Japanese doctoral students’ stress: Main findings from a national survey in 2017

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Abstract
This study is mainly concerned with an analysis of what stress Japanese doctoral students face and how universities they belong to could provide better support for them, and help them to overcome their stress. The study employs the data from a national survey of doctoral students at Japanese research universities in 2017. In addition to a general description of their overall stress, four variables of gender, discipline, age and sector of universities are used to explore their perceptions of stress. The study argues that a vast majority of Japanese doctoral students suffered from stress in various aspects. Although some findings based on the case study of Japan are not consistent with previous research such as gender differences in stress, some match with existing research in terms of disciplinary differences and age differences in stress.

Keywords
doctoral students, stress, Japan, national survey

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Introduction
With a rapid expansion of doctoral education and training worldwide, an increased attention has been paid to researching into doctoral education and training. As it is generally agreed that doctoral students’ stress has considerable impacts on their educational and training experience, productivity, and career prospects, more studies focused on doctoral students’ stress, mental health, and their well-being have also emerged (Baik et al., 2019; EUA, 2005; Evans, 2018; Hunter & Devine, 2016; Juniper et al., 2012; Lovitts & Nelson, 2000; Pain, 2017). Recently, it was reported that rates of depression and anxiety of PhD and master’s students worldwide are six times higher than those in the general public (Evans et al., 2018). However, most of earlier research were undertaken by researchers in Western countries and
English-speaking countries. Their research subjects are mostly doctoral students in Australia, North America and European countries. Despite a quick growth in the numbers of doctoral students at Japanese universities since the early 1990s, little is known about their perceptions of stress and how to cope with it. This study is mainly concerned with an analysis of what stress Japanese doctoral students face and how universities they belong to could provide better support for them, and help them to overcome their stress.

Japanese doctoral education

The most striking characteristics of Japanese doctoral education include the following aspects (Arimoto et al., 2019; Huang, 2020).

Historically speaking, as early as the late nineteenth century when Japan established the modern higher education and academic systems by learning from western countries, some doctoral course was provided modelled on the German research university ideas. Compared to the U.S. doctoral education at the time, it did not become institutionalized until the end of the World War Two when Japan introduced the patterns of the U.S. type doctoral training. According to Japan’s Ministry of Education, Culture, Sports, Science and Technology (hereafter, MEXT) (2018), in contrast to the pre-war period graduate schools were established as independent institutions in which postgraduate education was provided. Regulations governing graduate school programs were initially set by the Japanese University Accreditation Association under “Standards for Graduate Schools” in April 1949. In 1953, “Academic Degree Regulations” was issued by the Ministry of Education. The first four graduate schools were set up in March 1950 in private universities, followed by graduate schools in both national and local public universities in 1953. Because the idea of German research university has affected Japan’s higher education, including Japanese doctoral education even in the postwar period, Japan’s doctoral education is also a combination type of various foreign models (Clark, 1983).

Typically speaking, the standard length of study at a doctoral education level is three years, but it takes four years for students in medicine, dentistry, pharmacy, and health science. Addition, individual graduate schools have the authority to prolong the length of students’ study, and mature students can learn as long as eight years. Like many other countries, the basic requirement for new entrants to be recruited for a doctoral course is a master’s degree, a degree from a professional school, or a functional equivalent. Regarding the supervision of doctoral students, the impacts from both the German idea and the U.S. model on the formation of Japanese doctoral education and training have resulted in two different ways of doctoral training in Japan in terms of disciplines. For example, the faculties of humanities and social sciences, which have been more significantly affected by the German patterns, still encouraged and promoted the traditional way of ronbun hakase (dissertation based doctoral degree) for a long time. In contrast, the faculties in the fields of sciences such as science, technology, agriculture and medicine trained more doctoral-degree holders based on the U.S. model of katei hakase (course work and schooling based doctoral degree). But in general, the coursework system based on US practice has been developed more and more broadly. Meanwhile, there has been a decline in traditional patterns of doctoral training such as apprenticeship at an individual level without the provision of any systematic courses. In a large sense, team supervision is the normal way of training doctoral students.

In relation to coursework, doctoral students should learn and earn credits from basic courses in their first year, followed by courses on research methods, specific topics, and other courses which are provided by faculty members at a program level or the level of the Graduate school. Generally speaking, doctoral students have to successfully defend their
research proposal to the supervision team, pass an oral presentation in the mid-term examination, a final examination in the form of presenting their original research outcomes, and finally submit their doctoral dissertation.

