

Obstacles to success – doctoral student attrition in South Africa

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The article explores doctoral attrition in South Africa, investigating and comparing the attributions of attrition of doctoral students and PhD programme leaders. The article is based on secondary data analysis of two large studies on doctoral education in South Africa. The main point of the article is that the different understandings of the students and the PhD programme leaders, as well as the gaps in the narratives of both groups, are an indication of a lack of in-depth understanding of the actual causes of doctoral attrition. Using attribution theory, the article suggests that this lack of understanding may contribute to further attrition and calls for further research on the topic.

Keywords: Doctoral student attrition, attribution theory, doctoral education, South Africa

Introduction

One of the burning issues in higher education in South Africa is the rate of student attrition (Letseka & Maile, 2008). It is estimated that “a student drop-out rate of 20% implies that about 1.3 billion in government subsidies is spent each year on students who do not complete their study programme ... moreover, the cost to those who drop out, in terms of the moral and psychological damage associated with ‘failure’ is incalculable” (Department of Education [DoE], 2001, Section 2.1.3). Despite the scale of the problem, South African research knowledge on retention and attrition, especially at postgraduate level, is scarce (Koen, 2007).

Doctoral students’ attrition is a complex issue, involving feelings of loss, waste, failure and guilt. The causes of doctoral attrition are multifaceted and not fully understood. While students tend to attribute them to the institution, faculty members tend to attribute them to the students (Gardner, 2009b; Lovitts, 2001). Attribution theory (Weiner, 2010) is concerned with how individuals interpret events and how this relates to their thinking, motivation and achievement. Gardner (2009b), using attribution theory, proposes that erroneous attributions of the causes of attrition can increase the number of students who leave the programme. The aim of this article is therefore to explore the causes to which doctoral students and PhD programme leaders attribute attrition in South Africa, based on the supposition that the attributions they make for the students’ success or failures can significantly affect their attrition rate.

The attributions are explored by analysing and comparing the views of doctoral students and PhD programme leaders on the causes of doctoral student attrition and what they perceive to be the main obstacles to the completion of a degree. This is based on the argument that the factors which spur attrition in some students may also be viewed as obstacles for those who persist (Golde, 2005). The article utilises attribution theory as a theoretical lens with which to examine these views.

The article begins with an overview of the literature on doctoral students’ attrition, followed by a short outline of the theoretical framework, that is, attribution theory. It continues with a section on methodology, followed by the findings. The article concludes with a discussion on the implications of the findings for policy and practice.

Research on doctoral attrition

In recent years, doctoral attrition has become a growing policy concern and research topic worldwide. Research in the USA indicates that the attrition rate is more than 50% across disciplines, that women drop out at a higher rate than do men, that under-represented students have higher attrition rates across

disciplines, and that students leave humanities and social-science programmes at a higher rate than those in the natural sciences (Council of Graduate Schools 2008; Golde 2005; Nettles & Millet, 2006). An Australian study maintains that local students have lower completion rates than international students (Neumann & Rodwell, 2009).

There are consequences and costs to doctoral attrition. Governments, universities and faculties have invested time and resources in those students who left. There are costs to society in terms of the loss of the knowledge and talent of non-completers and there are costs to the non-completers themselves. These can be financial and professional, including a loss of opportunities elsewhere, but also personal, with a loss of self-esteem or a feeling of failure (Allan & Dory, 2001; Gardner, 2009a; Golde, 2005; Lovitts, 2001).

There are multiple reasons why students leave doctoral programme. There could be personal factors, such as time constraints, financial constraints, family responsibilities, lack of a support system, and the effects on relationships (or lack of) with significant others. Physical and psychological stresses, which are the consequence of trying to balance the normal stresses of personal lives and relationships with the demands of a doctoral programme, are major causes for doctoral attrition (Smith, Maroney, Nelson, Able & Able 2006). Allan and Dory (2001) identified a number of psychological factors as barriers to completion; these included a lack of self-efficacy and self-esteem, frustration, a lack of persistence and commitment, an inability to work independently and execute a significant research project, and a lack of capabilities, especially a lack of focus in choosing a dissertation topic, and poor time management. In a similar fashion, Kearns, Gardiner and Marshall (2008) speak of self-sabotaging, or self-handicapping behaviours, such as over-commitment, procrastination, perfectionism, or choosing performance-debilitating circumstances.

