A difference in priorities?
Why US and international students consider leaving doctoral programs

Casey E. George
University of Louisville, Louisville, Kentucky, USA

Evthokia Stephanie Saclarides
University of Alabama, Tuscaloosa, Alabama, USA, and

Sarah Theule Lubienski
School of Education, Indiana University Bloomington, Bloomington, Indiana, USA

Abstract

Purpose – This study aims to focus on survey reports of doctoral students’ experiences in the USA, providing a look at factors influencing “in the moment” decisions students make about persistence. Specifically, the authors investigate the reasons doctoral students consider leaving their programs, and how these reasons may differ for international and domestic students. The authors also examine international–domestic patterns by sex and by program of study.

Design/methodology/approach – As part of a campus-wide doctoral program assessment, doctoral students and recent graduates at a large, public, Research I institution in the Midwest region of the USA are asked to complete a program satisfaction survey. Content analysis of open-ended survey responses is the basis of the analysis. Next, a code by committee approach is used whereby two members of the research team coded all open-ended responses and discussed discrepancies to reach consensus on all codes assigned, and to reduce individual biases. Each open-ended response is assigned at least one of 16 codes, with more than one code used as necessary.

Findings – The results suggest that, although both academic and social factors are important influences of doctoral departure in general, academic concerns – specifically, alignment with goals, career preparation and program structure – may be particularly important for international students, whereas social aspects – faculty relationships and program climate – may be more important for domestic US students.

Research limitations/implications – Researchers should consider conducting larger, multi-institutional studies in the USA, which would reflect a diversity of perspectives and experiences within the American context. Parallel studies of doctoral programs in other countries may be useful in identifying whether similar factors are found for international and domestic students attending those programs. Follow-up interviews could be used to further delve into and understand the emergent patterns from the surveys. The findings of such future studies have the power to inform programs and policies designed to increase the retention of both domestic and international doctoral students.

Practical implications – Given that faculty/advising is one of the most important factors cited by both domestic and international students, our findings suggest that US faculty members may need to give more attention to nurturing supportive relationships with their advisees. Furthermore, American university administrators might consider changing tenure requirements and reward systems for professors to place more emphasis on cultivating positive relationships with advisees, publishing, presenting and writing grants.

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with advisees, and providing high-quality mentoring for doctoral students. Doctoral-granting institutions should consider implementing regular program reviews that include surveys from doctoral students to help programs identify and meet their students' needs.

**Originality/value** – Likewise, while other research on international students’ doctoral experiences has been conducted, such as the relationship with their faculty advisor (Kim, 2007; Rice et al., 2009), single studies that focus on factors affecting the attrition of domestic versus that of international students' remain limited. The purpose of this study is to address the following research questions: What factors contribute to doctoral students' considerations of departure in the USA? How might these factors differ between domestic and international students? We seek to expand understandings of doctoral attrition by using larger-scale qualitative data to address limitations of existing studies that focus on the experiences of only a few students.

**Keywords** International students, Retention, Graduate education, Attrition, Doctoral students

**Paper type** Research paper

**Introduction**

Graduate student attrition in the USA continues to be a significant concern as one out of every two doctoral students will not complete his or her degree – a concern that has persisted for decades (Cassuto, 2013; Lovitts, 2001). Recent trends also indicate that the international student population in the USA more than doubled between the 1999 and 2000 and 2016 and 2017 academic years (Institute of International Education, 2017). International students are integral to US higher education as they enrich the learning experiences of their peers by providing an important international perspective, elevating the reputation of their departments through their contributions to cutting-edge research, fostering overseas research collaborations and helping attract and retain faculty (Anderson, 2013; Trice, 2003). Furthermore, many international students who complete their doctorates in the USA remain in the country, entering the workforce and contributing to the economy. In fact, approximately two-thirds of international doctoral recipients who earned degrees in science and engineering fields between 2001 and 2011 remained in the USA for work purposes (Finn, 2014). Despite the increasing enrollment of international students and the financial, academic and cultural benefits they bring, this population continues to be underserved and invisible on American campuses (Mori, 2000). Little is known about the factors that may contribute to their decision to remain in or leave their programs of study.

International doctoral students may consider departure for different reasons than their domestic counterparts as they encounter academic, social and psychological adjustment challenges that do not necessarily affect domestic students. Academic challenges may include difficulties with reading, writing, lecture comprehension and class participation due to some international students’ limited English proficiency or lack of confidence in their English abilities (Ku et al., 2008; Le and Gardner, 2010; Poyrazli and Grahame, 2007; Zhai, 2002). Social and psychological challenges may include feelings of homesickness, isolation and powerlessness as international students struggle to cope, make new friends and develop a support system in a new country (Moores and Popadiuk, 2011; Phelps, 2016; Poyrazli and Grahame, 2007; Poyrazli and Lopez, 2007). These particular challenges faced by international students may have short- or long-term implications for their doctoral program persistence, and might cause them to consider leaving their programs for different reasons than their domestic peers.