By the early 1990s, the primary objective of Japan’s doctoral education is to form the academic profession mostly in universities and research institutes (Ushiogi, 1993). However, since the 1990s, the destination of their employment has come to be more diverse. For example, relevant data from national survey of doctoral degree holders suggest that, as of 2012, 60 percent of them became academics, 52.6 percent hired in universities and 7.4 percent of them in public research institutes. Otherwise, 26.1 percent of them worked in private enterprises, 7.7 percent in non-profit organizations, 3.5 percent were self-employed, 2.8 percent of them were independent and unaffiliated to any workplace; and 14 percent of them in “other” (National Institute of Science and Technology Policy (NISTEP), 2016).

Literature review

Notable research in relation to this study covers with two broad fields. One is about comprehensive studies in doctoral students’ overall stress or well-being, factors affecting their stress, and how to deal with their stress. The other is relating to analyzing more specific aspects of their stress by employing different variables. To illustrate, in terms of impacts of going to doctoral educational programs on their life, Castello’s group (Castello et al., 2017) suggests that the most frequent motives for considering dropping out were difficulties in achieving a balance between work, personal life and doctoral studies and problems with socialization. Based on 17 studies, Schmidt and Hansson’s research (2018) suggests that the study proposes a more student-centred approach to meeting doctoral students’ needs, and the enhancement of doctoral student well-being in order, as a long-term goal, to improve academics’ well-being and productivity. By reviewing literature, Mackie and Bates (2019) claim that factors contributing to doctoral students’ stress include problems in the supervisory relationship, lack of transparency of university processes, workload, role conflict, financial insecurity and uncertain career prospects. Their research proposes guidelines to address these deficiencies, based on an ecological understanding of the doctoral research setting. As for more detailed analysis of doctoral students’ stress from various perspectives, it seems that studies in gender differences in doctoral students’ stress have been increased with a rise in the number of female doctoral students (Haynes et al., 2012; Kurtz-Costes et al., 2006; Mallinckrodt et al. 1989; Schmidt & Umans, 2014; Ulku-Steiner et al., 2000). Further, Hockey’s study (1994) examines issues concerning early-stage doctoral students and their stress. Based on an online survey of all newly enrolled doctoral students at one university in New Zealand, Cornwall’s team identifies students’ experiences relate to stress during the early-stage doctoral study (Cornwall et al., 2019). In addition, more efforts have been made in exploring the correlation between doctoral students’ stress and their disciplines. For example, EI-Ghoroury et al. (2012) report the stress facing doctoral students from psychology and how they cope it. Focusing on doctoral students from Clinic psychology, Nelson’s team (Nelson et al., 2001) reports collected and analyzed 2,776 student responses to the question: What can be done to improve student wellbeing? However, as mentioned earlier, despite several studies in Japanese doctoral education in Japanese, research into doctoral education (Huang, 2019, 2020; Ushiogi, 1997; Yamamoto, 2007), research into Japanese doctoral students’ stress based on main results from a national survey is rare, let alone any prior research based on data from a national survey.
Method

With respect to target group, research subjects are doctoral students at Japanese research universities by the time when the national survey was implemented. Due to a very small number of valid responses from international doctoral students, they are excluded from this research.

As revealed in Table 1, the percentage of male in the respondents is 74.4 percent. The percentage is a little larger than the percentage of the all doctor course students in Japan (66.6%). The percentage of each discipline is as follows; the number of doctoral students in Humanities and Social sciences is 19.3 percent, Natural sciences is 39.2 percent, Engineering is 16.1 percent, and Medical sciences is 25.4 percent. The number of doctoral students in Natural sciences (39.2%) is larger and the number of those in Medical sciences (25.4%) is smaller than the percentage of the all doctor course students in Japan (8.3% and 49.9% respectively). By age, the number of doctoral students at 27 years old or younger is 54.5 percent, 28 years old or older and younger than 32 years old is 25.8 percent, and 33 years old or older is 19.7 percent. The number of those at 27 years old or younger is larger, and 33 years old or older is smaller than the percentage of all doctor course students in Japan (30.2% and 42.8% respectively). The distribution of doctoral respondents by age is unbalanced. That is, there are more numbers of doctoral students at 27 years old or younger who responded to the survey than the actual number of doctoral students at the same age group in the national statistics.

Questions about stress consist only part of the questionnaire survey. Questions about stress are asked and assessed by eight items on the questionnaire (Table 2). They include stress associated with the influence of their doctoral education on their work and life, financial situation, performance, career expectations, and role conflicts. Each of the stress items is scored with a 7-point scale. A total score was computed by adding responses to all the items. For the convenience of this research, “Not at all” and “Not very” were added and categorized as “Not true”. While “Slightly true”, “Some-what True”, “True”, “Very true”, and “Extremely true” were added as a new category “True”.

