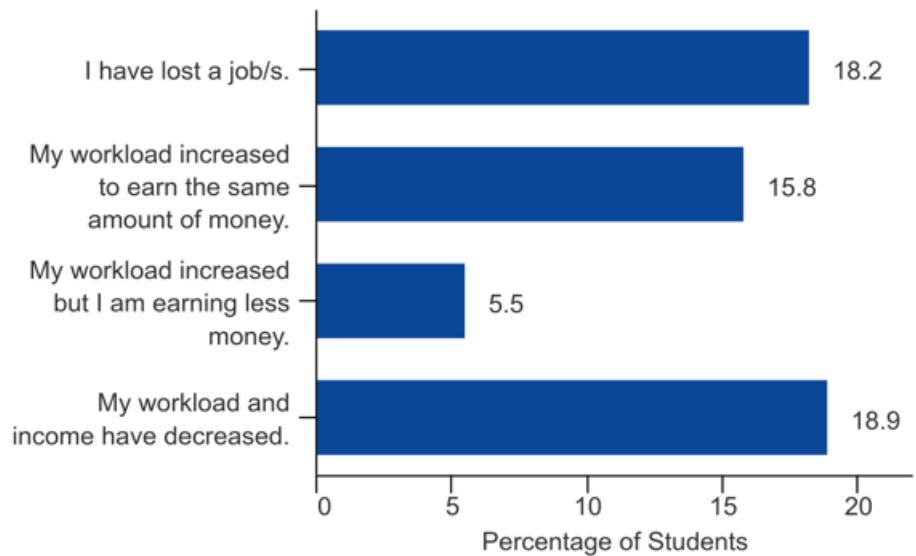
Comparison of Australian research students' attitudes to their finances prior to and during the COVID-19 pandemic.



## Negative Employment Impacts due to COVID-19



Of 1020 respondents to the University of Sydney survey indicated the COVID-19 crisis has had some negative impact on their employment.



**Fig. 2 | Negative impacts on employment arrangements of research students at the University of Sydney as a result of the COVID-19 pandemic.**

Employment is defined as income other than scholarships, bursaries, or stipends. Only impacts indicated by over 5% of respondents are shown in the bar graph. Respondents could select multiple choices. Where workload increased to earn the same amount of money this was generally shown by other results to be due to research students working as teachers and undertaking unpaid work to move coursework units online in response to travel bans and social distancing restrictions.

## Figure 2

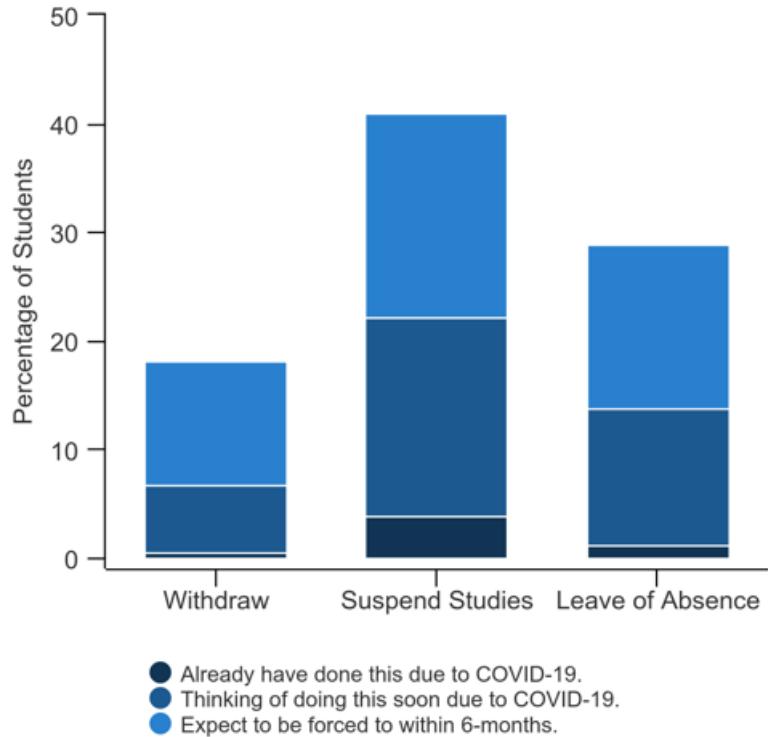
Negative impacts on employment arrangements of research students at the University of Sydney as a result of the COVID-19 pandemic.



## Disengagement due to COVID-19



Have already, or expect to within six months, be forced to disengage their research studies as a result of the COVID-19 crisis.