This study focuses on survey reports of doctoral students' experiences in the USA, providing a look at factors influencing decisions students make about persistence. Specifically, we investigate the reasons doctoral students consider leaving their programs, and how these reasons may differ for international and domestic students.
Literature review

This study sits at the intersection of literature on general factors influencing doctoral student departure and factors specifically influencing international student departure. Most prior studies of doctoral departure in the USA have involved qualitative examinations of small samples and ignored distinctions between international and domestic students. Still, it is worth noting what these prior studies have found, which is that students leave their doctoral programs primarily due to program-based and/or personal factors.

Program-based factors

Program-based factors influencing doctoral departure include advising, program involvement, academics, finances and career options. More specifically, problematic student–advisor relationships and ineffective advising contribute to departure (Bagaka et al., 2015; Golde, 2000; Greene, 2015; Kim, 2007; Proctor and Truscott, 2012; Rice et al., 2009). The extent to which a student feels integrated in his or her department may also influence departure (Herzig, 2004). Academic factors contributing to departure include problems with teaching quality, program structure, socialization to the profession and discipline and dissertation completion (Bagaka et al., 2015; Gardner, 2010; Spaulding and Rockinson-Szapkiw, 2012). It is important to note that socialization experiences and associated outcomes are found to differ not only by the student’s field of study or discipline (Lott et al., 2009), but also by students’ demographic backgrounds (Gardner, 2008). In addition, the type and amount of financial support and perceptions of future employability and career earnings may contribute to departure (Ampaw and Jaeger, 2012; Greene, 2015; Herzig, 2004; Kim and Otts, 2010; Rockinson-Szapkiw et al., 2014).

Personal factors

Personal factors contributing to doctoral departure include issues related to family responsibilities, life style preferences (students do not want the life of a graduate student or faculty member) and difficulty cultivating relationships with peers (Greene, 2015; Herzig, 2004; Litzler et al., 2005; Rockinson-Szapkiw et al., 2014). Social isolation, which can occur at multiple stages of doctoral study, is also a major reason for attrition (Ali and Kohun, 2007; Terrell et al., 2009).

Intersecting factors

A number of factors of doctoral persistence intersect programmatic and personal aspects, including the congruence of students’ own expectations of the program with what the program actually offers students (Hoskins and Goldberg, 2005). A disconnect between students’ occupational goals and how well programs prepared students for their desired careers can also lead to attrition (Golde and Dore, 2001; Proctor and Truscott, 2012). Financial aid, often based on students’ own resources, is another factor that stands at the nexus of programmatic and personal factors.

These studies pointing to program-based and personal factors do not, however, distinguish between domestic and international students. For instance, Bøgelund and de Graaff (2015) conducted a qualitative study of 14 international students studying science and engineering at a university in Denmark, pointing to the challenge of international students being socialized to a new country as a personal factor that may compound reasons for students’ departures, but they did not compare those findings to reasons for domestic students’ departure. Likewise, while other research on international students’ doctoral experiences has been conducted, such as the relationship with their faculty advisor (Kim,
studies that compare factors affecting the attrition of domestic versus international students remain limited. The purpose of this study is to address the following research questions:

\textit{RQ1.} What factors contribute to doctoral students’ considerations of departure within a large, US university?

\textit{RQ2.} How might these factors differ between domestic and international students?

We seek to expand the understandings of doctoral attrition by using larger-scale qualitative data to address limitations of existing studies that focus on the experiences of only a few students. We anticipate that factors influencing student attrition, regardless of citizenship status, may not be adequately captured by the main theory of doctoral persistence (Tinto, 1993). Tinto’s model (described in the next section) has not been empirically tested and is over two decades old.

\textbf{Theoretical framework}

The only existing longitudinal model of doctoral persistence was developed by Tinto (1993), and it suggests that doctoral students progress through several stages (Figure 1).

Tinto’s model of doctoral persistence grew out of his better-known model of undergraduate persistence. While Tinto’s model of undergraduate persistence is well known, cited and critiqued, he cautioned that it is more difficult to develop a singular framework of doctoral persistence because of the unique attributes of various fields of study at the graduate level. Merriweather Hunn (2008) critiqued Tinto’s (1993) undergraduate model in positing that issues of racism and otherness are not adequately incorporated into the framework – a critique that can also be applied to the doctoral model. One major commonality between the undergraduate and doctoral models is that they both incorporate the academic and social systems that define students’ educational experiences and shape students’ integration into their department, college and/or university. Tinto (1993) acknowledged that these two systems are linked, and when students feel less integrated into the academic and social systems of their department and/or program, they are more likely to depart.

