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## Social factors are associated with academic stress in Pasifika students at the University of Otago

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### Abstract

*The majority of Pasifika students at the University of Otago come from other parts of New Zealand and have to adapt to studying and living in an environment that does not have a strong Pacific culture. These changes potentially affect their education experience and academic performance. Students may form social networks through religious institutions or student associations. Using a brief (10–15 minute) survey, we investigated how religiosity, social provision, and social anxiety as ethnic minorities are associated with perceived academic stress among Pasifika students in our department. We recruited 54 Pasifika students from a cohort of 101 students: 20 male, 33 female, and 1 akava'ine. Male students had higher academic stresses related to academic expectation than female students. Religiosity, social provision, and avoiding interaction with New Zealand European people were all associated with perceived academic stress in our cohort. Students preferred seeking social support from Pasifika friends and family members, and academic support from academic staff, tutorials organised by the University's Pacific Islands Centre, and friends. In conclusion, social factors are associated with academic stress of Pasifika students in the University of Otago. Institutions need to establish strong support infrastructure for ethnic minority students as they may have additional stressors which may affect their study.*

### Keywords

Academic stress; Pasifika students; religiosity; social provision; social anxiety

### Introduction

In Aotearoa New Zealand, approximately 8 percent of the population identify as Pacific peoples in the 2018 census (Stats NZ, 2018). The term Pasifika is a broad term used to describe “peoples who have migrated from Pacific nations and territories ... [and] New Zealand-based (and born) population, who identify as Pasifika, via ancestry or descent” (Airini et al., 2010). However, the term “Pasifika” does not reflect the diversity of cultures, languages, and experiences of the different Pacific ethnic groups. The proportion of Pasifika students at the University of Otago was at 6 percent in 2021 (close to 1,300 students), like the population demographic. Among these, about 90–100 Pasifika students study in the



Department of Anatomy at second- and third-year undergraduate levels each year. A recent survey (Corre et al., 2022) found that the main reasons students take courses in our department are because of liking the topics, degree requirement, and as a pathway to future professions. From our experiences, anecdotally, many Pasifika students reported of aiming to gain entry into healthcare professional programmes, such as medicine, dentistry or physiotherapy. They may also receive a scholarship from our institution, which can be a major incentive to pursue a degree in our institution.

Universities in Aotearoa New Zealand have had an increasing number of Pasifika students in recent years and the number is expected to increase (University of Auckland, 2021; University of Otago, 2022b). As an example, according to their Pacific Strategic Framework, the University of Otago aims to increase the numbers of Pacific postgraduate students and international students from the Pacific region (University of Otago, 2022a). In our department, the number of Pasifika students are increasing slowly. For example, in two of the undergraduate second-year courses, the proportions of Pasifika students were around 9 percent in 2017 and approximately 13 percent in 2021. Despite the increasing numbers, universities in Aotearoa New Zealand may not be fully set up to support Pasifika students. As the number of Pasifika people is expected to increase in the coming years in Aotearoa New Zealand (Stats NZ, 2021), the number of enrolments of Pasifika students is expected to increase as well. Thus, universities need to prioritise on improving the support infrastructure for Pasifika students.

Pasifika students in Aotearoa New Zealand are currently overrepresented in poor academic outcomes. For example, Pasifika students in the Health Sciences First Year programme at the University of Otago have lower academic grades than non-Pasifika students (Sopoaga et al., 2013). This finding is consistent with data from the Auckland University of Technology (Te Wānanga Aronui o Tāmaki Makau Rau) where first-year Pasifika students in a Human Anatomy and Physiology course have lower academic grades than Māori and New Zealand European students (Brown et al., 2018). Unpublished data from our department also show similar findings that the academic grades of Pasifika students in second- and third-year courses are, on average, lower than New Zealand European students. Furthermore, Pasifika students are more likely to leave tertiary studies without a qualification compared to New Zealand European students (Benseman et al., 2006).

Undoubtedly, many factors may influence academic outcomes among Pasifika students in Aotearoa New Zealand. For example, the Western and Pacific frameworks have different approaches to education. Universities in Aotearoa New Zealand were built from a Western framework and, in many cases, do not incorporate indigenous values in the learning environment. Western-style approaches are more individualistic and objective, but Pasifika students' success involves a more holistic learning environment which involves establishing relationships with academics, a welcoming environment, and culturally appropriate teaching practices (Alkema, 2014). Consequently, Pasifika students may have difficulties in adapting to the Western-style education system.

