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The Application of Blue Zone Theory to Assess Institutional Wellness

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Abstract

There are several ways to conceptualize health. One of them is Blue Zones, places around the world with the highest concentration of people living to 100 years old. As people look for secrets to healthy aging and overall better wellbeing, the idea of Blue Zones has grown in popularity around the United States. While communities around the country have been assessed using Blue Zone's 9 key factors as a way to enhance community wellbeing, universities have remained largely untouched. College campuses are pockets of a community within a larger area, leading to a more specific demographic. This survey was conducted in an effort to evaluate a small, public liberal arts and sciences university population's health using the 9 Blue Zone factors and perceptions of university support for each of these. Results of this study can be used to inform university policy and practices to align practices with student, staff, and faculty perceptions so that the university population can maximize their wellness.

1. Introduction

Health of a Nation

The United States of America (USA) has long been touted as one of the most, if not the most, influential countries in the world. Power can be judged through military, economic, political, or cultural terms.[1] Immediately following World War II, the USA represented nearly half of the world's economy. While their share of the global economy has returned to the pre-war percentages of about a quarter, the nation has been jockeying for power ever since.[2] Regardless of this marginal decrease in global power, the United States is still incredibly powerful; with that power comes great responsibility, especially to the citizens of their country.

On paper, the United States is investing in its citizen's health, as evidenced by the sizable proportion of the USA's gross domestic product (GDP) that is dedicated to healthcare. In 2016, healthcare comprised 17.8% of the GDP, which is double that of 10

other high income countries. This spending is mostly towards labor, goods such as medicine and technology, and administration. However, it is not directed towards preventing diseases.[3] In 2018 the National Health Interview Service (NHIS) composed a list of 10 chronic conditions: hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, asthma, COPD, and kidney trouble. Of these chronic conditions alone, 51.8% of US adults had at least one, with 27.2% having more than one.[4] In 2012, the incidence of adults with more than one was 25.5%, demonstrating an increase in prevalence.

While all people get sick, there are inequities as far as prevalence, treatment, and access. The social determinants of health are the factors in life that influence an individual or a population's health. These include, but are not limited to, race, gender, ethnicity, socioeconomic status, education, employment statistics, income, and language use. These factors all influence an individual's health, and taken big picture, highlight health inequities.[5] Although this was known before the rise of the coronavirus, they were highlighted and exacerbated during the pandemic. The morbidity and mortality rates of COVID-19 disproportionately affected African Americans, Latinx, Native Americans, individuals in prison or jails, immigrants and refugees, people with disabilities, and people with unstable housing.[6]

Conceptualizing Health

It is difficult to provide statistics, evidence, and information for health in broad terms as there are many different ways to conceptualize it. After World War II, the World Health Organization (WHO) defined health as the "state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity".[7] WHO recognizes that it is not just about someone staying out of the doctor's office, but being wholly well. Physical well-being consists of behaviors such as a good diet, regular exercise, and other health promoting factors. Mental well-being has historically been considered to be the absence of a diagnosable mental illness but is better understood to include stress levels, the ability to acknowledge and regulate one's emotions, and resilience. Social well-being consists of someone's connection with friends, family, regularly seeing people through school or work, etc. These factors all feed into and influence one another.

Another way to conceptualize health is looking primarily at psychological well-being to signify health. Lomas and VanderWeele (2022) explain how several intellectuals have tried to create visuals to conceptualize well-being, Maslow's hierarchy of needs being the most prominent. The 6 factors of Maslow's theory are physiological, safety, love and belonging, esteem, self actualization, and self-transcendence with physiological as the base of a pyramid and self-transcendence as the top. These same principles were reconceptualized into a sailboat by Kaufman, with the base layers comprising the hull, ensuring stability and security, and the top layers providing movement and creating individuality.[8]

Lomas and VanderWeele also throw out their own metaphor, showing that health metaphors can be taken to the population level, similar to a garden. In their metaphor, each individual plant has factors that contribute to its health: the stem, leaves, flowers, and roots. These components are individual, but also feed into one another. The health

of the overall plant cannot be complete without each part doing its job.[8] Similarly, the health of the overall garden influences each plant.