Tinto’s doctoral model has two main limitations. First, compared to the extensive research on the undergraduate model of persistence, little work has been done that uses and/or critiques Tinto’s doctoral model of persistence. Second, advancements in doctoral education may render the model outdated in some ways. For instance, Tinto’s model suggests that doctoral students primarily encounter research opportunities only after they have achieved candidacy. Presently, many doctoral students have early research experiences prior to passing comprehensive examinations (Fuhrmann et al., 2011).

Despite these limitations, the model still points to factors that may be important in shaping doctoral students’ persistence. Although our study does not follow the staged aspect of the model, it does examine which factors are more or less prevalent for both domestic and international doctoral students at a large public research institution.

\textbf{Method}

\textit{Data collection}

As part of a campus-wide doctoral program assessment, current doctoral students and recent graduates at a large, public, Research I institution in the Midwest region of the USA were asked to complete a survey about their doctoral program experiences. This university contains one of the largest international student populations of any US institution, representing 46 per cent of its doctoral enrollment. In the spring of 2013, this survey was
Figure 1. Tinto's longitudinal model of doctoral persistence.
sent electronically to approximately 5,000 doctoral students across more than 90 doctoral programs, and 2,070 students responded. Of these 2,070 survey respondents \((n = 2,070)\), 45 per cent were international students (defined as non-US citizens) and 55 per cent were domestic students (defined as US citizens), thereby closely mirroring the population of doctoral students at this university.

The idea of departure was probed as students were asked whether they ever considered leaving their program of study. Of those who answered this question, \((n = 1,992)\), 76 per cent of international students said they had not considered leaving as compared to 70 per cent of domestic students. While these percentages are high, it is still important to look at the 26 per cent of respondents (545 students) who indicated they had considered leaving to better understand potential reasons students may leave their programs. Of these 545 students, 454 of them (83 per cent) provided a written explanation describing why (this was 75 per cent of the international students and 89 per cent of the domestic students who answered “yes” to whether they had considered leaving). Hence, a greater percentage of domestic students explained their thoughts about leaving their doctoral programs as compared to their peers.

As summarized in Table I, the final analytic sample of 454 students contained a slightly higher percentage of domestic women (45 per cent) than international women (37 per cent). By program group, the highest percentage of all students was found in engineering and physical sciences (36 per cent), but observable differences were found in terms of the program domestic and international students enrolled in. A higher percentage of domestic students than international students pursued degrees in applied health sciences and social sciences (23 per cent versus 18 per cent) and humanities and creative arts (17.8 per cent versus 10 per cent). Conversely, a higher percentage of international students were enrolled in engineering and physical sciences (44 per cent versus 31 per cent). Approximately 40 per cent of domestic and international respondents were relatively early in their program – before the dissertation stage, 30 per cent had successfully defended their dissertation proposal and the final 30 per cent completed the survey one to two years following graduation.

**Data analysis**

Content analysis of open-ended survey responses was the basis of analysis. As part of an earlier mixed-methods study that used the data set but did not focus on international

<table>
<thead>
<tr>
<th>Background attributes</th>
<th>All students ((n = 454))</th>
<th>Domestic students ((n = 296))</th>
<th>International students ((n = 158))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>263 (57.9%)</td>
<td>163 (55.1%)</td>
<td>100 (63.3%)</td>
</tr>
<tr>
<td>Female</td>
<td>191 (42.1%)</td>
<td>133 (44.9%)</td>
<td>58 (36.7%)</td>
</tr>
<tr>
<td><strong>Program group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied health and social sciences</td>
<td>95 (20.9%)</td>
<td>67 (22.6%)</td>
<td>28 (17.7%)</td>
</tr>
<tr>
<td>Natural and biological sciences</td>
<td>57 (12.5%)</td>
<td>36 (12.1%)</td>
<td>21 (13.3%)</td>
</tr>
<tr>
<td>Engineering and physical sciences</td>
<td>162 (35.6%)</td>
<td>93 (31.3%)</td>
<td>69 (43.7%)</td>
</tr>
<tr>
<td>Humanities and creative arts</td>
<td>69 (15.2%)</td>
<td>53 (17.8%)</td>
<td>16 (10.1%)</td>
</tr>
<tr>
<td>Education and professional programs</td>
<td>71 (15.2%)</td>
<td>47 (15.9%)</td>
<td>24 (15.2%)</td>
</tr>
<tr>
<td><strong>Survey participation in relation to doctoral studies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before the dissertation stage</td>
<td>192 (42.3%)</td>
<td>126 (42.6%)</td>
<td>66 (41.8%)</td>
</tr>
<tr>
<td>Following dissertation proposal</td>
<td>124 (27.3%)</td>
<td>77 (26.0%)</td>
<td>47 (29.7%)</td>
</tr>
<tr>
<td>1-2 years after graduation</td>
<td>138 (30.4%)</td>
<td>93 (31.4%)</td>
<td>45 (28.5%)</td>
</tr>
</tbody>
</table>