Gardner (2008) adds that attrition is high among students who feel that they do not “fit the mould” of a graduate student. These are often under-represented students, or those who differ with regard to gender, race, age, enrolment (part-time), and familial status from the traditional mode of a graduate student who has persisted in many fields, that is, anyone who is not a young, white male.

Golde (2005) suggests that some students leave doctoral education because of a mismatch between their goals, expectations and strengths and the norms and practices of the discipline and the department. She maintains that some students are unaware of what it is like to be a doctoral student, while others leave because they do not fit in with the preferred ways of being a lifelong member of the discipline, as portrayed by those in the department. The scarcity of desirable academic jobs also contributes to attrition. A further frequently cited reason for attrition is a change in career goals, with students leaving their programmes to take jobs (Allan & Dory, 2001).

In a groundbreaking study, Lovitts (2001) argued that the emphasis on students’ failure diverts attention from organisational factors which may contribute to attrition, that is, factors related to the institution, department or the discipline. She highlighted the importance of the students’ social and academic integration to completion. Attrition is lower in highly structured disciplines, such as life sciences, which often require students and faculty members to work in teams. In contrast, the highest attrition rates are in the humanities, where study and research are often individualised and isolated. The role of the disciplinary context in the retention or attrition of graduate students is explained by the socialisation theory, the process by which a newcomer is integrated into a community (Ehrenberg, Jakubson, Jeffrey, So & Price, 2007; Gardner, 2008; Gardner, 2010; Golde, 2005; Lovitts, 2001; Lovitts & Nelson, 2000; Nettles & Millet, 2006; Tinto, 1993).

Other studies also point to organisational factors that act as barriers to completion, including poor working relationships or personality conflicts with supervisors, limited availability of supervisory capacity at the department, supervisors who are too busy to take on doctoral students or are uninterested in student topics or problems, a lack of flexibility in the doctoral programme, and insufficient training (or, in some cases, a lack of any training at all) on how to conduct research or write a dissertation (Allan & Dory, 2001). A lack of financial support for doctoral students has always been cited as a major barrier to completion (Allan & Dory, 2001; Haynes, 2008).

There are no comprehensive studies exploring doctoral attrition in South Africa. Portnoi (2009a) explores the barriers to developing academics in South Africa. Drawing on a study of a small sample

of students, she suggests that the lack of a systematic induction into postgraduate studies, feelings of solitude, a lack of a supportive community, and the students' experience of "flying solo" are among the reasons for attrition of doctoral students. These conditions, in particular, negatively affect students from under-represented groups. The latter are mostly first-generation students, who are unable to exercise their cultural and social capital in pursuing postgraduate studies, and often do not have role models or others with whom they feel comfortable speaking about their experiences. Portnoi (2009b) further identified funding, feelings of inferiority among black South Africans as a psychological legacy of apartheid, and covert institutional racism as demotivating factors which could cause them to abandon their doctoral studies or affect their decision to pursue an academic career.

In Portnoi studies (2009a, 2009b), students attribute attrition mostly to organisational factors or external causes. According to attribution theory, if other students believed that they had the same attributes, they would leave the programme as well. Thus, the first step in combating doctoral student attrition is to explore how students and faculty members understand attrition. However, before we proceed, the next section will present attribution theory as the theoretical framework.

Attribution theory as a lens to explain doctoral attrition

Attributions are the causal explanations people give to events that happen to and around them. Weiner (2010) identifies three conceptual dimensions along which particular attributions can be analysed. These are stability, locus of causality, and controllability.

The stability dimension refers to whether causes change over time (stable – skills and abilities; unstable – efforts). Locus of causality refers to whether the attributions are internal (skills, abilities and efforts) or external (task difficulty and luck). Controllability refers to whether the cause or the event is perceived to be within the control of the person (efforts) or not (luck, other actions). Therefore, according to this conceptual framework, skills or ability are stable, internal and uncontrollable, while effort is unstable, internal and controllable.