One of the most popular conceptualizations, perhaps because of the clear cut statistics, is life-span. Life-span is the expected length of life for newborns in that year. Life-span has consistently risen from 47.3 years in 1900 to 78.7 years in 2010. The ability to reduce infant mortality has been a key component in this rise. Now, the leading causes of death are cardiovascular disease and cancer, diseases that primarily take hold later in life; chronic conditions take up 7 out of the top 10 causes of death. The United States did recently experience a decline in life-span due to the COVID-19 pandemic, its first since the early 1900s. Men experienced the biggest change, a 2.2 year drop in 2020.[9]

However, many adults do not live all of their years in good health. This concept is called health span; the number of years that an individual is consistently healthy. The statistics from the NHIS survey on adults with chronic conditions highlight that over half of the nation's adults have a chronic condition. As well, rates of chronic conditions rise with increasing age. The prevalence of having 1 chronic condition for an adult age 18-44 is 20.7%, 30.4% for 45-64, and 23.9% for adults over the age of 65.[4] The drop in the 45-64 age group to those older than 65 is due to fact that 63.7% of adults 65 years and older having 2 chronic conditions. Health-span could be argued to more accurately reflect the health of a nation.

Blue Zones

Blue Zones reflect not only improved life-span, but more importantly, an improved health-span. The idea of Blue Zones was first coined by Dan Buettner during a National Geographic exploration of the areas of the world that had the highest rates of longevity. Buettner was trying to “uncover the secrets of longevity” to understand how we can live longer. The search started in Okinawa, Japan, but five areas of significant longevity were discovered. In addition to Okinawa, the list includes Sardinia, Italy; Ikaria, Greece; Loma Linda, California; and Nicoya, Costa Rica. These areas are recognized as a Blue Zone if their residents reach 100 years of age at a rate 10 times higher than the United States.[10]

While all of these areas have different cultures, traditions, diets, habits, and more, Buettner’s team found nine causal factors that are shared among all of the Blue Zones. These factors, called the “Power 9™”, are as follows: Move Naturally, Down Shift, Purpose, Wine at 5, Plant Slant, 80% Rule, Loved Ones First, Belong, and Right Tribe.[10]

Power 9™ factors	Definition[10]
Move Naturally	Physical activity is a natural part of the way you live your life, not simply going out and exercising.
Wine at 5	Alcohol is consumed almost daily, except for in Loma Linda, CA. It is approached socially and with moderation. Only 1-2 glasses with dinner, around friends.

Plant Slant	Meat is eaten on rare occasions or in small portions. Beans make up a big part of the Blue Zone diet.
80% Rule	Stop eating when you are 80% full. The last 20% brings excessive eating that leads to unnecessary weight gain.
Belong	Be an active member in a faith or spiritual based group.
Purpose	“Why I wake up in the morning.”
Loved Ones First	Family is closely connected, often living close to one another and constantly supporting each other.
Down Shift	Stress is a natural part of life, take part in daily practices to reduce stress and mitigate the risks of chronic stress.
Right Tribe	Behavior in social circles is contagious. Find the people that support healthy practices and you yourself will pick up those habits.

Table 1: The 9 factors identified in Blue Zones and how the Blue Zone research team has described them.

Similar to other metaphors, these principles are all independent, but feed into one another. In our metaphorical garden, Move Naturally can be seen as the flowers, Loved Ones First, Belong, and Right Tribe can be the roots, Downshift and Purpose can be the leaves, and Plant Slant, 80% Rule, and Wine at 5 can be the stem of our plant.