**Table I.** Background information of survey respondents, by domestic and international student status.
students, the research team conducted an exploratory factor analysis of the quantitative survey data to identify clusters of items that correlated with each other and that related to students' program satisfaction (Ruud et al., 2016). These initial categories were sufficiency of financial support, quality of advising, collegiality, career preparation and knowledge of requirements. As we conducted comprehensive coding of the open-ended items, focusing on reasons for considering departure, we used these five categories as initial codes. We then inductively added other codes to capture additional reasons suggested through repetition. We met several times to discuss, develop and refine the codes until a final set of 16 was identified. A summary of the 16 codes are found in Table II, along with sample student responses that were assigned each code. While Tinto’s model influenced our thinking about the reasons for departure that this study might uncover, we felt it was important to capture the themes most important to international and domestic students in this data set, as opposed to being constrained by the specifics in Tinto's model during data collection and analysis.

After establishing the 16 codes, a code by committee approach was used whereby two members of the research team coded all open-ended responses and discussed discrepancies to reach consensus on all codes assigned as well as to reduce individual biases (Saldaña, 2015). Each open-ended response was assigned at least one of the 16 codes, with more than one code used as necessary. Finally, the prevalence of the coded responses was compared between domestic and international students. To accurately capture students’ expressions, each quote is inserted unedited and the word “sic” is not used to highlight errors.

Results
We start by describing overall trends for all students in the sample and then compare results for domestic and international students.

<table>
<thead>
<tr>
<th>Code</th>
<th>Sample open-ended response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty/Advising</td>
<td>Poor advising from my advisor led to a lot of wasted time and effort</td>
</tr>
<tr>
<td>Mismatch of interests and goals</td>
<td>It does not have faculty in the field that I am mainly interested in</td>
</tr>
<tr>
<td>Collegiality/Climate</td>
<td>An environment of seclusion is prominent. I did not know majority of the grad students there</td>
</tr>
<tr>
<td>Career preparation</td>
<td>I felt that my plan for my career was not being served appropriately</td>
</tr>
<tr>
<td>Program structure</td>
<td>Too many course requirements, few credits can be transferred for credit towards PhD</td>
</tr>
<tr>
<td>Finances</td>
<td>I do not understand why there is so few funding opportunities for a TA ship</td>
</tr>
<tr>
<td>Administrative issues</td>
<td>Constant battles with inefficient administrative practices</td>
</tr>
<tr>
<td>Other</td>
<td>Taking very long time to complete</td>
</tr>
<tr>
<td>Personal reasons</td>
<td>Family considerations</td>
</tr>
<tr>
<td>Prestige/Ranking of institution</td>
<td>To join another university that has a higher rank (at that time) in my area</td>
</tr>
<tr>
<td>Advisor/Faculty are leaving</td>
<td>Advisor was transferring to another institution</td>
</tr>
<tr>
<td>Understanding formal/informal requirements</td>
<td>Requirements seemed too many, unclear</td>
</tr>
<tr>
<td>Discrimination and/or representation</td>
<td>A majority of younger students ostracize older students</td>
</tr>
<tr>
<td>Geography</td>
<td>The town itself is not ideal for me</td>
</tr>
<tr>
<td>“Is it worth it?” “Is it for me?”</td>
<td>Not sure if the degree worth the time and effort</td>
</tr>
<tr>
<td>Tired/Stressed</td>
<td>Once I was very stressful in the program</td>
</tr>
</tbody>
</table>

Table II.
Codes and sample responses
Overall trends
In the full analytic sample of 454 students who explained why they considered departure, faculty/advising (30 per cent) and mismatch of interests and/or goals (21 per cent) were the two reasons most often cited for both domestic and international students (Table III). In the following sections, we provide several illustrations of these reasons, using quotations from the survey responses.

Faculty/advising. Two themes emerged as students described concerns about their advisor or faculty:

1. the nature of the relationship with their advisor or faculty; and
2. the quality of guidance provided.

Nature of the relationship. Some students described troubling relationships with advisors or faculty. In describing his relationship with his advisor, one domestic student likened it to the relationship between a servant and master:

"The level of service to the academic advisor was equivalent to an indentured servant. I feel that PhD students should not have to do construction or move furniture in their advisors’ homes in order to succeed." An international student had a similar experience, describing how he felt like a laborer:

I wanted to change my advisor at one point in time, but I was not allowed to and instead I was told that since u have received RA funding for the last two semester you cannot change your advisor. I was made to feel like a bonded labor. I strongly want to register my adverse remarks on the professionalism of the faculty members of the department. I hope some action would be taken in this regard.