Unlike some institutions in the North Island of Aotearoa New Zealand, Pasifika students at the University of Otago may have additional challenges in adjusting to living and studying in Dunedin. Most Pasifika students grew up in places with strong Pacific cultures (e.g., North Island of New Zealand or Pacific Islands), but only about 3 percent of the population of Dunedin is made up of Pacific people. Expectedly, some Pasifika students may experience social anxiety as an ethnic minority, similar to other ethnic minorities elsewhere (Lesure-Lester & King, 2004). Furthermore, the number of Pasifika staff in universities in Aotearoa New Zealand is few (Naepi, 2019), and thus Pasifika students may also be reluctant to approach academic staff who are not competent of Pacific cultures. As previously reported, the impact of stress on academic outcomes is more profound among ethnic minority students (Zajacova et al., 2005). Data from a recent talanoa from our team (Fakapulua, 2022) also confirm the struggles that Pasifika students have when they live as an ethnic minority in Dunedin. While these social factors may not directly affect academic performance, they enable us to acknowledge that Pasifika students may face additional challenges in their daily life while also managing their studies.

When Pasifika students move to Dunedin, many have to form a new social network, but the number of Pacific people in Dunedin are few. They may meet other Pasifika students from their class or Pacific students associations. In addition, they may meet Pacific people through church activities because religion is an important component of Pacific cultures (Evans, 2018). Being religious itself may not have a negative impact on students' wellbeing but, anecdotally, some Pasifika students may put church activities at high priority, which may reduce the time available for their study. As a result, they will need to manage their study time, in addition to church commitment.

In this study, we aim to determine: 1) how religiosity, social provision, and social anxiety as an ethnic minority are associated with perceived academic stress in Pasifika students; and 2) Pasifika students' preference for social and academic supports. Our findings should help us indicate the importance of academic and social supports for Pasifika students in Dunedin. In addition, data from our study can also be relevant to Māori students who have a similar culture and background as Pasifika students, as well as ethnic minority or international students elsewhere.

## Methods

### Participants

Using a cross-sectional approach, we sent an online survey (10–15 min) to 101 second- and third-year Pasifika undergraduate students in our department. Students in 2021 who identified as Pasifika could participate in this study. The study protocol was approved by the University of Otago's Human Ethics Committee (D21/245) and the survey was built using the Research Electronic Data Capture (REDCap). In addition, we sought help from the Biomedical Otago Pacific Students Association, and the University's Pacific Islands Centre to also help distribute the survey in their mailing lists. Each participant received a gift (koha) in the form of a \$25 gift card.

This survey took approximately 10–15 minutes to complete. Once the link was clicked, they viewed a screening question: "The following statements relate to the 200- and 300-levels papers you are studying this year. Anatomy papers include those with paper codes ANAT and BIOA. Please select an option which is applicable to you", with the options "I am currently taking one or more anatomy papers at 200- and 300-levels", "I took one or more anatomy papers at 200- and 300-levels last semester", and "I have not taken any anatomy paper at 200- and 300-levels". Only those selecting the first two options viewed the Participant Information Sheet and the consent form. The Participant Information Sheet indicated that the survey was open to Pasifika students who were currently taking or have taken at least one course in our department in 2021. Only those who consented to the study had access to the questionnaires.

The survey was active from August 2021 to September 2021. This period was approximately mid-to-late semester at our institution. During this time, Aotearoa New Zealand was under Level 2 restriction of the COVID-19 pandemic. Within this period, 75 people accessed the survey link, and 59 consented to the study. Two participants were removed because they did not answer any questions, and three more were excluded because they did not answer any questions after consenting to the study.

### Measures

#### *Demographic*

Demographic information including age, ethnicity, gender, courses they had taken, place of birth, primary place of growing up, sexual orientation, and relationship status was collected by self-report. The categories for ethnicities were the ones used by Statistics New Zealand. Each participant may select

more than one ethnicity. Some participants in our study also selected additional ethnicities which were not Pasifika, such as Māori, New Zealand European, Asian.

