Impact of the COVID-19 Pandemic on the Academic Community Results from a survey conducted at University of Massachusetts Amherst

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The COVID-19 pandemic has significantly impacted academic life in the United States and beyond. To gain a better understanding of its impact on the academic community, we conducted a large-scale survey at the University of Massachusetts Amherst. We collected multifaceted data from students, staff, and faculty on several aspects of their lives, such as mental and physical health, productivity, and finances. All our respondents expressed mental and physical issues and concerns, such as increased stress and depression levels. Financial difficulties seem to have the most considerable toll on staff and undergraduate students, while productivity challenges were mostly expressed by faculty and graduate students. As universities face many important decisions with respect to mitigating the effects of this pandemic, we present our findings with the intent of shedding light on the challenges faced by various academic groups in the face of the pandemic, calling attention to the differences between groups. We also contribute a discussion highlighting how the results translate to policies for the effective and timely support of the categories of respondents who need them most. Finally, the survey itself, which includes conditional logic allowing for personalized questions, serves as a template for further data collection, facilitating a comparison of the impact on campuses across the United States.

CCS Concepts: • **Social and professional topics** → **User characteristics**; • **Applied computing** → **Consumer health**;

Additional Key Words and Phrases: Survey, COVID-19, COVID-19 impacts, Academia

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1 INTRODUCTION

Major societal crises, such as the COVID-19 pandemic, transform people's lives in perceptible and imperceptible ways [1–3]. The COVID-19 pandemic has impacted academic life across the world [4]. Campus closures [5, 6], interrupted teaching and learning [7, 8], financial instability [9–12], and travel restrictions [13–15] are just a few examples of the problems faced by the academic community [16]. Many universities have implemented policies

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and procedures to manage the spread of COVID-19. Collecting rich data is the first step toward understanding the depth and breadth of these changes [17].

To gain a better understanding [18] of the pandemic's impact on students, staff, and faculty's well-being [19–22], we conducted a large-scale online survey with 1,785 respondents at the University of Massachusetts Amherst. The aim of this study was to determine the magnitude and types of impact that the COVID-19 pandemic had on different members of the academic community. In particular, we focused on dimensions such as health, levels of stress, levels of isolation, productivity, and financial stability, while asking for other hardships the pandemic may have caused for members of the academic community [23]. We hypothesized that, while the majority would be negatively impacted according to all criteria, there would be also differences between the impact areas for different categories of participants. For instance, we expected that undergraduate students, especially those with campus positions, would be more financially impacted than tenured faculty. We also expected that the segment of the campus community that requires access to facilities to perform research would be rendered a lot less productive than the rest. There is a significant exploratory aspect to this study in that, although some of the results were foreseeable, we did not limit our analysis to a fixed set of research questions and instead sought to pinpoint differences between categories of respondents and identify campus subpopulations that were severely impacted from different perspectives.

Universities across the world face many important decisions and challenges in managing the COVID-19 pandemic and mitigating the harm it has caused within their communities. For instance, universities need to decide which groups should have priority in testing for potential COVID-19 cases [24]. Our survey identifies the groups that are most at risk of COVID-19 and its complications (section 3.1). The administration can thus focus its efforts on testing the most vulnerable groups first. Other important decisions revolve around finance management and the allocation of financial support [25]. In Section 3.4, we analyze the financial impacts and concerns of different academic groups such that resources can be distributed to the groups that need them the most. Moreover, decisions should be taken to keep the same level of education [26, 27] and engagement. We analyze the impacts of the pandemic on the educational experience, as well as the challenges it created for different groups, in Section 3.5. Universities also need to address issues related to mental well-being in the community [20, 21], including how to conduct online counseling services. We analyse the impact on respondents' mental health in Sections 3.2 and 3.3. There are many different strategies that have been suggested for addressing each of these decisions [28–32].

Our ultimate objective is to use the insights presented in this article to help the university administration in their pandemic-related decision making. Our study is the first step toward the provision of support in the areas in which it is sorely needed and in the manner in which it brings the most benefit to the community.

We reached out to a representative subset of students, as well as all faculty and staff. We received 1,785 responses from our community, enabling us to ascertain the impact of the pandemic on our campus. In the rest of this report, we provide a summary of the most important findings of our survey. Reflecting on these findings, we also provide suggestions for addressing some of the identified issues.