Another aspect to Blue Zones is what was coined the “Life Radius”, defining the 5 miles around an individual’s home. Blue Zones states that individuals spend around 90% of their life within that 5 mile radius.[10] Therefore, targeting changes within the 5 mile radius will have the largest effect. To continue the garden metaphor, this is the garden as a whole; every organism contributes to the health of the other, a cumulative and contagious effect. There are differing figures on how much your life-span is determined by genes. Blue Zone cites this number as 20%[10] signifying that your environment plays a large role in determining your health. This can be expressed through the natural and built environment, epigenetics, social environment such as your peers and their behaviors, and policies affecting your health.

University Utilization of Blue Zones

After the success of researching the Blue Zones, Dan Buettner and his company began taking the lessons they learned from their research and working to apply them in cities around the United States. Alberta Lea, Minnesota was the first community they began working in, but by 2016, they had impacted 26 communities, including completed projects such as the State of Iowa and the California Beach cities of Manhattan Beach, Hermosa Beach, and Redondo Beach.[10] For these projects, the Blue Zones team analyzes both natural and built environments to see how they work and can influence health, as well as working with public health groups to create programs around some of the Power 9™ such as walking groups and based off of the Okinawa’s friendship group

called *moai*.[11] The work that is done by the Blue Zones team has been impactful in these communities. Rates of smoking has consistently declined in each of these communities, Body Mass Index scores are down, healthy eating is up, along with a general increase in reported healthy behaviors.[10] Individuals are provided a checklist to analyze their personal environment, looking at factors in the home, kitchen, bedroom, and tribe. Marston, Niles-Yokum, and Silva (2021) highlight transferability issues to a more diverse human experience.[11] These checklists are offered through a membership which may impact the health equity through availability, similar to the lack of transferability in the checklist items themselves.

Blue Zones projects have impacted communities around the country, but one type of community that hasn't been reached is college campuses. They could be an interesting example of how Blue Zones can be targeted on a specific and influential scale. Campuses experience a lot of community health promotion already. Students are able to be targeted specifically with specialized buildings like health and counseling centers, student recreation, student unions, and department focused buildings. The Life Radius is pertinent to colleges because for many, especially those who live on campus, they spend so much of their time in the campus area.

College students are also at a pivotal point in their lives. They are experiencing new-found freedom and are living independently for the first time, away from the watchful eyes of parents. This, coupled with the idea that late adolescents tend to get closer to their parents in the 16-20 year old range following their rebellious teen years, leads to lots of challenges, especially at the beginning.[12] This is exemplified through the "Freshman 15", the idea that it is normal to put on 15 pounds during your freshman year. While this might not be the case for all, the 18-29 year old age range experiences the highest rates of becoming overweight, and students usually gain the most weight their first year.[13] These students are aware of it as well. 70% of the study participants expressed concern about their weight gain and were interested in health promotion programs, to which there are often options.[13] However, just like health inequities, college students living on the same campus have different perceptions of barriers to accessing these health promotion programs. These perceptions can be targeted in health promotion by providing actions to get around barriers, not just health information.[13] Targeting the attitudes, interests, motivations, self-efficacy can improve access to health promotion materials and improve health equity on college campuses.[14]

COVID-19 severely disrupted the economy. Schools big and small, public and private, experienced heavy losses during the pandemic. Some schools had to close their doors completely.[15] The combination of the effects of transitioning to online learning and implementing health and safety measures lead to an instability in many universities' financial structure.[16] As such, a formal connection between Blue Zones and college campuses isn't in the budget for many. However, it is possible for universities to use the lessons learned from the Blue Zones and Blue Zone project case studies to influence their wellness practices. First and foremost, evaluating the university population on the basis of the Power 9™ factors can provide insight into the physical, mental, and social well-being. Using the principles of Life Radius, universities can evaluate their natural and built environment and how conducive that environment is to promoting healthy behaviors.