### *Perceived academic stress*

We used the Perception of Academic Stress Scale (Bedewy & Gabriel, 2015) to assess levels of academic stress. This instrument consists of three subscales on stresses related to academic expectations, academic works, and students' academic self-perception. This scale has 18 items, and each item can be rated on a 5-point scale ranging from "strongly disagree" to "strongly agree". The internal consistency in our sample was  $\alpha = 0.795$ .

### *Religiosity*

Since religiosity is crucial in Pacific cultures and Pasifika students may form social connection through religious institutions, we assessed religiosity using the Centrality Religiosity Scale (Huber & Huber, 2012). This scale has 15 items assessing five aspects of religiosity, including frequency of intellectual engagement, subscription to a religious ideology, public practice, private practice, and experience of a divine influence. Each item can be rated on a 5-point scale based on frequency, ranging from "never" to "very often". A higher score on this scale indicates greater religiosity. The 15-item Centrality of Religiosity Scale has an internal consistency of  $\alpha = 0.957$  in our sample.

### *Social provision*

The Social Provision Scale (SPS) was used to assess the participants' perception of their social support. The SPS (Perera, 2016) is made up of six subscales relating to social relationships: Attachment, Reliable Alliance, Guidance, Nurturance, Reassurance of Worth, Social Integration subscales. Each subscale contains four items, in which the participant indicates on a 4-point scale (ranging from 1 [strongly disagree] to 4 [strongly agree]) how each item describes their degree of perceived support. The internal consistency in our overall sample was  $\alpha = 0.905$ .

### *Racial anxiety scale*

Since Pasifika students in our sample are studying as an ethnic minority, we included the "Intergroup Anxiety" and "Avoidance" subscales from the Racial Anxiety Scale (McAloon, 2008). We used the version that measures other minorities' anxiety when interacting with White people (Appendix C in the McAloon study) because the majority of staff and general population in Aotearoa New Zealand is of European ethnicity. There are four items for the Intergroup Anxiety subscale, and five items for the Avoidance subscale. Each item can be rated on a 7-point scale, ranging from "strongly disagree" to "strongly agree". The internal consistency for the "Intergroup Anxiety" and "Avoidance" subscales in our sample were  $\alpha = 0.862$  and  $0.891$  respectively.

### *Academic and social supports*

Participants also completed additional questions related to how often they went to various social and academic support. The options for social support were Pasifika friends, non-Pasifika friends, family/relatives, religious affiliations, Pasifika students associations, and significant other. The options for academic support were academic staff, tutorials at the Pacific Islands Centre, Pasifika liaisons in the

Department of Anatomy, friends, family members/relatives, and significant other. For each of these supports, they were asked to rate on a 5-point scale ranging from “never” to “always”.

### Data analyses

These data were analysed using SPSS statistics software (IBM version 25). Demographic data, and academic and social support preferences were summarised using descriptive statistics. Perceived academic stress, social provision, and racial anxiety subscales were compared between sexes by using an independent samples t-test. Data from the akava'ine participant was included in the male group. Pearson's correlation analyses were used to determine how perceived academic stress correlated with religiosity, social provision, and racial anxiety. Multiple regression was performed to indicate how religiosity, social provision, and avoidance behaviour as an ethnic minority were associated with perceived academic stress (dependent variable), while adjusting for biological sex.  $P < .05$  was considered significant.

## Results

Table 1 summarises the demographic data of our participants. Demographic variables were comparable between male and female participants, except for relationship status, where male participants were more likely to be in a relationship than female participants ( $\chi^2(1) = 7.660, P < .01$ ).

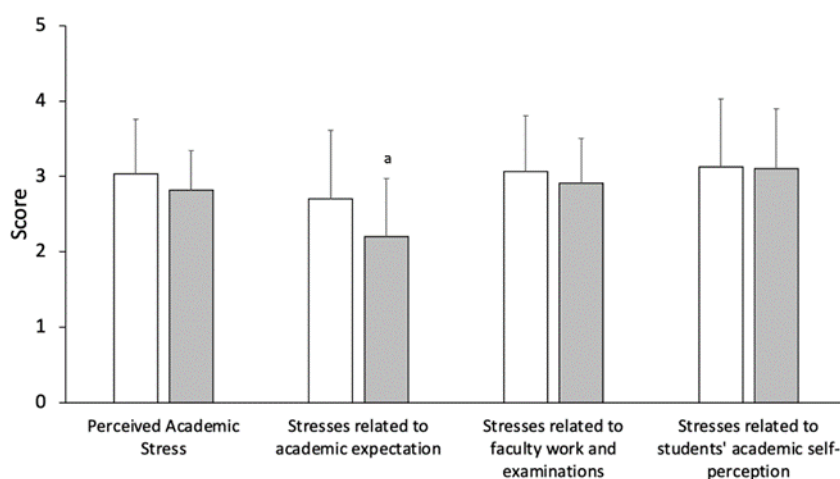
**Table 1. Demographic Data of Male and Female Participants in Our Study**