2 METHODOLOGY

We conducted a large-scale online survey to collect data about the impact of the COVID-19 pandemic on the campus community at University of Massachusetts Amherst.

2.1 Participants

The survey's target population included current students, faculty, and staff of the University of Massachusetts Amherst. Participants were recruited with the university administration's help, which provided us with emails of a sample of undergraduates (4,500), graduate students (2,750), and all faculty and staff. We sent emails containing a description of the study, the consent agreement, and a link to the online survey to the selected subpopulation. Table 1 shows the breakdown of participants.

Table 1. The Gender and Campus Roles of the Survey Respondents

	Student (Ugrad)	Student (master's)	Student (Ph.D.)	Postdoc	Faculty	Staff	Other/ Unspecified	Total
Female (trans + cis)	227	86	146	13	154	465	28	1119
Male (trans + cis)	146	59	90	14	94	178	15	596
Other/Unspecified	14	9	10	2	6	25	4	70
Total	387	154	246	29	254	668	47	1785

This study was approved by the Institutional Review Board of University of Massachusetts Amherst under protocol number 2044. All participants provided their informed consent by signing an online form before proceeding with the survey. Data were collected anonymously without IP addresses or GPS tracking.

2.2 Survey Design and Flow

We developed our survey based on review of prior research that considered the potential impacts of such global pandemics. Most significantly, the design of our questions were informed by well-known past survey designs such as Quality of life (WHO-QOL BREF) [33], WHO-5 well-being [34], Perceived stress (PSS-10) [35], and Depressive symptoms (PHQ-9) [36]. Our survey included 50 unique questions and was deployed via Qualtrics [37]. We collected data on a range of relevant topics, including (1) physical health; (2) stress; (3) socialization, loneliness, and family; (4) income and financial prospects; and (5) productivity. We conducted the survey between April 29, 2020, and July 20, 2020.

Taking the survey, participants first provided basic demographic data such as gender, age, and country or state of origin. Next, they moved to a multiple-choice question with 12 options including effects on health, levels of stress, levels of isolation, productivity, and financial stability to understand what aspects of their lives were impacted by the pandemic. All our survey participants responded to this “overview question.” Based on the participants’ responses to this overview question, we then asked more detailed questions for each of these aspects to better understand how they have been impacted. Table 2 shows all the options that respondents could choose in the overview question. The estimated completion time of the survey was 5–10 minutes based on pilot testing conducted among the study team members.

2.3 Data Collection and Analysis

We recorded all the participants answers to multiple choice questions as well as their textual comments and feedback. We received a total of 1,785 responses from the campus community. Table 1 shows the breakdown of the participants by gender and their campus role, which are faculty, staff, graduate students (Ph.D. and masters), and undergraduate students. To analyze the collected data, we used Qualtrics platform’s built-in statistical, text analysis, and visualization tools.

3 FINDINGS

Based on the “overview” question, we found that for both health and finance, concerns about future risks affect a higher percentage of respondents than the actual realities at the time of the response. A majority of respondents reported high levels of stress, an impaired capacity in maintaining focus and motivation, and a reduction in physical activity. Moreover, two-thirds of the respondents expressed concern about their families.

Figure 1 summarizes the responses to the overview question that shows the impact on different aspects of respondents’ lives, split by their role on campus. For instance, social isolation and loneliness disproportionately affected undergraduate students (Ugrads). Ph.D. students had the most trouble managing their work. Meanwhile, managing multiple responsibilities appears to be a problem for twice as many faculty and postdocs compared to

Table 2. Options Available in the Overview Question Shown to All Participants

Options in overview questions	Percentage of respondents
I am having difficulty keeping focused and staying motivated.	64.41%
I am worried about my family.	64.24%
I am less physically active.	57.37%
I am experiencing high levels of stress.	53.09%
I am concerned about myself or my household being placed in financial difficulty.	48.76%
Due to social distancing and self-isolation, I feel lonely.	47.08%
I am heavily relying on social media for news and updates.	36.45%
I am worried that I will get seriously ill.	34.26%
I am having difficulty managing my work.	33.97%
I am overwhelmed with juggling between many things (e.g. kids and work).	33.45%
I am (or my household is) in financial difficulty.	15.08%
I am experiencing health issues.	6.82%

Any number of options could be checked. The percentage of respondents who checked each option is indicated on the right.