Regarding administration procedure, as part of the international project focused in doctoral education in East Asian countries and societies, the research team at the Research Institute for Higher Education of Hiroshima University in Japan implemented a national survey of doctoral students at Japanese universities with the same questionnaire as other research teams in 2017 as a part of a national survey of faculty members. In the survey, 20 universities were selected by founder or administration, type, and number of faculty. Among which, only five universities belong to research universities, including three national, one local public and one private research universities. Altogether 6,380 faculty from these universities

| Table 1. Characteristics of respondents. |
|-----------------------------------------|----------------|----------------|
|                                    | Respondents | Population     |
| Gender                               |             |                |
| Male                                 | 422 (74.4%) | 49,231 (66.6%)|
| Female                               | 145 (25.6%) | 24,678 (33.4%) |
| Disciplines                          |             |                |
| Humanities/Social Sciences           | 106 (19.3%) | 11,625 (20.0%) |
| Natural Sciences                     | 215 (39.2%) | 4,849 (8.3%)   |
| Engineering                          | 88 (16.1%)  | 12,690 (21.8%) |
| Medical Sciences                     | 139 (25.4%) | 29,085 (49.9%) |
| Age                                  |             |                |
| 27 years old or younger              | 302 (54.5%) | 4,465 (30.2%)  |
| 28–32 years old                      | 143 (25.8%) | 3,974 (26.9%)  |
| 33 years old or older                | 109 (19.7%) | 6,327 (42.8%)  |

Note: The data of all doctoral students is obtained from MEXT (2017b).
were selected randomly. In October 2017, 8,800 paper questionnaires were sent out to these faculty members. The faculty members at the five research universities were asked by the research team to assign the questionnaires to all their doctoral students without selecting them purposely. While doctoral students at 15 non-research universities were not required to answer them. 591 valid responses were received from doctoral students.

Results

Based on the use of the chi-square test to examine the differences in the scarce distributions, the study uses gender, discipline, age, and sector (national, local public and private research universities) as independent variables to analyze respondents’ answers to the questions relating to their ‘stress’.

Table 3 presents that no significant differences could be found in their answers to all the questions regarding to their ‘stress’ between the two groups. It means that no considerable gender differences could be statistically confirmed in relation to gender.

With respect to discipline, as shown in Table 4, no significant differences could be identified in their responses to most items among doctoral students from four disciplines. However, significant differences could be confirmed in their responses to “I am concerned that I may not be able to graduate on time” and “I am concerned with my career after graduation”. To the former item, the largest numbers of doctoral students from Humanities and Social sciences (81.6%) were concerned that they might not be able to graduate on time, followed by those from Medical sciences (67.4%), Natural sciences and Engineering (60.6%). To the latter item, the largest numbers of doctoral students from Natural sciences (83.8%) were concerned with their career after graduation. This is followed

Table 2. The following questions are regarding doctoral students’ ‘stress’.

| Question                                                                 | Not at all | Not very | Slightly true | Somewhat true | True | Very true | Extremely true | N/A |
|-------------------------------------------------------------------------|------------|----------|---------------|---------------|------|-----------|----------------|-----|
| 1. I feel that the doctoral program has negatively influenced my work-life balance | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 2. I am concerned with my financial situation                           | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 3. I am concerned with my English language ability                       | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 4. I feel that my work progress is lagging behind that of other students | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 5. I cannot focus on doing research in the themes of my interest          | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 6. I am concerned that I may not be able to graduate on time              | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 7. I am concerned with my career after graduation                        | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
| 8. I have too much to do aside from learning and research during doctoral program (e.g. administrative work, teaching responsibility etc.) | 1          | 2        | 3             | 4             | 5    | 6         | 7              |     |
Table 3. Doctoral students’ views of their stress by gender.

| Items                                                                 | Male     | Female    | n.s. |
|----------------------------------------------------------------------|----------|-----------|------|
| I feel that the doctoral program has negatively influenced my work-life balance | 54.0%    | 58.5%     |      |
| I am concerned with my financial situation                           | 76.3%    | 69.8%     |      |
| I am concerned with my English language ability                      | 84.8%    | 86.1%     |      |
| I feel that my work progress is lagging behind that of other students| 74.6%    | 83.9%     |      |
| I cannot focus on doing research in the themes of my interest         | 45.0%    | 47.2%     |      |
| I am concerned that I may not be able to graduate on time             | 64.4%    | 73.8%     |      |
| I am concerned with my career after graduation                       | 74.7%    | 77.3%     |      |
| I have too much to do aside from learning and research during doctoral program (e.g. administrative work, teaching responsibility etc) | 56.2%    | 52.8%     |      |