Variables	Male (n = 21)	Female (n = 33)
Age (n = 41)	21.5 (1.4)	21.0 (1.6)
Ethnicities		
Pacific peoples, not further defined	1 (4.8)	2 (6.1)
Samoan	9 (42.9)	7 (21.2)
Cook Islands Māori	3 (14.3)	4 (12.1)
Tongan	6 (28.6)	9 (27.3)
Niuean	0	2 (6.1)
Tokelauan	0	2 (6.1)
Fijian	4 (19.0)	10 (30.3)
Solomon Islander	0	1 (3.0)
Māori	0	4 (12.1)
New Zealander European	5 (23.8)	2 (6.1)
Asian	1 (4.8)	5 (15.2)
Other ethnicity	0	1 (3.0)
Anatomy papers taken		
200-level papers	20 (95.2)	32 (97.0)
300-level papers	12 (57.1)	15 (45.5)

Place of birth		
Dunedin	0	0
New Zealand, other than Dunedin	12 (57.1)	23 (69.7)
Pacific Island	7 (33.3)	9 (27.3)
Other	2 (9.5)	1 (3.0)
Place grew up		
Dunedin	2 (9.5)	1 (3.0)
New Zealand, other than Dunedin	11 (52.4)	22 (66.7)
Pacific Island	7 (33.3)	9 (27.3)
Other	1 (4.8)	1 (3.0)
In a relationship	13 (61.9)	8 (24.4)
Sexual orientation		
Prefer not to answer	1 (4.8)	2 (6.1)
Heterosexual	15 (71.4)	27 (81.8)
Gay/Lesbian	1 (4.8)	1 (3.0)
Bisexual	0	3 (9.1)
Other	1 (4.8)	0

*Note:* Data are presented as either mean (standard deviation) or number (percentage)

Figure 1 shows that the total score for the perceived academic stress were comparable between male and female participants, but its subscale on stresses related to academic expectations was higher in males than females ( $t(52) = 2.16, P < .05$ ). The scores for the other two subscales did not differ between sexes.



**Figure 1.** Sex difference in perceived academic stress and its three subscales among Pasifika students. Data are presented as mean (standard deviation). Male participants (white bars) had significantly higher stress associated with academic expectation than female students (grey bars). <sup>a</sup>Significantly different from male students,  $P < .05$

Table 2 indicates that female participants had higher score for social provision than male participants ( $t(50) = -2.51, P < .05$ ), but there was no sex difference in their levels of religiosity, social anxiety level as an ethnic minority, and avoidance behaviour as an ethnic minority.

**Table 2. Comparison of Potential Correlates to Academic Stress Based on Biological Sex**

	Male	Female
Religiosity	3.6 (1.0)	3.4 (1.0)
Social provision	72.0 (13.7)	79.4 (7.5)*
Social anxiety as an ethnic minority	10.2 (6.9)	11.9 (5.1)
Avoidance behaviour as an ethnic minority	13.9 (7.7)	14.5 (5.8)

\*Significantly different from male participants,  $P < .05$

Note: Data are presented as means (standard deviation).

We found that religiosity ( $r = .350, P < .05$ ) and social provision ( $r = -.480, P < .001$ ) correlated with perceived academic stress. Table 3 indicates how different subscales of the religiosity and social provision scales were associated with perceived academic stress. In addition, avoidance behaviour as an ethnic minority correlated with perceived academic stress ( $r = .320, P < .05$ ). The correlation between these measures and the three subscales of the perceived academic stress are included in Supplementary Table 1. In brief, all religiosity subscales correlated with stresses related to students' academic self-perceptions, and all social provision subscales correlated with less stresses related to faculty work and examinations. Furthermore, avoidance behaviour as an ethnic minority correlated with stresses related to faculty work and examination.