<table>
<thead>
<tr>
<th>All students (n = 454)</th>
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<th>International students (n = 158)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty/Advising (30%)</td>
<td>Faculty/Advising (34%)</td>
<td>Mismatch of interests and/or goals (22%)</td>
</tr>
<tr>
<td>Mismatch of interests and/or goals (21%)</td>
<td>Mismatch of interests and/or goals (21%)</td>
<td>Faculty/Advising (22%)</td>
</tr>
<tr>
<td>Collegiality/Climate (15%)</td>
<td>Collegiality/Climate (19%)</td>
<td>Career preparation (16%)</td>
</tr>
<tr>
<td>Career preparation (14%)</td>
<td>Administrative issues (14%)</td>
<td>Program structure (15%)</td>
</tr>
<tr>
<td>Program structure (14%)</td>
<td>Program structure (14%)</td>
<td>Finances (13%)</td>
</tr>
<tr>
<td>Finances (13%)</td>
<td>Finances (13%)</td>
<td>Other (8%)</td>
</tr>
<tr>
<td>Administrative issues (12%)</td>
<td>Other (8%)</td>
<td>Collegiality/Climate (7%)</td>
</tr>
<tr>
<td>Other (8%)</td>
<td>Advisor/Faculty are leaving (5%)</td>
<td>Administrative issues (6%)</td>
</tr>
<tr>
<td>Personal reasons (6%)</td>
<td>Personal reasons (6%)</td>
<td>Prestige/Ranking of institution (6%)</td>
</tr>
<tr>
<td>Advisor/Faculty are leaving (5%)</td>
<td>Prestige/Ranking of institution (5%)</td>
<td>Advisor/Faculty are leaving (4%)</td>
</tr>
<tr>
<td>Prestige/Ranking of institution (6%)</td>
<td>Understanding formal/informal requirements (5%)</td>
<td>Geography (3%)</td>
</tr>
<tr>
<td>Understanding formal/informal requirements (3%)</td>
<td>Understanding formal/informal requirements (4%)</td>
<td>Discrimination and/or representation (2%)</td>
</tr>
<tr>
<td>Discrimination and/or representation (3%)</td>
<td>Discrimination and/or representation (4%)</td>
<td>“Is it worth it?” “Is it for me?” (1%)</td>
</tr>
<tr>
<td>Geography (2%)</td>
<td>Geography (2%)</td>
<td>Tired/Stressed (1%)</td>
</tr>
<tr>
<td>“Is it worth it?” “Is it for me?” (2%)</td>
<td>“Is it worth it?” “Is it for me?” (2%)</td>
<td>Understanding formal/informal requirements (2%)</td>
</tr>
<tr>
<td>Tired/Stressed (1%)</td>
<td>Tired/Stressed (1%)</td>
<td>&quot;Is it worth it?&quot; &quot;Is it for me?&quot; (1%)</td>
</tr>
</tbody>
</table>

Table III. Reasons for considering departure, by citizenship status.

Doctoral programs
One domestic respondent expressed great confusion about the relationship with her advisor. She described how she was “constantly berated and praised causing me to not know what was going on”.

Quality of advising. Other students focused more on the academic advising received from faculty. One international respondent described spending two years in the program without receiving any feedback:

I ended up wasting two years in my career without any research and have not received any feedback or advice on the project. I had to research my own topic without any guidance and without any help. I feel miserable at times to have ended up in such a situation.

Another domestic student described specific frustrations in her attempts to communicate with faculty when help was needed: “Faculty are often unresponsive (e.g. ignoring emails, not showing up to meetings, not providing needed feedback to move forward) which can be very frustrating considering the issue of timeline”.

Mismatch of interests and/or goals. Three themes emerged within this code, and each is described below.

Mismatch of research interests with faculty and peers. Some students said they considered leaving their program because their research interests did not align with those of their advisor and/or the faculty. One international student described his program as follows: “It doesn’t have faculty in the field that I am mainly interested in.” Similarly, one domestic student said, “Too few faculty in my area of focus,” and another international explained, “There will only be one professor whose research interest is same as mine because my advisor will be retired by the end of this semester.” Finally, one international respondent explained that a mismatch of interests had previously made him consider departure, but finding a better fit helped:

[I] Lost interest in the research in my former advisor’s group. Now I don’t want to leave the program anymore because I’m interested in my new research with my new advisor.

In addition, some students contemplated departure because of the lack of peers who had similar research interests. One domestic student said:

My interests were interdisciplinary and there was no other student of similar interests within the department, so I considered leaving the department to find peers with whom to learn and interact. I soon found students in other departments and at other universities that fulfilled that supportive role and showed me I didn’t need to leave.

Mismatch of research interests with course offerings. Some students cited a mismatch between their research interests and the courses offered. One domestic respondent wrote, “The department lacked courses to help me develop some of the quantitative skills I was most interested in using in my research.” A different international student wrote, “The course work required does not tally up with research interest.” Another domestic respondent shared:

My research has shifted focus during my studies creating a need for more coursework in other areas [. . .]. Additionally, many of the courses in my program are not relevant to what I am going to do, so my choices in major are limited.