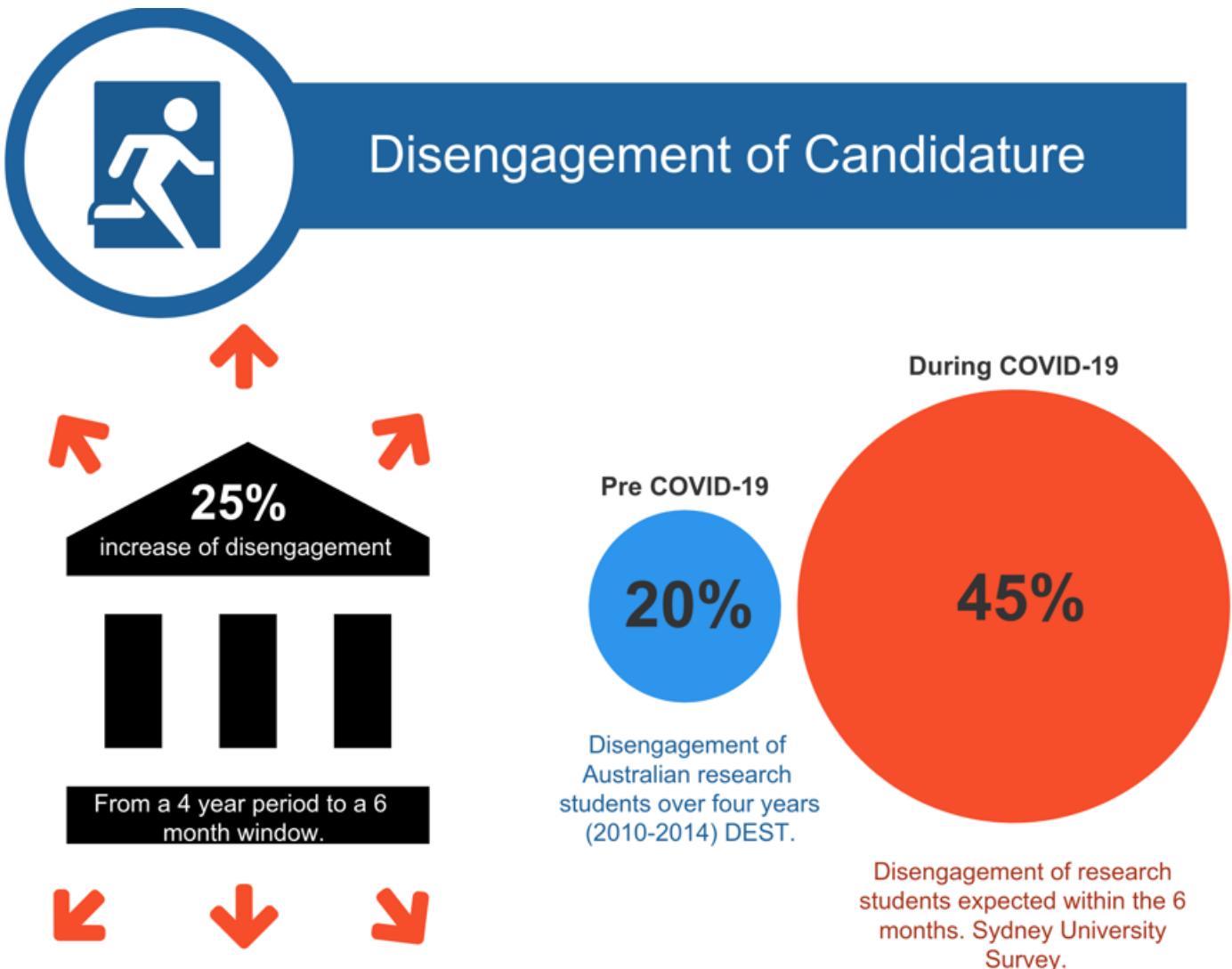


**Fig.3 | Disengagement with candidature as a result of the COVID-19 pandemic.**

Of the 1020 respondents from the University of Sydney, 45% indicated they expect to be forced to disengage from research work due to the pandemic. Respondents were able to indicate in each category of: withdraw, suspend, and take leave of absence. A suspension of studies at the University of Sydney is for a minimum of one research period (2-4 months), during which any stipends cease and disengaged domestic students may be eligible for government welfare. Emergency COVID-19 welfare payments in Australia in April 2020 were higher than the income of most scholarships calculated on a weekly basis.

### Figure 3

Disengagement with candidature as a result of the COVID-19 pandemic.



**Fig.4 | A comparison of disengagement of candidature from research degrees from Australian national figures and the University of Sydney.**

Pre COVID-19 disengagement numbers of research students are from the Australian Department of Education, Skills and Training (DEST). Disengagement includes students who have re-enrolled, but dropped out, or never came back after the first year. In both the 2017 DEST and 2020 Sydney University results there was no significant difference between science and arts based disciplines. The doctoral degree in Australia is typically four-years in length for a full time student, thus a disruption may not be accurately observed for four years after the event. Additionally, the DEST results are confirmed enrolment numbers, whereas the Sydney results are the expected outcomes of impact from the COVID-19 crisis. Nevertheless, this potential canary in the coal mine warns that over 16,000 doctoral candidates in Australia may be forced to exit the research community.

## Figure 4

Comparison of disengagement of candidature from research degrees from Australian national figures and the University of Sydney.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [TheSydneyCOVID19impactdatasurveyinstrument.pdf](#)
- [TheSydneyCOVID19impactdataanonymisedopencommentsremoved.xlsx](#)