Fig. 1. Normalized responses to the overview question, split by graduate and undergraduate students, postdocs, faculty, and staff.

students. Given these differences, we performed an in-depth analysis of the responses broken down by topic and campus roles—students, staff, postdocs, and faculty. Our findings are summarized in the following subsections.

3.1 Physical Health

Over the entire population of participants, only 6.82% reported that they are experiencing health issues due to the pandemic. However, 34.28% mentioned that they are worried that they will get seriously ill. When asked more detailed questions, this group reported their overall health condition as highly worsened (13%) or worsened (65%) following the onset of the pandemic. Figure 2 shows the breakdown of this data by role on campus. Of the survey participants, 43.23% reported suffering from chronic health conditions before the start of the pandemic. Figure 3 shows the breakdown of this data by role on campus. Asthma, depression, migraine, hypertension, and diabetes are among the most reported conditions. The relatively high percentages of respondents affected by chronic conditions call for closer attention to existing health issues when making policies related to the control of the pandemic.

Fig. 2. Breakdown of level of impact on health of participants who were concerned about their health or were experiencing health issues.

Fig. 3. (a) Percentage of participants in each role who reported having chronic conditions; (b) word cloud generated from the chronic conditions the participants reported as free-form text.

Among all groups, Ph.D. students had the highest percentage of respondents who experienced health issues (10.29%), followed by master's students (7.33%). Ph.D. students were also second in terms of being worried about becoming seriously ill, with 36.63%. Furthermore, Ph.D. student respondents were the second group in terms of percentage of belonging to high-risk categories for COVID-19. However, undergraduate students had the lowest percentage (21.88%) of respondents belonging to high-risk groups. Consequently, undergraduate respondents were also the least concerned about their health (23.64%). Meanwhile, staff were the most concerned about their health; 39.01% reported that they are worried that they will get seriously ill, while only 6.19% actually experienced health issues related to COVID-19. Among the groups who were concerned about their well-being, staff had the highest percentage of respondents both in terms of belonging to high-risk categories for COVID-19 and suffering from chronic diseases. Faculty members also expressed moderate concern with getting seriously ill (34.15% of respondents) despite having the second highest prevalence of chronic conditions.

3.2 Stress

Among our participants, 53.12% indicated that they are experiencing high levels of stress, which affected all surveyed groups. In our overview question, a higher percentage of Ph.D. students (63.37%) selected this problem followed by undergraduate students (58.42%), postdoc researchers and staff (51.27%), master's students (48.67%),

Fig. 4. (a) The breakdown of levels of increase in stress level based on the role in the campus among the participants who selected that they are experiencing high levels of stress. (b) The breakdown of how often participants who reported high levels of stress felt nervous during the pandemic.

and faculty members (45.12%). Figure 4(a) shows a breakdown of how much the stress levels of each group increased due to the pandemic, and Figure 4(b) shows how often these participants felt nervous during the pandemic. Among the participants who reported an increase in stress levels, master's students both felt stressed more often and experienced higher levels of stress.

Staff members and postdocs were amid the groups least affected by stress and lack of socialization, as around 51.27% indicated they are experiencing high levels of stress. Among those, only 24.48% said that this feeling was felt very often—least of any group. Only 37.70% reported their loneliness levels increased due to social distancing, and among these respondents only 21% reported their loneliness levels as highly increased, which is the lowest percentage in any group.

Furthermore, faculty have the lowest percentage of respondents who experienced high levels of stress with 45.12% of faculty participants selecting this choice in the overview question. They also are the cohort who felt nervous or stressed the least amount of time among the respondents who experienced high levels of stress, only around 63.64% indicated that they felt nervous or stressed often or very often.

3.3 Socialization, Loneliness, and Family

All the participants reported impacts of the pandemic on their socialization and loneliness. Responses to our overview question showed that 47.11% of the participants across all groups reported loneliness due to social distancing and self-isolation. However, this affected different groups disproportionately, with students feeling the most impact, followed by staff and postdoc researchers and, finally, faculty members. Figure 5(a) shows a breakdown of increase in loneliness levels in these groups due to the pandemic. A higher percentage (47.95%) of respondents who self-identified as extroverts reported highly increased levels of loneliness compared to only 27.40% of self-identified introverts. Figure 5(b) shows the breakdown of increase in loneliness levels according to whether the person considers themselves to be an extrovert or introvert. Furthermore, 64.28% of participants reported being worried about their family members, making this the second most selected choice after the ability to focus and stay motivated.