Lovitts (2001) and Gardner (2009b) used attribution theory as the lens through which to examine student and faculty beliefs and understandings about doctoral student attrition. On the basis of the attribution theory, Lovitts (2001) found that students often believe that they are the only ones experiencing problems; thus, they attribute their difficulties to their own inadequacies and not to the structure of the situation. Most supervisors in Lovitts' study shared the view that the students themselves were responsible for their own attrition. Gardner (2009b) adds that doctoral candidates often relate the causes of attrition to attributions made by others, particularly other students. If the candidates believe they are removed from such an attributed set of behaviours or conditions, they often believe that the outcome (i.e., attrition) will not happen to them, and vice versa. For example, many students in Gardner's study talked about marriage and children as a reason for doctoral attrition. If a student understands this attribution through the existing cultural narrative in their programme, it may encourage another student to leave when he or she gets married or has a baby.

Gardner (2009b) points to the discrepancy in the views of PhD students and supervisors with regard to the reasons for attrition. In her study, academics were unaware of specific reasons for the departure of students from their programmes and most determinedly did not attribute any reasons for attrition to the department. On the other hand, students often attributed the causes of their attrition to the academics, the department and the institution. Lovitts (2001) explains the discrepancy by referring to the actor-observer model of attribution theory. The observers (academics) tend to focus on the actors' (students') disposition, while the actors (students) tend to focus on the context. This leads to the fundamental attribution error (Lovitts, 2001:24), whereby observers tend to overestimate the role of actors' dispositions and underestimate the situational causes of their actions.

Research methodology

The article is based on a secondary analysis of data from two national studies on doctoral education in [South Africa](#).¹ One set of data comes from a qualitative study that explored the experiences of PhD

programme leaders in educating and preparing doctoral students (Herman, 2009). The sample comprised 16 leaders of reputable PhD programmes at nine South African universities, representing a range of disciplines – including engineering, agriculture, medicine, biological sciences, chemistry, physics, health, business, education and law – as well as interdisciplinary and professional fields. The sample was chosen from DST-NRF Centres of Excellence, recipients of National Science and Technology Forum (NSTF) awards specifically commended for graduating doctoral students, and Research Chairs with exemplary doctoral graduate track records. The interviews were conducted between February and June 2009. They were transcribed verbatim, and analysed using AtlasTi.

Data on students' views come from a large survey that explored the experiences of PhD students in higher education institutions in South Africa. The web-based survey included 950 PhD students, enrolled in the top 12 PhD-producing universities in 2009 (Herman & Yu, 2009). This article mainly focuses on two items from the survey that dealt with students' views of the obstacles to the completion of their PhD. The first item (Item 52 in the questionnaire – Appendix 1), owing to technical error, was answered by only four top PhD-awarding universities, and included 438 entries. In this item, students were asked to rate, on a four-point Likert scale, 12 different possible obstacles to on-time completion. The responses were recorded in two categories (“not at all” or “not much”, and “a great deal” or “to a large extent”), and analysed using IBM SPSS Statistics 19. Chi-square tests were used to identify whether there were significant associations between the various variables. The second item was open to all participants in the survey. The students were allowed to add another obstacle if they chose to do so (Item 53 – Appendix 1). There were 336 entries for this item. The responses were analysed qualitatively.

Findings

Attributions by PhD programme leaders

The analysis of the interviews with the 16 PhD programme leaders highlighted six main attributions for the attrition of doctoral students: (1) students' personal reasons; (2) students' lack of ability, skills or motivation to do a PhD; (3) students' lack of financial support; (4) poor supervision; (5) inflexible policy; and (6) faulty equipment.

Among the personal attributions were family issues, child-bearing, health and HIV/AIDS. It is understandable that some drop-out rate is unavoidable in any programme which spans three to five years, mostly because “*life intrudes into the PhD*” (PhD programme leader in the humanities). Students may realise that a doctorate is not for them; some are not prepared for the intensity of the programme, while others lack the commitment to persist.

I think life is the biggest obstacle actually. The one other thing is that we introduced the programme where we would induct students into an academic career; they all said that they wanted an academic career when they started. But one of the reasons why the others did not complete is that they decided at some point that academia was not for them (PhD programme leader in math education).

Sometimes the decision to leave academia has to do with the negative image of an academic career:

The main reason to get a PhD in Humanities is to become an academic, and academia looks less and less attractive. Students see what is going in the university, they experience low levels of morale in the institution at large ... they experience high levels of conflict and high workloads – a job that people are saying openly is less rewarding than it used to be (PhD programme leader in the humanities).