Mismatch between career goals and program focus. Some students indicated that the program was not going to lead to the type of career they desired. One international respondent had second thoughts about his PhD program, saying that he had “thoughts that an MBA would be more appropriate for my career goals.” Another international student felt her program was not adequately preparing her to obtain a position in academia:
I strongly believe now that the program I am in prepares me to do research in a governmental laboratory, and not become a university professor. As I approach the end, I realize that I am not prepared to enter the job market for tenure-track positions. Thus, my sadness that my dream cannot be achieved, at least not at the level I have planned.

In contrast, another domestic respondent considered leaving his program because of its focus on preparing students for faculty positions:

I feel at times as though I would more like to teach the more I am in grad school, yet there is very little support here to help a student in the PhD program line up a help to become a professor at a non-R1 or industry institution.

Comparison of international and domestic students

Although faculty/advising and mismatch of interests and/or goals were the most prevalent reasons for considering departure among both domestic and international students, faculty/advising was substantially more prevalent for domestic (34 per cent) than international students (22 per cent), whereas mismatch of interests and/or goals was slightly more prevalent for international (22 per cent) than domestic students (21 per cent). While these two categories were discussed in some detail above, the differences in the prevalence of several other categories among domestic and international students merit further attention.

Collegiality and climate. In addition to faculty/advising, collegiality/climate was more important for domestic (19 per cent) than for international students (7 per cent). Some students described their departments as “contentious” (domestic student), “isolating” (domestic student), “toxic” (domestic student), “unwelcoming” (domestic student), “cliquish” (domestic student) and “oppressive” (international student). One domestic student characterized faculty as “hostile, degrading faculty who looked down on students and viewed them as a burden,” whereas another domestic student said her peers were “clicky/gossipy, and at the beginning of the year, cruel rumors were spread about me.” One domestic respondent, in addition to expressing concern about recognition of RAs’ contributions to papers, described his program climate as follows:

The neglect I’m referring to is a profound absence of collegiality between graduate students and faculty. It’s expressed in a variety of ways, from major failures of communication (of which there are many), to the cliquish nature of our regular department social events. It includes rogue emails from faculty members, late at night, chastising grad students for not living up to expectations. (Some of these expectations are far from clear.)

Career preparation. After international students’ top concerns of mismatch of interests/goals and faculty/advising, career preparation (16 per cent) and program structure (15 per cent) ranked #3 and #4, but these were ranked slightly lower among domestic students. Two sub-themes emerged within career preparation. First, students considered departure if they perceived a lack of job opportunities in their field upon graduating. For example, one international student responded as follows:

I was very happy with the doctoral program, but the job market is quite competitive in our field. In comparison, there are a lot more job opportunities for Ph.D.s from the business school.

Other international students echoed this student’s sentiment regarding an absence of job opportunities: “very bad prospect to find a job,” “terrible industrial job prospects” and “too difficult to find either a faculty job or an industry job after the graduation from this doctoral program”.

Doctoral programs
Other students contemplated departure because they did not perceive they were being adequately prepared for a career in their field, which was the second emergent sub-theme. One international respondent stated, “Mode of learning seemed outdated (based on memorization and regurgitation) and not designed to help generate the skills a researcher and teacher will need.” Another international student was concerned that the “knowledge we learned is difficult to prepare us for the job market”.

**Program structure.** Students indicated concern about several aspects of their program’s structure. These aspects included program requirements (“Requirements seemed too many, unclear, not suited to my needs” [international student]), expectations (“It feels like I’m only expected to pass my classes, but I do not see how they can help me in achieving my academic goals” [international student]), opportunities (“Very little opportunity or ability to pursue interdisciplinary interests or ideas” [domestic student]) or the absence of structure (“Lack of structure in the first two years of my Ph.D” [international student]).

**Domestic and international differences by sex and program of study**

Additional analyses were conducted to determine whether the international–domestic patterns observed in the top five reasons for considering departure persisted regardless of sex (Table IV) or program area (Table V). When looking at the results by sex, faculty/advising remained the top concern among domestic males (30 per cent) and females (38 per cent), with fewer international males (20 per cent) and females (24 per cent) mentioning this concern. Mismatch of interests and/or goals was the most frequently cited concern for international females (26 per cent) and for international males (tied with faculty/advising; both at 20 per cent). Collegiality/Climate was consistently more important for domestic students than for international students, regardless of sex.

When each of the five program areas were examined more closely, we see some variation in factors cited across program areas, with some “fuzziness” in the international–domestic patterns, especially in program areas with relatively few international students (e.g. natural and biological sciences and humanities/arts, which together had only 37 international students in the sample). Still, overall, the general domestic–international patterns tended to persist across programs, particularly for collegiality/climate, which was mentioned as a factor by a higher percentage of domestic students, across all five programs. In addition, faculty/advising was the top response for domestic students across all programs, whereas international students were often at least as concerned about the mismatch with their career goals.