Loneliness was the second common problem among students, as the majority of the students reported an increased sense of loneliness and isolation (62.07%). Loneliness seems to have had the worst impact on the undergraduate students, with 72.63% reporting that due to social distancing they feel lonely. A closer look at the comments provided by undergraduates shows that concerns related to transferring social and academic activi-

Fig. 5. (a) Breakdown of increase in loneliness levels by each group among participants who reported that they faced loneliness and socialization problems. (b) Breakdown of increase in loneliness levels according to whether the person considers themselves to be an extrovert or introvert.

ties online represent the most emerging theme, followed by uncertainty about the future of the job market and financial hardships.

Moreover, the most common problem for university staff and postdoc researchers was the concern about their family members, with 67.66%, the highest among any group; 40.96% reported having family members at COVID-19 hot spots.¹

However, faculty members were the least impacted group in terms of socialization and loneliness problems where only 30.49% reported these problems in the overview question, and among those only 32% indicated their loneliness levels as highly increased.

3.4 Income and Financial Prospects

Over the entire survey population, concerns about *potential* financial impact far outstripped the actual financial impact experienced by the respondents. While less than 15.09% reported that they have been actually impacted financially, 48.79% of respondents reported concerns about potential impact. Responses were vastly different depending on the role on campus, with students being significantly more affected than faculty. We further explored the financial impact of the pandemic for the respondents who reported that they were affected or concerned about being financially challenged according to our overview question. We call this the “financially concerned” cohort of the survey population, and it comprises a total of 895 respondents, around half of the total number of survey respondents. Over half of the financially concerned reported suffering some loss of income or experiencing a worse financial situation than before the outbreak. A small percentage experienced a significantly worse situation. A troubling aspect is that very few respondents in this cohort believed their jobs were safe: Only 10.61% of financially concerned respondents considered themselves out of danger of losing their source of income. Forty-two of the respondents even reported that they are in danger of becoming homeless. The undergraduate students were by far the most financially impacted survey population, 24.93% of which reported that they, or someone from their household, were placed in financial difficulty by the pandemic. They are closely followed by the master’s and Ph.D. students, with 23.33% and 20.58%, respectively, reporting financial difficulties at the time of the survey. Concern about future impact is widespread, affecting 40–50% in every student category. Amid the financially concerned students, over 65% of the master’s students and over 57% of the Ph.D. students reported a worsened or highly worsened financial situation. Four of five financially concerned undergraduates

¹COVID-19 hot spots were different depending on the time when the survey was taken.

Table 3. Breakdown of Aspects of Work Being Impacted for Each Campus Role

#	Factors affecting productivity	Overall	Student (Ugrad)	Student (master's)	Student (Ph.D.)	Postdoc	Faculty	Staff
1	Can not finish my study due to lack of access to lab equipment	17.79%	18.75%	12.20%	25.61%	50.00%	23.68%	1.64%
2	Can not finish my study due to lack of access to human subjects	11.35%	4.17%	12.20%	19.51%	37.50%	21.05%	1.64%
3	Fewer meetings with my advisor/s	33.13%	43.75%	56.10%	45.12%	12.50%	5.26%	4.92%
4	Difficulties in meeting collaborators/coworkers	33.44%	40.63%	46.34%	30.49%	50.00%	39.47%	11.48%
5	Difficulties in consulting with (and getting advice from) peers/coworkers	29.14%	37.50%	29.27%	40.24%	25.00%	10.53%	13.11%
6	Lack of socialization with peers/coworkers	47.85%	48.96%	73.17%	70.73%	62.50%	18.42%	14.75%
7	Inability to access computing facilities	13.50%	11.46%	24.39%	17.07%	25.00%	7.89%	6.56%
8	Poor internet connections and/or lack of quiet working place	44.48%	48.96%	48.78%	48.78%	87.50%	55.26%	16.39%
9	Not Applicable	33.13%	34.38%	17.07%	13.41%	12.50%	26.32%	75.41%

Lack of socialization and interaction with peers as well as diminishing opportunities for mentorship and advice were major contributors to the decrease in productivity, especially amid students and postdocs, while the poor working conditions (poor internet connection and/or lack of quiet working space) has a detrimental impact on a high percentage of respondents in all categories except the staff.

reported that they or someone in their household have already lost income, as did three of five non-Ph.D. graduate students and almost half of the Ph.D. students. Worse yet, almost a fifth of the financially concerned Ph.D. students were uncertain about whether they will be able to keep their homes.