The purpose of the present study is to investigate the following research questions: (1) How do the University's students, faculty, and staff score on 9 studies related to Blue Zones?, and (2) How do the University's students, faculty, and staff perceive that the University supports their efforts to follow the 9 Blue Zone principles? The research team's hypotheses are that:

1. University students will score well on $\leq$ 4 blue zone categories
2. University faculty/staff will score well on $\geq$5 blue zone categories
3. Students will perceive the University to score well on $\leq$3 blue zone categories
4. UNCA faculty/staff will perceive the University to score well on $\leq$3 blue zone categories

Recalling the garden metaphor by Lomas and Vanderweele (2022), the gathered data reveals the health of the parts of the plant, the plant as a whole, the garden as a whole, and how the garden is tended.

2. Methods

2.1 Participants

A total of 119 participants took part in this survey. In order to examine the wellness of students, faculty, and staff, the research team used convenience sampling through social media fliers and email listservs. 119 participants responded to the survey, with 65 students responding, 33 staff, and 21 faculty members. Due to the nature of recruitment, response rates were unclear.

2.2 Materials

2.2.1 Baecke Questionnaire of Habitual Physical Activity[16]

This instrument was used to evaluate the Power 9 factor "Move Naturally". The 17 item questionnaire assesses how active a person's total lifestyle is. It is broken down into work, sports, and leisure activity subsets. The questions are on a Likert type scale from 1-5: 1=Never, 2=Seldom, 3=Sometimes, 4=Often, and 5=Always. The research team removed the first question, "what is your main occupation" due to the fact that the answer would be "student", "faculty", or "staff" and would not affect their habitual physical activity behaviors. The team also did not count the question "Do you play a sport" and added the remaining questions from the sport subset to the leisure subset to improve ease of scoring and remove subjectivity from the research team. Scoring for this subsection was corrected accordingly. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their physical activity.

2.2.2 Alcohol Use Disorders Identification Test (AUDIT)[17]

This instrument was used to evaluate the Power 9 factor "Wine @ 5". The AUDIT is a 10 item survey to determine if an individual is suffering from Alcohol Use Disorder.

Scoring below an 8 shows a healthy relationship with alcohol, above an 8 is associated with harmful or hazardous behaviors, and over a 13 in males and 15 in males is associated with alcohol dependence. For the purpose of this study, the research team is using the AUDIT to identify general behaviors around alcohol, not to diagnose. If the participant answers “Never” to the first question, “How often do you have a drink containing alcohol?”, they will skip the rest of the section. Therefore, their scores will not be counted in the data. Questions 1-8 are on a 0-4 point scale, with questions 9 and 10 being a 3 point scale of “no”, “yes, but not in the past year”, and “yes, in the past year”. These questions are scored 0,2, and 4 accordingly. The research team added a question on the typical alcohol consumed, with answers being “wine”, “beer”, “liquor”, and “cider/seltzers”. This question was added due to literature pointing to wine as the primary form of alcohol drunk in Blue Zones, however the question does not affect the participant’s overall score on the AUDIT. The AUDIT yielded an acceptable Cronbach’s Alpha score of .83. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to have healthy practices with alcohol.

2.2.3 Mini Eating Assessment Tool (Mini EAT)[18]

This instrument was used to evaluate the Power 9 factor “Plant Slant”. The Mini EAT is a 9 item survey used to predict healthy eating habits. It is a survey that has been reduced from 19 questions, with these 9 questions being the best predictors of a good diet. Each question is scored 1-9, with a maximum score being 81. The questions pertain to how often the participant eats a particular food group, where 1= “I do not eat this food group at all” and then defining portions per week or per day, with a 9=6 or more servings per day. A score of 60 and below is associated with a poor diet, a score of 61-69 is associated with a fair diet, and a score of 70 and above is associated with a healthy diet. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to choose to maintain a healthy diet.