**Discussion**

**Summary of results**

Our results suggest that, although both academic and social factors are important influences of doctoral departure in general, academic concerns – especially alignment with goals (and

<table>
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<td>Reasons for considering departure</td>
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<td>International ($n = 100$)</td>
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<tr>
<td>Faculty/Advising</td>
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<td>Mismatch of interests and/or goals</td>
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<td>Faculty/ Advising</td>
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Table V. Top reasons for considering departure, by program group and citizenship status.
to a lesser extent, career preparation, and program structure) – are among the top concerns for international students, whereas social aspects – including faculty relationships and program climate – may be more important for domestic US students. The majority of these patterns are upheld regardless of sex or program of study.

In fact, the most prevalent factor affecting international students’ consideration of departure was mismatch of interests and/or goals, which only a few prior studies have identified as important in shaping students’ considerations of departure (Bøgelund and de Graaff, 2015; Golde and Dore, 2001; Hoskins and Goldberg, 2005). Our study provides further support of the importance of a match between the doctoral program and students’ goals, and, moreover, we find that this alignment may be particularly important for students who travel a great distance both geographically and culturally to pursue their doctorate. Our results relate to a prior study of over 1,100 students studying at the University of Helsinki that found that international students are more motivated by their career goals to pursue a doctoral program as compared to domestic students (Sakurai et al., 2017). While mismatch of interest and/or goals was mentioned less often among international students in the natural and biological sciences, they expressed concern about career preparation, which is related to their occupational goals. Still, more research is needed to determine whether these results hold for international students generally (e.g. including US students studying abroad), and how they are specific to particular populations, contexts and programs of study.

Many prior research works have pointed to poor faculty advising as a critical factor influencing doctoral departure (Greene, 2015; Herzig, 2004; Kim, 2007). While this was important for both domestic and international students in this sample, both faculty/advising and collegiality/climate tended to be a greater concern among domestic students. Perhaps, based on experiences in their previous institutions, the international students were less likely to expect warm, supportive relationships with faculty (consistent with Shilkofski and Shields’s, 2016 study of Malaysian medical students adapting to a US program), but again, more research is needed to determine whether these results generalize.

Revisiting Tinto’s model
As noted above, Tinto (1993) called for empirical testing of his model, which he based on his undergraduate model of persistence. Hence, we now turn to his model, examining how well it captures the factors reported by the 454 doctoral students in this study.

In important ways, the findings from this study help validate Tinto’s model. First, the main factors mentioned by the students in this study are generally included in some form in the model. Specifically, Tinto’s model mentions faculty relationships, career goals, collegiality and most of the other factors identified in our analysis, as shown in Table I (although different category names are often used). Conversely, all of the factors mentioned in Tinto’s model appeared to some degree in the survey responses.

Second, although the prevalence of factors differed between domestic and international students, it seems sensible to maintain a single model of doctoral persistence, given that Tinto’s factors appear relevant to both populations. Likewise, Tinto’s model does specify the department/program context in regard to both the institutional experiences and the research experiences. Given the present results and some differences identified by program of study, including this program-level context is a strength of the current model and allows for researchers to conceptualize how experiences at the program level – whether they be interactions with faculty or alignment of program offerings with students’ interests and goals – affect student experiences and potential outcomes.

Another aspect of Tinto’s model supported by our data is that it includes faculty relationships in both the academic and social spheres of doctoral study. This is consistent
with the ways in which students in this study talked about faculty relationships (as illustrated in the “nature of relationship” and “quality of advising” subcategories described above). In addition, several students discussed concerns about their advisors in ways that confirmed that their academic and social experiences were intertwined (Tinto, 1993).

**Suggested revisions to Tinto’s model**
This study suggests that students’ nationality can influence which factors are more or less important. Hence, in Tinto’s model, “student background” should include whether students are studying in their home country or abroad (see the revised model in Figure 2).

The results of this study also suggest two modifications to Tinto’s model may be warranted. First, Tinto’s original model incorporated occupational goals at the point of entry only, and focused on experiences and relationships in the program, as opposed to the content learned and how well the program prepares students for their desired career. Our findings indicate that students’ goals and expectations of career preparation should be considered throughout the doctoral program, as the alignment between students’ career goals and program offerings may fluctuate during the doctoral experience. The revised model reflects this change, moving the “goals” box from within “entry orientations” to the bottom of the diagram, where it spans Tinto’s doctoral program phases.

Second, Tinto’s model places students’ research experiences after they have achieved degree candidacy. Our data suggest that students’ research experiences are an integral part of their programs, as opposed to a final, culminating stage. In this study, students rarely talked about research as an isolated activity, but instead discussed research-related issues together with many factors, including advising (e.g. receiving respectful and timely feedback on research), mismatch with career goals (e.g. availability of faculty with compatible research interests) and coursework (e.g. availability of courses to prepare students for pursuing research). Hence, the staged progression of Tinto’s model has been revised with the inclusion of two-way arrows linking integration with both “institutional experiences” and “research experiences” and the removal of “candidacy” as the gateway through which academic and social integrations are linked with research.