**Table 3. Correlation Coefficients Between Perceived Academic Stress and the Subscales of Religiosity, Social Provision, and Social Anxiety Scales**

	Correlation coefficient
Religiosity subscales	
Intellect	.350*
Ideology	.295*
Public practice	.343**
Private practice	.268
Experience	.232
Social provision subscales	
Attachment	-.322*
Social integration	-.457***
Reassurance of worth	-.548***
Reliable alliance	-.440**



Guidance	-.443**
Opportunity for nurturance	-.012
Social anxiety as an ethnic minority	.183
Avoidance behaviour as an ethnic minority	.320*

\*Significant correlation between perceived academic stress and the independent variable,  $P < .05$ ; \*\* $P < .01$ ; \*\*\*  $P < .001$

After controlling for biological sex, we found that religiosity ( $\beta = .428$ ,  $P < .001$ ) and social provision ( $\beta = -.565$ ,  $P < .001$ ) but not avoidance behaviour as an ethnic minority were predictors for perceived academic stress among Pasifika students (Table 4). As shown on Supplementary Table 2, social provision was associated with lower stresses related to faculty work and examinations ( $\beta = -.487$ ,  $P < .001$ ) and students' academic self-perceptions ( $\beta = -.524$ ,  $P < .001$ ). In addition, religiosity is associated with stresses related to students' academic self-perceptions ( $\beta = .522$ ,  $P < .001$ ).

**Table 4.** *The Association Between Perceived Academic Stress and Religiosity, Social Provision, and Avoidance Behaviour as an Ethnic Minority, After Controlling for Biological Sex.*

Variables	B	SE	$\beta$	P value	R <sup>2</sup>	F	Model P Value
					.465	F(4,46) = 9.994	P < .001
Religiosity	.232	.061	.428	< .001			
Social provision	-.032	.007	-.565	< .001			
Avoidance	.017	.009	.194	.086			

Figure 2 shows participants in our study preferred to seek social support from Pasifika friends and family members more than non-Pasifika friends, religious affiliation, Pasifika students' associations, or their significant other.

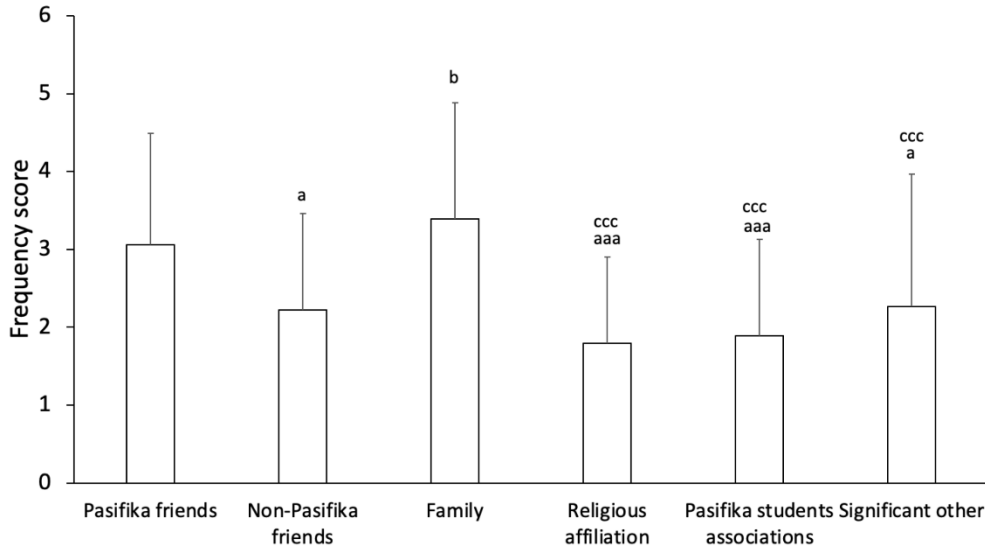


Figure 2. **Frequencies of Pasifika students going to various social support. Pasifika students went to Pasifika friends and family for social support more than the other options.** a = significantly different from Pasifika friend; b = significantly different from non-Pasifika friends; c = significantly different from family. Single, double, triple letters refer to  $P < .05$ ,  $P < .01$ ,  $P < .001$  respectively.