2.2.4 Intuitive Eating Scale-2 (IES-2)[19]

This instrument was used to evaluate the Power 9 factor “80% Rule”. The IES-2 is a 23 item survey, however the research team used the questions for the “Reliance on Hunger and Satiety Cues” subset, resulting in a 6 question survey. Questions are true/false and cumulatively scored. An answer of “True”=1 and an answer of “False”=2. The IES-2 yielded an acceptable Cronbach’s Alpha reliability score of .87 for women and .89 for men. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to have healthy eating habits.

2.2.5 Religiosity[20]

This instrument was used to evaluate the Power 9 factor “Belong”. The original study is investigating how religiosity lowers the risk adolescents participating in substance use. The research team pulled the “value on religion” questions resulting in a 4 item survey focused on religious involvement and attendance. This decision was

made due to unclear scoring, as well as the low requirements from within the Blue Zone literature stating the most influential consideration around religiosity is whether an individual is a part of a faith based organization. This scale was primarily used as part of the demographics section. The research team decided this was the best course of action to be able to clearly see religious involvement in the university and perceptions on how the University supports faith-based involvement. The original survey is focused exclusively on religion, but the research team added spirituality to include the diverse background of the university's students, faculty, and staff. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to actively engage in their religiosity or spirituality.

2.2.6 Life Engagement Test[21]

This instrument was used to evaluate the Power 9 factor "Purpose". The developers of this survey defined purpose through "the extent to which a person engages in activities that are personally valued." It is a 6 item survey, scored on a 1-5 scale, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Questions 1,3, and 5 are reverse coded and the scores summed. The Life Engagement Test yielded an acceptable Cronbach's Alpha score of a .80, with item-level reliability ranging from .72-.87. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to develop purpose in their own lives.

2.2.7 Beach Center Family Quality of Life Scale (FQOL)[22]

This instrument was used to evaluate the Power 9 factor "Loved Ones First". The full FQOL scale is a 25 item survey, however the research team pulled the "Family Interaction" subscale as it most closely aligned to the parameters the literature defined for the Blue Zone factor. Therefore, the participants answer 6 questions from the FQOL to assess their connection to family. The research team added that family could mean biologically or chosen in the effort of inclusion. Answer choices are on a 1-5 scale, where 1=very dissatisfied, 3=neither satisfied nor dissatisfied, and 5=very satisfied.The subsection used in the FQOL yielded an acceptable Cronbach's Alpha score of .92. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to maintain a connection with their family, when desired.

2.2.8 Perceived Stress Scale (PSS)[23]

This instrument was used to evaluate the Power 9 factor "Downshift". The questionnaire attempts to measure perceived stress felt in the last month. It is the "most widely used psychological instrument" for measuring an individual's perceived stress levels. This 10 item survey is on a 0-4 scale, where 0=never, 1=almost never, 2=sometimes, 3=fairly often, and 4=often. The PSS yielded an acceptable Cronbach's Alpha score of .82. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to manage their stress and educates on methods to downshift.

2.2.9 Interpersonal Support Evaluation List-12 (ISEL-12)[24]

This instrument was used to evaluate the Power 9 factor “Right Tribe”. The ISEL-12 is 12 item, shortened from the original 40 item survey, and measures on subscales of appraisal, belonging, and tangible. The ISEL-12 operates on a 4 point scale where 1=definitely false, 2=probably false, 3=probably true, and 4=definitely true. The ISEL-12 yielded an acceptable Cronbach’s Alpha score of .87. The research team added a Likert type question and open-ended question to allow participants to explain their perceptions about how the University supports their ability to connect with others and form close relationships with their peers.