It is perceived that academia is especially unattractive for black South Africans:

There is a sense in many black South Africans asking: ‘Why a PhD?’ ... Many other African students come to do a Ph.D, they really want it, but most of our students have to be convinced that a PhD is something worth doing. It does not seem to have a value. People would point to you and say that you have a PhD, but you are still poor. Maybe this has got to do with our legacy for black people that education is to going to free us from poverty. If it doesn't, what is the purpose? ... People are not

attracted to academia, so they think why should they do a PhD? (PhD programme leader in math education).

Racism and an institutional culture that alienated black students were also viewed as external attributions to attrition. Furthermore, students' lack of skills or abilities was considered to be a major attribution for attrition:

Not every student is capable of doing a PhD, and that should be really emblazoned in red letters on the top of any letter. I have seen among our own students, once they have started on this process of university, that everything becomes inevitable. But that truly isn't the case, I hope everybody understands that. A PhD student is somebody with a special set of qualities, not just intellectual qualities, which is why there is a substantial drop-out rate (PhD programme leader in chemistry).

It is perceived that South African students, especially black South Africans, lack the foundational skills necessary to pursue a PhD. In particular, students are struggling with language and academic writing. While some PhD programme leaders blame this on selection criteria, the blame was often laid on the external context, that is, the schooling system in South Africa:

I think it is our schooling system. Compared with our own students, students from other African countries have a better background when they come here. We find that, right through, they have a better statistical training, they have a better understanding... somehow there is just something lacking; our students have more to catch up than students from elsewhere in Africa ... And there is no excuse for it because some of our students from Malawi, who have schools under trees, have a better understanding than students from some of our schools (PhD programme leader in agriculture).

Related to the notion of "student lacking" is the perception among PhD programme leaders that students are often not aware beforehand of the financial, emotional and intellectual commitment required to complete a doctorate. Given the duration of PhD studies, a change of lifestyle is required. The students need to negotiate a space in their family for their academic work. This is a major barrier, given the fact that doctoral students in South Africa tend to be mature students, the majority of whom study part-time, while supporting themselves or their families (Herman & Yu, 2009).

The PhD programme leaders attribute funding as an external cause for attrition. They maintain that bursaries are too low, and that the National Research Foundation's (NRF) typical three-year allowance is not enough for a PhD. Even when the NRF bursary is supplemented with more generous grants from industry or university funds, it provides limited income if the PhD student has a family to support.

The lack of financial support results in some students' premature entry into the job market. Companies and government departments that lure promising black students into jobs in order to fill their equity quotas encourage this type of attrition. At the same time, black families pressurise students to earn a decent salary:

If you are the first person in your family to go to college, and then to tackle a PhD, and you are in a family that is very poor, there is going to be enormous pressure on you to take a short-cut. And if you are lucky enough to finish college and get a job, some of the biggest obstacles are not just funding, but poverty and economic pressures (PhD programme leader in customary law).

Another external attribution is the higher education system in South Africa, which recognises only one type of doctorate, that is, a doctorate that serves the academic career with the research dissertation at the centre of each PhD programme (DoE, 2007). Doctoral students, on the other hand, pursue the qualification for other purposes, such as to serve industry or to further their careers, and are not prepared for the academic rigour and theoretical requirements of the traditional PhD programme (Herman, forthcoming). These conflicting agendas, coupled with the inflexibility of some programmes and their failure to cater for the diversity of the students' needs, are perceived as increasing attrition.

A number of PhD programme leaders attributed students' attrition to supervisors' overload, the quality of the supervisors, and the supervisory relationship. It is perceived that not enough is being done to ensure that inexperienced supervisors, such as recent PhD graduates, or unsuitable supervisors, such as those without PhDs, are not supervising doctoral students. The following quotation sums it up:

I've seen students drop out because of an irreversible breakdown of the relationship with a supervisor. Not common, but it happens. Sometimes it's the student's fault and sometimes it's the supervisor's fault. And there are still examples of bad supervisions around, everywhere, not just in this country. And I suppose a limited number drop out because of a semi-supervisor issue, not a personality issue, but the project is poorly designed or proved to be unworkable or something, and basically they give up (PhD programme leader in biotechnology).

Other obstacles to completion are attributed to the lack of equipment for scientific experiment or to general poor facilities:

Those computers don't work all the time. The whole question of networks, they are unpredictable. Even the computers, we don't use the university computers for our number crunching, we purchase our own computers that are dedicated towards that. But one little thing gets out of order, then the whole system is down (PhD programme leader in physical and material science).