**Limitations**
There are several limitations to this study. First, the sample is drawn from a single institution, and its students may have different experiences than students from other institutions. For example, the students at this university are typically well-funded (particularly given the area’s low cost of living) and this is not always the case[2]. However, the institution is fairly typical in size and rankings of large, public, US research universities, with a large percentage of international doctoral students, which makes the comparisons presented here possible. Hence, although more research is needed to determine the extent to which these results generalize, it seems likely that the challenges faced by the students surveyed from the 90+ different doctoral programs on this large campus would be shared, at least to some extent, by students at other large US universities.

A second limitation relates to the response rate. Although the survey was administered to approximately 5,000 doctoral students, only 2,070 (41 per cent) responded, and those responding might not represent the views of all domestic or international students. Still, given that students were given no incentive to respond to this online survey, the response rate is fairly typical (Nulty, 2008). A related limitation is that statistical analyses were not used to compare group differences. The use of such tests would suggest that the sample was randomly chosen from a population and that patterns could be generalized to that population, which does not fit this study’s design. Instead, basic percentages were reported,
Figure 2. Revisions to Tinto's model of doctoral departure
with patterns suggesting themes that should be studied further with larger, more representative samples.

A final limitation is that the open-ended responses obtained from the survey results did not provide the same type of in-depth feedback that might have been obtained from interviews or focus groups. However, the responses provided gave the researchers enough information to cull common themes and make comparisons as presented here. Subsequent research could use individual interviews and focus groups to gain a richer, more in-depth understanding of the phenomena.

**Implications**

While further research is needed to determine the extent to which these results generalize to other institutions, the current results illuminate struggles that international and domestic students in US doctoral programs can face, pointing to some implications for university faculty and staff, as well as for researchers.

*University faculty and staff*

Given that faculty/advising was one of the most important factors cited by both domestic and international students, our findings suggest that US faculty members may need to give more attention to nurturing supportive relationships with their advisees. Furthermore, American university administrators might consider changing tenure requirements and reward systems for professors to place more emphasis on cultivating supportive relationships with advisees, publishing, presenting and writing grants with advisees, and providing high-quality mentoring for doctoral students.

The international students in this sample voiced many concerns about a mismatch between their career interests and their doctoral program. To ensure that students make a highly informed choice about their program, US universities might consider implementing changes to help international students choose programs that align with their occupational goals. First, programs could carefully examine their marketing materials, ensuring that websites and other information provided are current and help students understand how well the program fits their career goals. Second, prior to admission, interviews with prospective doctoral students (via Skype as necessary) should be conducted to facilitate conversations about students’ career goals, research interests and how faculty and program resources can be leveraged to help students meet their goals. Although some programs already conduct such interviews, the findings from this study suggest that these conversations should occur more often. More generally, doctoral-granting institutions should consider implementing regular program reviews that include surveys from doctoral students, as this is an important means of helping programs identify and meet their students’ needs.

*Researchers*

Given the lack of prior research, this study takes a critical step toward testing the factors outlined in Tinto’s model, including how these factors may differ for domestic and international students in the USA. To address some of the limitations described above, researchers should consider conducting larger, multi-institutional studies in the USA, which would reflect a diversity of perspectives and experiences within the American context. Likewise, parallel studies of doctoral programs in other countries may be useful in identifying if similar factors are found for international and domestic students attending those programs. While survey data could allow researchers to examine the consistency of patterns across US institutions, follow-up interviews could be used to further delve into and understand the emergent patterns from the surveys. In addition, to further assess the
validity of Tinto’s (1993) staged model of doctoral student departure, including the proposed updates we offer, future studies should examine doctoral students over time as they progress through their programs. The findings of such future studies have the power to inform programs and policies designed to increase the retention of both domestic and international doctoral students.

Conclusion
This study helps us better understand the factors influencing domestic and international doctoral students’ consideration of departure at one large, US research-intensive university. While international students were particularly concerned about their program’s alignment with their goals and receiving good career preparation, domestic students were more concerned about faculty advising/relationships and program climate. Our results help us support and refine Tinto’s model, moving us beyond “merely informed speculation” (Tinto, 1993, p. 241), while also highlighting differences between two important sub-populations based on students’ citizenship. The factors identified from this study can help inform universities as they explore how to tailor their support to maximize retention of both groups, as well as researchers as they strive to better understand doctoral students’ experiences and decisions about departure.

Notes
1. Regarding the researchers’ positionality, two of the researchers had completed their PhDs, and one was a doctoral student at the time data were analyzed. All of the researchers were born and educated in the USA.
2. In addition, given this study’s focus on the 26 per cent of survey respondents who reported that they considered leaving their programs, it may seem as if students’ experiences at this university are particularly negative. However, it is important to note that the majority of respondents said that they had not considered leaving their programs.

References


**Further reading**


**Corresponding author**
Casey E. George can be contacted at: c0geor02@louisville.edu

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