2.3 Procedures

After approval by the Institutional Review Board, participants were recruited through convenience and snowball sampling. A flier was distributed through social media weekly, an email was sent twice through faculty, staff, and student email listservs, and a follow-up email was sent to campus groups in an effort to recruit more underrepresented identities. The emails and fliers had a QR code and an anonymous link to the survey. The survey began with an informed consent form that required a “yes” or “no” answer. Upon clicking “yes”, participants would be directed to the rest of the survey, beginning with the demographics section. After denoting whether they were a student, faculty, or staff, the participant would be shown specific follow up questions around their history at UNC-Asheville. After the demographic information was submitted, the participant would fill out the instruments in the following order: Baecke Questionnaire of Habitual Physical Activity, Alcohol Use Disorders Identification Test (AUDIT), Mini-Eating Assessment Tool (EAT), Intuitive Eating Scale-2, Religiosity and Substance Use, The Life Engagement Test: Assessing Purpose in Life, Beach Center Family Quality of Life Scale, Perceived Stress Scale, Interpersonal Support Evaluation List-12. At the end of each instrument, the research team added two questions to allow the participant to score how the University supports their ability to fulfill this factor. There was one Likert-type scale using Strongly Disagree-Strongly Agree terms. A follow up qualitative question was provided for the participant to elaborate on their answer. Upon completion of all instruments, participants were presented with resources gathered by the research time for each Blue Zone factor of wellness. Students, faculty, and staff were shown the same list, but specific resources were denoted to each group. In addition to the list of resources, participants were thanked for their time and prompted to reach out to the research team if they were interested in the results of the study. SPSS was used to analyze the resulting data. Means were found for the individual questionnaires and the perceived university support for each area. An analysis of variance (ANOVA) was conducted for each questionnaire to explore differences between faculty, staff, and students. Tukey’s HSD was used to examine the differences between groups.

3. Results

3.1 Demographics

There were a total of 119 participants that took this survey. Out of all respondents, 54 (48%) were between ages 18-24, 5 (4%) were between ages 25-29, 12 (11%) were between ages 30-36, 13 (12%) were between ages 37-43, 10 (9%) were between ages 44-50, 9 (8%) were between ages 51-57, 5 (4%) were between ages 58-64, 4 (4%) were between ages 65-71, and 1 respondent preferred not to answer. When asked to identify their gender, 80 (68%) respondents identified as female, 27 (23%) identified as male, 4 (3%) identified as non-binary, 2 (2%) identified as transgender, 1 individual's gender was not listed, and 4 participants preferred not to answer (Figure 1). When asked to identify their ethnicity, 107 (91%) of respondents identified as white, 6 (5%) identified as black or african american, 5 (4%) identified as asian, 4 (3%) identified as hispanic or latino, and there were no responses from native hawaiian or other Pacific Islanders or American Indian or alaskan native groups (Figure 2). When asked if they belonged to a religious or spiritual group, 81 (76%) participants reported that they did not belong to a church, temple, mosque, or spiritual organization, while 25 (24%) reported that they did. 55 (52%) of respondents reported not identifying with a religion or spiritual group, 25 (24%) identified with christianity, 8 (8%) identified with a spiritual group, 5 (5%) identified with judaism, 2 (2%) identified with buddhism, 1 (1%) identified with hinduism, and 9 (9%) reported identifying with another religion or spiritual group (Figure 3).

Of the 119 participants, 65 (55%) of respondents were students, 33 (28%) were staff, and 21 (18%) were faculty (Figure 4). Among student respondents, 19 (29%) were in their second year of enrollment, 15 (23%) were in their fourth year, 15 (23%) were in their first year, 14 (22%) were in their third year, and 2 respondents had been enrolled at the university for over four years. Student’s majors included psychology (25), health and wellness (18), biology (4), environmental studies (4), business (2), economics (2), with single respondents from accounting, atmospheric science, education, interdisciplinary studies, management, mass communication, music, political sciences, sociology, and an undecided. Among faculty and staff respondents, 18 (35%) have been employed by the university for up to 4 years, 17 (33%) have been employed by the university for between 5-9 years, 4 (8%) have been employed by the university for between 10-14 years, 5 (10%) have been employed by the university for between 15-19 years, 2 (4%) have been employed by the university for between 20-24 years, and 4 (8%) have been employed by the university for 25 or more years. There was representation from 26 departments for the faculty and staff (Table 2). Among all respondents, 27 (23%) lived on campus while 88 (77%) lived off campus. Of the 88 respondents who lived off campus, 54 (62%) lived within city limits, 29 (33%) lived outside of city limits but within county boundaries, 3 lived in another county, with 1 respondent living in another state.