Attributions by doctoral students

Students considered personal, yet external obstacles, such as academic challenges, financial constraints and family or work commitments, as more limiting than institutional obstacles, such as supervision, access to facilities and interaction with academics or other PhD students (Table 1). No gender differences were observed, except in the association between causes for attrition and collegial atmosphere/communication with others ($\chi^2(1)=4.381$, $p=0.036$). This association was mainly due to the fact that substantially more female students than males considered interaction with other academics as an obstacle to completion.

Table 1 Main obstacles to on-time completion

Obstacles	Not at all or not much	A great deal or to a very large extent
Academic challenges (n=426)	53%	47%
Financial problems (n=432)	57%	43%
Work commitments (n=401)	61%	39%
Family obligations (427)	62%	38%
Communication with academics (n=399)	78%	22%
Quality of supervision (n=401)	80%	20%
Limited access to facilities (n=438)	82%	18%
Administrative support (n=403)	82%	18%
Interaction with PhD students (n=406)	83%	17%
Language difficulties (n=426)	89%	11%
Health challenge (n=405)	91%	9%

The quantitative findings were supplemented by the students' comments, reporting other obstacles that they had to on-time completion of their doctoral studies. In most cases, the responses repeated or amplified the students' answers to the quantitative data, while some students suggested additional obstacles. The responses were categorised into six main groups:

- Work commitments
- Academic challenges
- Problems with access to facilities and resources

- Financial/funding problems
- Issues with supervision
- The South African context

In the section that follows the quantitative data are triangulated with the qualitative data to provide a more holistic picture of students' attributions of attrition.

Work commitment

Conflicts over time, as well as over energy, were the biggest attributes for late or non-completion. For those who worked full-time while studying part-time, it was easier when the PhD topic was related to their work. Students struggled to balance work, study and family. Yet, when choices had to be made, the PhD studies often took last place:

My family is my first priority, then my job and only then my studies. The first two consume most of my time.

Another common problem was the constant interruption of studies and the difficulty of re-starting after being involved in other things. This often meant repeating work already done and moving backwards instead of progressing.

One of South Africa's challenges has been to increase the supervisory capacity, that is, academic staff with doctoral degrees which, in 2007, averaged 30% (CREST, 2009). To this end, many academics have been pressurised to upgrade their qualification. Indeed, 44% of the participants in the survey were already working in academia when they embarked on their PhD studies (Herman & Yu, 2009). However, the comments indicate that working in academia while studying was demanding:

Working in an academic environment with full-time teaching and learning responsibilities makes completing a PhD in the expected time virtually IMPOSSIBLE! (Emphasis in original).

The Chi-Square test suggests that work commitment has significant associations to students' race ($\chi^2(4)=20.681$, $p<001$); age ($\chi^2(6)=95.122$, $p<001$); marital status ($\chi^2(2)=32.700$, $p<001$); children ($\chi^2(1)=17.809$, $p<001$); field of study ($\chi^2(13)=50.924$, $p<001$); nationality ($\chi^2(3)=33.052$, $p<001$); and the nature of studies, that is, part-time or full-time ($\chi^2(3)=175.452$, $p<001$). A comparison of the observed counts with the expected frequencies revealed that more mature students or married students with children considered work commitments an obstacle to on-time completion, than did young or single students. More South African students, as well as more part-time students with full-time employment, considered work commitment an obstacle to completion than did international students or those with part-time employment. Furthermore, more students in education, psychology, economic and management studies, religion and chemical sciences than those in other fields of study regarded work commitments as an obstacle to completion. Indeed, students in these professional fields are usually mature students, often professionals, working full-time or part-time while pursuing their PhD studies

Family responsibilities

In their comments, very few students referred to their family responsibilities. They usually noted the pressure of balancing family life with work and study, especially when dealing with the unexpected, such as sickness, death, divorce or loss of income. The quantitative data showed that family obligation had significant associations with a student's age ($\chi^2(6)=75.507$, $p<001$); marital status ($\chi^2(3)=60.923$, $p<001$); children ($\chi^2(1)=52.484$, $p<001$); field of study ($\chi^2(13)=32.436$, $p=0.002$); nationality ($\chi^2(3)=11.692$, $p=0.009$); and the nature of his or her studies ($\chi^2(3)=70.273$, $p<001$). A comparison of the observed counts with the expected frequencies revealed

that more mature, married students or students with children than young, single students or those with no children viewed family obligation as an obstacle to completion. This also applied to students with full-time employment in comparison with those with part-time employment. Furthermore, substantially more South African students than international students considered family obligation to be an obstacle to completion. It was also evident that more students in education, psychology, economic and management studies, religion and health sciences than students in other fields considered family obligation to be an obstacle to completion. Again, this can be explained by the typical profile of the students, who tend to be working professionals, in these disciplines.