Note: n.s. stands for not statistically significant

Table 4. Doctoral students’ views of their stress by discipline.

| Items                                                                 | Humanities & Social sciences | Natural sciences | Engineering | Medical sciences | n.s. |
|----------------------------------------------------------------------|------------------------------|------------------|-------------|------------------|------|
| I feel that the doctoral program has negatively influenced my work-life balance | 49.5%                        | 57.7%            | 50.5%       | 58.6%            |      |
| I am concerned with my financial situation                           | 77.0%                        | 78.0%            | 72.7%       | 68.4%            |      |
| I am concerned with my English language ability                      | 81.4%                        | 87.1%            | 78.6%       | 88.7%            |      |
| I feel that my work progress is lagging behind that of other students| 77.7%                        | 79.1%            | 70.7%       | 75.8%            |      |
| I cannot focus on doing research in the themes of my interest         | 45.5%                        | 43.0%            | 43.0%       | 51.1%            |      |
| I am concerned that I may not be able to graduate on time             | 81.6%                        | 60.6%            | 60.6%       | 67.4% ***        |      |
| I am concerned with my career after graduation                       | 82.1%                        | 83.8%            | 68.7%       | 61.8% ***        |      |
| I have too much to do aside from learning and research during doctoral program (e.g. administrative work, teaching responsibility, etc.) | 54.5%                        | 49.8%            | 60.6%       | 59.5%            |      |

Note: ***p > 0.001, n.s. stands for not statistically significant

by those from Humanities and Social sciences(82.1%), Engineering (68.7%), and Medical sciences (61.8%).

Table 5 presents doctoral students’ perception of their stress by age. Significant differences could be found in their responses to the three items among doctoral students from three different groups by age. To illustrate, firstly, the largest numbers of doctoral students at 28 years old or older and younger than 32 years old (80.1%) were concerned with their financial situation. They are followed by those at 27 years old or younger (77.7%), and those at 33 years old or older (61.5%). Secondly, the largest numbers of doctoral students at 33 years old
or older (75.7%) were concerned that they might not be able to graduate on time. They are followed by those at 28 years old or older and younger than 32 years old (72.3%), and those at 27 years old or younger (60.4%). Thirdly, the largest numbers of doctoral students at 27 years old or younger were concerned with their career after graduation (79.3%). They are followed by those at 28 years old or older and younger than 32 years old (77.9%), and those at 33 years old or older (61.9%).

In terms of three different sectors (Table 6), no any significant differences could be found in their responses to all the items among doctoral students from national, local public, and private sectors.

| Items                                                                 | National | Local public | Private |
|----------------------------------------------------------------------|----------|--------------|---------|
| I feel that the doctoral program has negatively influenced my work-life balance | 56.1%    | 53.8%        | 53.9%   | n.s.    |
| I am concerned with my financial situation                          | 73.4%    | 72.5%        | 77.8%   | n.s.    |
| I am concerned with my English language ability                     | 86.1%    | 87.2%        | 82.2%   | n.s.    |
| I feel that my work progress is lagging behind that of other students | 77.4%    | 75.0%        | 77.2%   | n.s.    |
| I cannot focus on doing research in the themes of my interest        | 47.0%    | 43.6%        | 41.7%   | n.s.    |
| I am concerned that I may not be able to graduate on time            | 66.0%    | 71.8%        | 67.5%   | n.s.    |
| I am concerned with my career after graduation                      | 74.7%    | 71.8%        | 77.2%   | n.s.    |
| I have too much to do aside from learning and research during doctoral program (e.g. administrative work, teaching responsibility etc) | 56.0%    | 60.0%        | 54.5%   | n.s.    |

Note: n.s. stands for not statistically significant.
private universities. Clearly, it suggests that institutional differences do not seem to have any impacts on their perceptions of stress, even if national, local publica, private universities vary enormously in relation to their missions and functions, and some of academic activities.

Concerning their views of overall stress, as Figure 1 presents, except for their responses to “I cannot focus on doing research in the themes of my interest”, Japanese doctoral students believed that they suffered from stresses concerning all other items. Compared to only 54.8 percent of them confirming that it is not true of the fact that they cannot focus on doing research in the themes of their interest, as high as 87.2 percent of them answered that their work progress is lagging behind that of other students. This is followed by those who were concerned with their English language ability (85.1%), those who were concerned with their career after graduation (75.2%), their financial situation (74.7%), that they might not be able to graduate on time, and those who had too much to do aside from learning and research during doctoral programs (55.9%). Noticeably, although over half of them felt that the doctoral programs have negatively influenced their work-life balance, they are the least numbers of groups among those who answered with “True” to all other items.