However, while compared to the overall study group, a smaller percentage of staff and postdocs (10.73%) report actual financial difficulty, this cohort was the category with the highest percentage of concerned respondents about their future financial situation (60.36% expressed concern). Over 47% of financially concerned staff members and postdoc researchers have a worse financial situation than before the outbreak. Only 6.52% of the financially concerned staff feel certain that their household will not lose a main source of income.

Faculty also have, by far, the lowest percentage of respondents whose households were placed in financial difficulty (3.25%). Compared to the study population, a lower percentage of faculty expressed concern for the future (39.02%). Given that many of the faculty are tenured and also considering the age of the respondents, we conclude that concern amid the junior faculty is widespread. We also note that over 10 times more respondents are concerned than affected, which is a similar trend to what was observed amid the staff. In fact, few of the financially concerned faculty consider their jobs secure, with only 8.16% of them stating they are not in danger of being laid off. Additionally, over 41% of financially concerned faculty reported a worse financial situation than before the outbreak. On a more positive note, the faculty are the least in danger of homelessness.

3.5 Productivity

The pandemic and subsequent campus closures have taken a toll on the productivity of the community. According to our overview question, almost two-thirds of all respondents indicated having difficulty keeping focused and staying motivated. A third of the respondents indicated difficulty in managing work. A third of the respondents indicated they were overwhelmed with juggling many things, such as childcare and work. We selected the most impacted cohort from the perspective of productivity, namely, 332 respondents (18.6% of all the participants) who had difficulty managing work, keeping focused, and reported being less active.

For the cohort of respondents whose productivity was impacted, we also studied which aspects of their work were affected, as shown in Table 3. We found that poor working conditions - poor internet connection and/or

lack of quiet working space have a detrimental impact on a high percentage of respondents in all categories except the staff. The most common problem among our student respondents was the ability to stay motivated and focused, with 80.66% of Ph.D. students reporting difficulties in this respect. This group is closely followed by undergraduate students (79.95%) and master's students (77.33%), according to our overview question. However, undergraduates and master's students have the lowest percentage of respondents who reported being overwhelmed with juggling between many things, 23.1% and 23.33%, respectively.

Over 70% of graduate students in the affected cohort reported a lack of socialization with peers or co-workers to be a contributing factor to their decreased productivity. A related factor, difficulties in meeting collaborators or coworkers was also indicated by over 40% of undergraduates and 45% of master's students. Slightly less affected appear to be the Ph.D. students, with 30% indicating difficulties in meeting collaborators. Over 45% of Ph.D. students and 43% of undergraduates in this cohort reported having fewer meetings with their advisors, but the most affected category, from the perspective of advisor meetings, was the master's students, 56%.

Based on the overview question, the staff have the lowest percentage of respondents with difficulty in managing their work. Even amid the productivity-affected cohort, staff seem to not be as severely impacted, with just over a quarter reporting highly worsened productivity. Furthermore, postdocs, staff, and faculty have the highest percentage of respondents whose productivity was not lowered.

Conversely, the highest percentage of respondents overwhelmed with juggling between many things is amid the faculty (45.12%). Of the faculty, 54.88% also reported having difficulty focusing and staying motivated. In the productivity-affected cohort, almost 40% of the faculty reported difficulties in meeting collaborators or coworkers. Like postdocs, the faculty are also affected by the lack of access to lab equipment (about 1 in 4 respondents) and human subjects (about 1 in 5 respondents).