Financial/funding problems

Four main themes emerged from an analysis of the students' attribution of funding as a cause for attrition:

1. A lack of adequate funding. This increases students' doubts as to whether they have made the right choice in pursuing a PhD, especially when they have families to support:

It's better to just go and work after Masters. At least then there will be food on the table for our families, rather than doing a PhD.

Another respondent echoes this:

We are at a stage in our lives when many of our peers who chose to work are buying houses and cars, while those of us who chose to continue with our studies are constantly anxious about our funding and the fact that we continue to be a financial burden on our parents. This anxiety will continue for those who stay in academia, as post-doctoral funding is equally precarious ... many people who have the potential cannot afford to pursue an academic career, aside from the difficulties of raising a family and saving for retirement.

2. The perception that there is discrimination in the funding criteria. This is a particular concern for mature students, white students and international students, as the following quotes demonstrate:

I am 50 years old, with a career of 15 years ahead. Chances are good that I will spend them in academia with productive research. YET there is NO NRF funding for novice researchers of my age. I find it demoralising and inhibiting.

Only black students receive bursaries.

Not so many bursaries are available for postgraduate international students ... Yet the research that we do is applicable to South Africa and benefits the same country that denies funding to international students.

3. A lack of transparency in the selection process and in the distribution of funds. Sometimes the requirement for a certain procedure does not seem logical, as one respondent observes:

If a student starts the PhD immediately after his master's, there is very little time to write proposals for funding before completion of the master's, let alone to have a full understanding of what their chosen PhD study will encompass.

There are also reported differences in the level of funding between universities. For example, one respondent wished that his university "will provide financial support that is more or less equivalent to what other universities ... are offering".

4. The hidden costs of doing a PhD, such as travelling and accommodation, are not covered. This is particularly applicable to international students and those who register with universities outside their areas:

[I am concerned about] the cost of travelling to the university, which is 700 km away, and paying for guesthouse accommodation within walking distance of university.

I stay and work in Windhoek, Namibia. Financial resources are not always available to travel to Pretoria for consultations and access to relevant materials.

The Chi-Square test indicates that financial problems have significant associations with race ($\chi^2(4)=23.238$, $p<0.001$); this is due to the fact that more African students and fewer white students than expected considered financial problems an obstacle to completion. Financial problems are also associated with age ($\chi^2(6)=15.381$, $p=0.017$) and parents' education ($\chi^2(3)=9.038$, $p=0.029$). Financial problems impact the age group 30-40 more than the other age groups. It also appears as if more students from homes where at least one parent had a postgraduate qualification considered financial problems an obstacle to completion, than did students from homes where neither of the parents had schooling. This may be related to the level of subsidy available to students from disadvantaged backgrounds. However, this finding contradicts the association between race and financial problems, and needs to be investigated further.

Academic challenges

For some students, pursuing a PhD, especially after a hiatus of 10 years or more, was a great challenge. A repeated complaint was a lack of research skills or training and the difficulties of conducting the research due to a lack of access to equipment and expertise. For some students, personal motivation or psychological factors, such as procrastination and perfectionism, were perceived as obstacles to completion.

The Chi-Square test indicates that academic challenges have a significant association with race ($\chi^2(4)=18.405$, $p=0.001$). A comparison of the observed counts with the expected frequencies revealed that fewer African students than expected and more white students than expected regarded academic challenges to be an obstacle to completion. Interestingly, the PhD programme leaders spoke about academic challenges almost exclusively with regard to African students. It is possible that the PhD programme leaders' focus on black students emanates from the pressure on universities to increase racial equity at doctoral level.

A significant association was also found between fields of study and academic challenges ($\chi^2(13)=24.654$, $p=0.026$) as an obstacle for completion. This association is due to the fact that more students in the humanities, social sciences and health sciences considered academic challenges to be an obstacle to completion than students in other disciplines. This may be explained by the low level of integration of doctoral students into disciplines where the focus is on individual work, rather than on team collaboration, and needs to be investigated further.