### Conclusion and discussion

When compared to earlier studies reviewed above, main findings of this study can be summarized as follows.

Firstly, substantially different from several prior research, in the Japanese context, no significant gender differences could be confirmed in their perceptions of negative influences from their participating in doctoral programs on their work-life balance. One of the important reasons might be that, compared to doctoral students in many Western countries, especially those from European countries, a vast majority of doctoral students at Japanese universities belong to traditional students, including female doctoral students, they are much younger than their counterparts in Western countries. Because the research target
group are full-time doctoral students enrolled in research intensive universities in Japan, usually, more of them are unmarried or do not have to take care of their children while pursuing their doctoral degrees. This is especially true in the case of Japan in which, in most cases, female doctoral students do not give a birth to children before they graduate and get jobs (NISTEP, 2020).

Secondly, it appears that Japanese doctoral students were not so concerned with their financial situation as they were concerned with their academic performance. Although as high as over 70 percent of them worried about their financial situation, much more of them were concerned with their work progress, English ability, and career after graduation. Seemingly, this finding does not match with a lot of existing research that points out that the financial situation is an important factor affecting doctoral students’ stress. In a major sense, Japanese doctoral students seem to be more concerned with their academic performance than their financial situation. There are two main reasons for this. First, because the Japanese government has implemented many strategies to provide financial support for doctoral students (MEXT, 2017a), their financial situation has been improved in recent years (Kobayashi et al., 2020). Second, although differences can be found between disciplines and universities, as a huge majority of Japanese doctoral students belong to traditional students, normally, they cannot be awarded with doctoral degrees if they are not able to earn required academic credits and also publish two peer-reviewed research articles in the limited period of study (Huang, 2020).

Finally, the analysis of Japanese doctoral students’ views of stress by discipline seems to be largely consistent with many prior studies. Namely, as it normally takes much longer time for doctoral students from Humanities and Social sciences than those from “Hard Sciences” such as Natural sciences, Engineering, and Medical sciences, to graduate, they were naturally concerned with whether they could graduate on time. In addition, despite mild differences between those from Humanities and Social sciences, and Natural sciences, as indicated in several previous studies, it has become more and more difficult for doctoral graduates in Natural sciences to secure a stable career after graduation. Or at least, doctoral students in Natural sciences and Humanities and Social sciences have been confronted with similar problems with their career prospects in recent years. This point is true in the case of Japan, too.

Thus, the findings of this research suggest that Japanese doctoral students provide no exception with respect to their numbers and degree of stress, compared to the finding made by Evans’ research team based on an international survey of thousands of doctoral students in 26 nations (Evans et al., 2018). Although we do not have the data of numbers of the general public’s stress, the data of Figure 1 clearly indicates the exceptionally high degree and numbers of doctoral students’ stress in the Japanese context.

As for implications for research, more comprehensive and in-depth research needs to be undertaken to explore why few gender differences exist in Japan, and why financial situation or institutional differences do not seem to exert any profound influences on doctoral students’ views of their stress. As for implications for policy and institutional practice, since more numbers of young doctoral students seem to be concerned with their financial situation, it would be important for government and individual universities, industry and private foundations, etc., to provide more financial support for them and reduce their stress prior to graduation. Further, both government and individual universities also need to strive to help doctoral students to be employed or to develop a diversifying career after graduation, especially for those in Natural sciences and Humanities and Social sciences. Besides, as more numbers of them were worried about their academic performance, the universities they belong to should provide more academic assistance, mentorship, including improving their English ability, for them.
It goes without saying that there are several limitations in this study. Firstly, as mentioned earlier, as the survey was only carried out of doctoral students from the five research universities, the valid samples are quite few and the respondents’ demographic profiles are not perfectly distributed, compared to national statistics in some aspects. This may affect arriving at reasonable conclusion. It is necessary to implement more numbers of doctoral students from other sectors of Japanese universities if an overall portrait of doctoral students’ stress is to be presented. Secondly, further research based on case studies and semi-structured interviews with doctoral students needs to be conducted to find out what reasons stay behind their self-reported perceptions of stress. Finally, the striking characteristics of Japanese doctoral students’ stress would be more explicitly presented if an international and comparative study of doctoral students based on similar surveys or interviews can be implemented.

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