4 DISCUSSION

Our findings pinpoint the negative impacts of the COVID-19 pandemic on all students, staff, and faculty's physical and mental well-being, productivity, prosperity, and social lives. All our respondents reported experiencing health-related issues such as a considerable increase in stress, depression, and anxiety. Our findings highlight the need for immediate provision of measures to assist the campus community with their increased physical and mental health problems. The current model of care is largely built around on-campus in-person services, but the current crisis shows the necessity of building the infrastructure to make services and resources available online. For instance, campuses should invest more in telemedicine [38, 39], enabling remote consulting and monitoring of patients, as well as facilitate online social interactions between community members to encourage the mental and physical benefits associated with social connections [1, 2, 40, 41]. The importance of such measures is even more pressing in light of the fact that 43% of our survey respondents reported suffering from chronic health conditions.

As also shown in previous research [42–44] we found that the manifestation and magnitude of other issues vary between the three studied groups. Financial difficulties seem to have the most notable impact on staff and undergraduate students. Staff also reported considerable concerns about their future job security. Productivity issues were mostly reported by graduate students and faculty. Graduate students principally attribute the toll on their productivity to the side effects of social isolation, such as loneliness and lack of access to on-campus research equipment and resources. However, for faculty, the problem mostly stems from the blurred lines between home-life and work-life, superimposing rest and leisure spaces to productivity and connectivity.

Respondents' comments on strategies to cope with isolation, social distancing, and stress provide insight into delivering measures and services to alleviate future crises. Several of the respondents mentioned online socialization and community building services such as virtual volunteering and support groups as measures for coping with isolation. Many participants also mentioned indoor activities, such as cooking, reading, exercise, meditation, and learning new skills, as coping mechanisms. Respondents' comments suggest that providing

productivity, creativity, and connectivity apps and online tools could help the campus community better cope with loneliness and isolation.

To the best of our knowledge, the present work is the first study that investigates the many ways in which the COVID-19 pandemic impacted academic communities, comparing the impact on different groups.

Our study contributes to the literature by highlighting the differences between, and the major challenges faced by various academic groups in the face of the pandemic. Another contribution is the survey itself, which is geared toward understanding these challenges in the academic community. One of the features of the survey is the conditional logic behind the questions shown to each respondent, with in-depth questions being displayed in the areas of concern for that particular respondent. This personalized setup enabled us to drill into each issue without overloading the study participants. The dataset collected from the 1,785 participants is sufficient to draw statistically significant conclusions and will be used for further analysis.

Our results follow the trends that previous research reported in the general population in terms of effects on mental health and isolation [21, 42, 45], financial impacts [46, 47], physical health [48], and productivity [49]. We also show the impacts that were specific to different groups in the academic community. For instance, we show that the pandemic impacted the graduate students' productivity more than any other mentioned academic group. University staff were the most worried about their financial situation. Our analysis indicates clear areas where interventions are needed and we provided actionable suggestions to university administrators based on the analysis.

This study is helpful to a wide range of stakeholders. For university administrators, it provides a clearer picture of the different groups' needs and challenges, based on which they can make informed decisions concerning interventions to combat the effects of the pandemic. If acted upon, then these insights can ultimately benefit the community as a whole, including the survey respondents. For the research community, this survey constitutes a template that can be used to compare results across universities and countries.

This study has some limitations as well. First, the survey is limited to the academic community at University of Massachusetts Amherst, and it is unclear if the results will generalize to other universities and communities. Although collecting data from other universities as well would have been preferable, it would not have allowed us to collect data in a timely manner. This was essential given the urgent need to gain an understanding of the impacts of the pandemic and promptly act on this understanding. However, some trends seen here, might be relevant to other universities, as suggested by previous research on the general population. Second, there is a potential selection bias, since the respondents volunteered their information following an invitation to the survey. Furthermore, all the questions are based on self-evaluation tests, which, while widely used, also introduce a source of bias when participants report on their own experiences [50].

5 CONCLUSION

Determining the most affected aspects of peoples' lives is the first step in moving toward mitigating the negative effects of a global pandemic. Finding out the various ways in which people are affected and the magnitude of the issues they face will indicate the aspects that they would need the most support. Through this survey, we collected data from students, faculty, and staff at the University of Massachusetts Amherst and highlighted the problems that each cohort is facing regarding the COVID-19 pandemic. We hope that our results help in identifying the most pressing issues and devising appropriate policies to mitigate the pandemic impact on the academic community.

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