In addition, as noted on Figure 3, participants in our study preferred to look for academic support from academic staff, tutorials at the University’s Pacific Islands Centre, and their friends more than from Pasifika liaisons in the department, family members, and significant other.

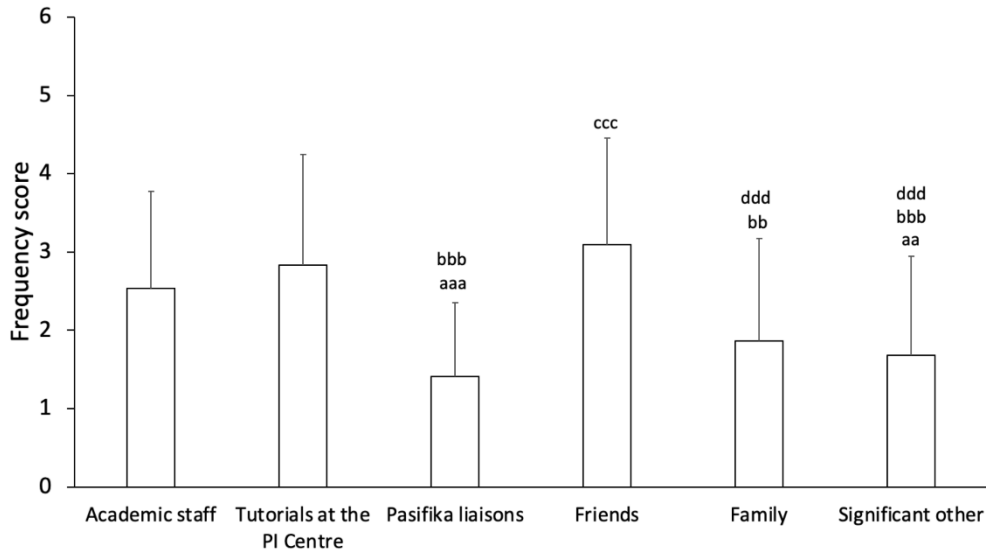


Figure 3. **Frequencies of Pasifika students going to various academic support. Pasifika students went to academic staff, tutorials at the University’s Pacific Islands Centre, and friends for academic support more than the other options.** a = significantly different from academic staff; b = significantly different from tutorials at the Pacific Islands Centre; c = significantly different from Pasifika liaisons; d = significantly different from friends. Single, double, triple letters refer to  $P < .05$ ,  $P < .01$ ,  $P < .001$  respectively.

## Discussion

There are several main findings from this study. First, male participants reported higher stress related to academic expectation than female participants. Secondly, academic stress in Pasifika students is associated with religiosity, social provision, and avoidance behaviour as an ethnic minority. Thirdly, Pasifika students prefer to seek social support from Pasifika friends and family members, and to seek academic support from academic staff, tutorials at the University's Pacific Islands Centre, and their friends. These findings highlight that social factors may be linked to academic stress for Pasifika science students in Aotearoa New Zealand. When supporting Pasifika students, universities need to consider not only academic support, but also take into consideration social support. Our findings may also be relevant to other students who have similar experiences, such as Māori students or other ethnic minority students in Aotearoa New Zealand or elsewhere.

### Academic stress

In this study, male students indicated higher stress levels related to academic expectation compared to female students. This difference may be attributed to the fact that males growing up in a Pasifika household may face a significant deal of pressure and responsibility. Parents in Pasifika cultures play important roles in many students' choices, including their education (Sterne, 2006). Parents of Pasifika students in Aotearoa New Zealand migrate overseas in hopes of providing better educational and career opportunities for their children, which means sacrifices are made to afford them the opportunity to attend university (Anae et al., 2002). Such a situation may put a lot of pressure and expectations on one to do well academically; for example, as documented in Pasifika secondary school students (Evans, 2018).

Our finding suggests that male Pasifika students may require additional academic support. A previous study showed that for many male high school Pasifika students, their learning environment and relationships with their lecturer or teachers play significant roles in their academic outcomes (Evans, 2018). For instance, secondary school male students tend to be more successful if they sense that their lecturer believes in them and utilises various teaching methods (Evans, 2018). Whether or not such a relationship is found in university students remains to be determined.