Facilities and resources

Students' attributions to attrition include inaccessible facilities and resources, such as faulty equipment and unavailability of library materials or publications, internet time, computer, working space and telephones.

These obstacles were clearly of more concern to the students who did not live on campus. The problems often seemed to be compounded by a lack of funding. At the institutional level, a lack of funding for facilities seems to have prevented certain universities or departments from buying or repairing equipment, books and journals, or from employing technical support personnel. At the personal level, insufficient funding seems to have contributed to some students' inability to afford laptops, to make use of libraries, purchase materials or access the internet.

Many problems in this category seem to be external and beyond the control of the individual students:

- Constant renovations and the constant breaking down of instruments.
- Lack of equipment available in South Africa for certain analyses. Equipment may be totally unavailable at some institutions. If available elsewhere in South Africa, it is difficult to obtain funding to commute to other institutions.

These problems were more applicable to certain fields, especially the natural sciences.

Supervision

While only 20% of the participants in the survey attributed attrition to supervision, many comments referred to the topic. Students argued that a lack of communication with and limited access to the supervisors attributed to their attrition. They observed that their supervisors seemed to be overloaded with teaching or with the number of students they supervised. Quite a number of students claimed that the time it took to get feedback from supervisors had severely delayed their progress. It was perceived that the unavailability of the supervisors exacerbated the students' feelings of loneliness, especially when there was little interaction with peers or other academics:

I experienced a total lack of structured supervision, i.e. setting of definite targets and intervention when a given strategy did not work. This caused a situation where the alternatives were sinking or learning to swim on your own.

In some cases, students related a lack of attention or interest to insensitivity to cultural differences:

Most supervisors are not African in their philosophical grounding and they know (or want to know) very little about the culture and languages of the majority of their charges.

Students attributed their obstacles to their supervisors' lack of capacity. They commented on a mismatch between the expertise and interest of their supervisors and their research topics (an administrative issue), and that "*supervisors have little idea about scope and completion of projects. And some even supervise work in areas in which they are not knowledgeable*". Supervisors' computer literacy was also mentioned by some students as having caused unnecessary delays.

The apprenticeship supervisory model, based on an individualised and personal relationship between the supervisor and the PhD student, is the dominant supervisory model in South Africa (Herman, 2009). Some students attributed their obstacles to completion to the inflexibility of this model:

Halfway through my Ph.D, my supervisor changed jobs and went to another university. I had to stay behind in a department with no support or expertise in my project.

If your supervisor has a problem with others you cannot even consult them on any academic-related issues. I missed collaborative work in South Africa.

It appears I am the only one doing a PhD under my supervisor and as such, I am often in suspense as to the way forward. Things would be much easier if there were other students I could speak with.

A number of students lamented the absence of a community when pursuing their doctoral studies:

I had expected some sort of academic community and exchange of ideas among faculty and doctoral students. The majority of the faculty are completely uninterested in my research or who I am.

I feel isolation (probably due to the nature of my topic and the lack of expertise in the field in South Africa) which makes the research journey lonely, and the lack of interest in my work by the department.

The South African context

Students attributed some of the barriers to the achievement of the award to practical problems, among them the high level of crime in South Africa and their experience of traumatic events, such as murders, burglaries at home, or hijacks ("*I left my data in the car*"), theft of computers and other equipment, leading to a loss of research time:

Security concerns in campus. Several murders have occurred on campus during my stay, as well as muggings and other forms of physical attacks on students. This has led to a general fear of walking at night.

Because of security reasons, sometimes working late in our lab is not possible.

Lastly, international students spoke about being homesick, their difficulty in communicating with home, red tape in pursuing a visa or study permit, and xenophobic experiences:

Having had my first PhD at Columbia University, New York City, I can authoritatively say that South African society and government do not treat foreign students from poor African countries very well.

Some problems that happen, like xenophobia, are affecting non-South African nationals, making people in a position of permanent fear. This can lead to days of not much commitment to work: need more safety.

Summary and conclusion

The doctoral students' and the PhD programme leaders' attributions to doctoral attrition are partly consistent and partly differ from one another. Comparing the responses brings forth some pertinent issues:

First, the need to secure sufficient funding while pursuing doctoral studies is well documented in the research literature (Nettles & Millet, 2006). It has been experienced by doctoral students in South Africa, and is acknowledged by the PhD programme leaders in this study. It is also accepted that attrition is part and parcel of doctoral education, as students change directions, goals or personal circumstances.