### Religiosity and academic stress

We find the relationship between religiosity and academic stress surprising. This finding may be due to the fact that religion plays an important part in Pacific cultures. Data from Statistics New Zealand indicate that almost 80 percent of Pacific peoples are affiliated to a religion (Stats NZ, 2018). As noted in the Introduction, religiosity itself may not have a negative impact on academic stress. However, for many students, church responsibilities often take precedence, and they may be involved in various church activities throughout the week (Evans, 2018). These commitments may require students to stay up late in the evening to complete some studying, by which time they are already exhausted. Students and their family members may not always realise the amount of time and effort required to achieve those goals. This information suggests the importance of informing Pasifika students on time management so they can better organise time for study and for church activities.

### Social factors and academic stress

Our findings emphasise the importance of having social support in alleviating academic stress among Pasifika students. Considering that almost all participants were not from Dunedin, many would need to

form new social relationships and adjust to living in a new environment. Most students come from communities with a higher proportion of Pasifika peoples (e.g., North Island of Aotearoa New Zealand or Pacific Islands) than Dunedin. In a recent *talanoa*, we found that many Pasifika students experience culture shock when they first move to Dunedin (Fakapulia, 2022). Those who have difficulties in starting a new social circle may expectedly have an additional stressor, which may ultimately affect their study as well. Furthermore, there may be experiential differences between Pasifika students who come from other part of Aotearoa New Zealand and Pacific Islands, such as in using English as a primary language for communication and lifestyle differences. These may potentially be additional challenges for those coming from overseas.

As noted above, avoiding New Zealand European people was linked to higher academic stress, particularly the one related to academic works. Pasifika students in Dunedin live as an ethnic minority, so expectedly some may have some level of social anxiety towards the New Zealand European people, who are the ethnic majority. In education settings, this may have some academic implication. Pacific cultures are heavily relational and communal (Alkema, 2014). Thus, relationship building, trust, and reciprocity are core values central to a Pasifika student's academic journey and may also help break down barriers for students to open up and approach their lecturer or tutors. Universities in Aotearoa New Zealand lack Pasifika academics (Naepi, 2019). Arguably, the low number of Pasifika academics may make it difficult for Pasifika students to form relationships with the teaching staff. As such, students with social anxiety as an ethnic minority may be reluctant to approach academic staff, who are not of the same ethnicity, when they have difficulties in their studies. Unfortunately, they may have elevated academic stress because they may not have the academic support they need.

The low number of Pasifika academics in universities in Aotearoa New Zealand also means that, unfortunately, few academics are familiar with Pasifika cultures, and some may not know how to navigate through Pasifika student spaces. In addition, in our recent *talanoa*, Pasifika students commented that some university practices do not align with indigenous ways or cultures (e.g., *tikanga*, *anga fakatonga*, *fa'asamoa*) (Fakapulia, 2022). These may potentially deter Pacific students from approaching academics.

### Preference for social and academic supports

Pasifika students prefer to seek social support from Pasifika friends and family members. These findings are expected because ethnic minority people are more likely to form social networks with people of the same ethnicity (Leonard et al., 2008) and family is an important part of Pacific cultures (Benseman et al., 2006; Evans, 2018). While Pasifika students may not have family members close by during their university study, the university may need to put more effort in connecting them to other Pasifika students, early in their university journey. For example, universities can specifically inform Pasifika students about Pacific students associations or organise social events for Pasifika students. Such initiatives may help alleviate some of their challenges while studying. Our team, for example, have met students who expressed interests in finding Pasifika flatmates in their early university study but could not find one.

For academic support, Pasifika students in our cohort prefer to go to academic staff, tutorials at the University's Pacific Islands Centre, and their friends. Each of these, however, has limitations. Academic staff such as lecturers ideally would be the person that students should go to but, from our experiences, many Pasifika students rarely approach them. At this stage, we cannot conclude to what extent their social anxiety as an ethnic minority contributes to their hesitation in approaching academics. Our institution has a Pacific Islands Centre that organises tutorials for many science courses, but tutors' availability can be an issue, especially for more specialised third-year undergraduate science courses. There were also cases where Pasifika students requested a one-on-one tutorial, but such personalised

tutorials could not be offered due to tutors' availability. When tutorials are not available, Pasifika students may turn to their friends. Discussing course materials with friends is great for exchanging ideas. However, it may have caveats if their peers are also struggling with the course materials.