Second, both students and PhD programme leaders consider personal problems as a major obstacle to completion. However, there were various understandings of the nature of these problems. The PhD programme leaders attributed attrition to the students' disposition, their internal, stable and uncontrollable traits. The dominant narrative evolved around the students' lack of capacity to do a PhD, a lack of basic skills, a lack of fit between the students and academia, and a lack of recognition of the value of the PhD. The strong emphasis on "student lacking" echoes Gardner's (2009a) findings in the US context. The students, on the other hand, perceived their academic shortcomings as deriving from insufficient training at postgraduate level. This is an external, controllable and transient attribute.

Third, it seems that the PhD programme leaders were not fully aware of the practical obstacles, besides appropriate funding, that stood in the way of the students. The struggle to balance work, family life and study was extremely taxing for the typical South African student with family commitments. In addition, a lack of resources and access to facilities, distance from the universities, as well as crime and xenophobia in South Africa, were considered by the students as important attributions of attrition. The fact that the PhD programme leaders hardly discussed these issues indicates the distance between them and the students.

Fourth, both students and PhD programme leaders attributed attrition to poor supervision. The programme leaders focused on novice supervisors' lack of preparedness for the task and highlighted examples of poor supervision. The students added dissatisfaction with feedback, overdue feedback, supervisors who were neither interested nor supportive, a general lack of expertise in certain fields in South Africa, a lack of access to and a lack of communication with supervisors.

Lastly, it is interesting to note the gaps and the silences in both narratives. It seems that the department, the discipline or the institution play a very small role in the students' or the PhD programme leaders' attributions of attrition. This resonates with Koen's (2007) observation that the scarce South African literature on attrition overstresses external factors, such as the historical system of apartheid (students are perceived to be poorly prepared for university study by a dysfunctional school system), socio-economic conditions at home (financial constraints lead to poor student throughput and withdrawal), and insufficient financing of universities by government (resulting in high student-staff ratios, leading to withdrawal of master's students because of a lack of contact with staff and poor thesis supervision).

Without underestimating these factors, Koen argues that there is not enough understanding of the internal factors, those related to socialisation or the integration of the students into the academic milieu, and that this emphasis on external factors exonerates institutions from blame for student failure.

The PhD programme leaders' narrative exhibits the fundamental attribution error (Lovitts, 2001), according to which they, as the observers, highlight the nature of the actors, that is, the students, and undervalue the situational causes for attrition. The students, on the other hand, seem to point to the external attributions. These were, however, mostly in the personal realm. The role of the department or of the institution in promoting retention or increasing attrition was less important.

According to attribution theory, if students feel that they have the attributions that cause attrition, they may feel that they have these problems and, consequently, will leave the PhD programme. Likewise, if PhD programme leaders believe that students who have these attributions may fail or leave the programme, they may inadvertently pass along these understandings both among themselves and to their students; thus, contributing to a higher rate of attrition (Gardner, 2009b). The discrepancy between the doctoral students' and the PhD programme leaders' attributions of attrition in this study, as well as the gaps in the narratives, indicate a poor understanding of the reasons for attrition. Consistent with attribution theory, these misunderstandings could spur further attrition.

Doctoral students are "silent leavers, departing without saying good-bye" (Nettles & Millet, 2006:125). Research knowledge on the actual causes of attrition and the obstacles to completion in South Africa is inadequate. In order to reduce doctoral attrition in South Africa, a better understanding of the actual causes of doctoral attrition is necessary. Research must be conducted in the different departments and institutions in order to inform the students and those working closely with them on the obstacles to completion in each specific programme or department. This study is limited, as it is based on secondary data and does not include in-depth interviews with students, especially the non-completers. Further research is needed to demystify the "invisible problem" (Lovitts, 2001:1) and to gain an in-depth knowledge of the actual causes of student attrition in South Africa, how these relate to the context and the various disciplines, and which causes may be prevented. The findings from such research should be discussed in order to inform and change students' and faculty members' attribution of attrition. Viewed through the lens of attribution theory, South African universities can begin to decrease attrition with a growing understanding of its causes.

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(Endnotes)

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