Universities in Aotearoa New Zealand should put a high priority on developing strategic plans to academically support Pasifika students. Universities should, for example, allow more time for Pasifika students to understand topics, offer information on how to do academic writing as expected by lecturers, as well as how to apply their learning beyond their study or in the workplace. Universities should also invite Pasifika students who achieved higher academic results to give feedback on what needs to improve from Pasifika's lenses, not driven by Western perspectives. Such opportunities would inform staff and current students on how they navigated through the university system.

Despite the various initiatives for Pasifika students that are in place in universities in Aotearoa New Zealand, many Pasifika students underperform in science courses (Benseman et al., 2006; Brown et al., 2018). Future initiatives should ideally be assessable so that academics can measure their effectiveness in improving the academic performance of Pasifika students. For example, universities can incorporate skill-based workshops (e.g., on essay writing, literature review, referencing, etc.) early in their university study year, such as the foundation programme at the University of Otago, so students are better equipped academically.

## Limitations

There are a few limitations in our study. For example, our study has a small sample size but this is not surprising because the number of Pasifika students in our department is proportionally much smaller than New Zealand European students. As mentioned above, we distributed the survey to 101 students, and had 56.4 percent response rate. Considering that we did not recruit students of other ethnicity for comparison, we cannot determine if the results are specific to Pasifika students. Some findings may potentially be relevant to other ethnic minority students such as Māori students due to the similarities in cultures and background. In addition, given to the subjective nature of the data collection, there may be some inaccuracies in the data.

## Conclusion

In conclusion, our findings provide evidence that some social factors may contribute to the academic stress of Pasifika students in Aotearoa New Zealand. Institutions need to recognise and be culturally responsive to the needs of our Pasifika students. The support institutions provide may extend beyond academic support but also social support. Furthermore, recognising that some students have social anxiety as a minority, institutions should have diverse scholars that represent ethnic minority groups. Enhancing such areas will help mitigate academic stress faced by Pasifika students. These findings may potentially be relevant to Māori and other ethnic minority students in Aotearoa New Zealand or elsewhere.

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## Supplementary tables

**Table 1.** *Correlation coefficients between academic stress subscales and the subscales of religiosity, social provision, and social anxiety scales.*

	Stresses related to		
	Academic expectations	Faculty work and examinations	Students' academic self-perceptions
Religiosity subscales			
Intellect	.288*	.090	.325*
Ideology	.293*	.107	.398**
Public practice	.258	.236	.472***
Private practice	.244	.049	.337*
Experience	.184	.001	.350*
Social provision subscales			
Attachment	-.265	-.316*	-.162
Social integration	-.221	-.411**	-.366**
Reassurance of worth	-.254	-.398**	-.541***
Reliable alliance	-.308*	-.438**	-.252
Guidance	-.267	-.412**	-.308*
Opportunity for nurturance	.161	.037	-.157
Social anxiety as an ethnic minority			
Avoidance behaviour as an ethnic minority	.095	.143	.162
	.223	.291*	.209

\*Significant associations between academic stress subscales and the independent variable,  $P < .05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$

**Table 2.** *The association between perceived academic stress subscales and religiosity, social provision, and avoidance behaviour as an ethnic minority, after controlling for biological sex. Dependent variables are in italics.*

Variables	B	SE	$\beta$	P value	R <sup>2</sup>	F	Model P Value
<i>Stresses related to academic expectation</i>					.161	F(4,46) = 2.207	.083
Religiosity	.192	.104	.260	.070			
Social provision	-.014	.011	-.185	.216			
Avoidance	.021	.016	.177	.207			
<i>Stresses related to faculty work and examinations</i>					.291	F(4,46) = 4.721	.003
Religiosity	.107	.080	.173	.186			
Social provision	-.031	.009	-.487	< .001			
Avoidance	.020	.012	.201	.121			
<i>Stresses related to students' academic self-perceptions</i>					.434	F(4,46) = 8.824	< .001
Religiosity	.424	.093	.522	< .001			
Social provision	-.044	.010	-.524	< .001			
Avoidance	.010	.015	.074	.517			