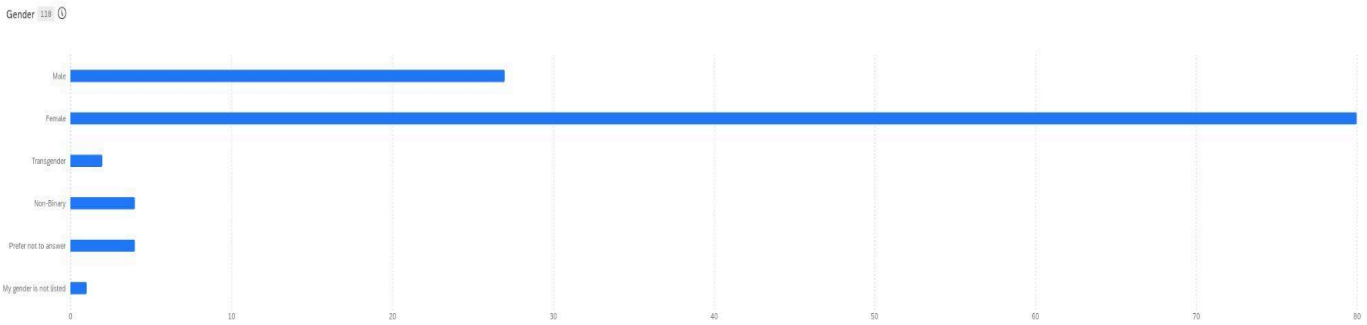

Figure 1: Participant's identified genders. 80 (68%) respondents identified as female, 27 (23%) identified as male, 4 (3%) identified as non-binary, 2 (2%) identified as transgender, 1 individual's gender was not listed, and 4 participants preferred not to answer.

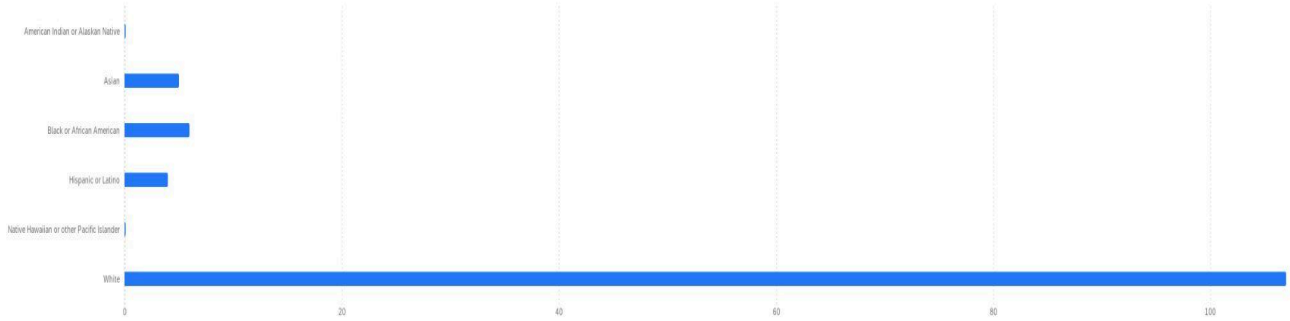

Figure 2: Participants identified race/ethnicities. When asked to identify their ethnicity, 107 (91%) of respondents identified as white, 6 (5%) identified as black or african american, 5 (4%) identified as asian, 4 (3%) identified as hispanic or latino, and there were no responses from native hawaiian or other Pacific Islanders or American Indian or Alaskan native groups.

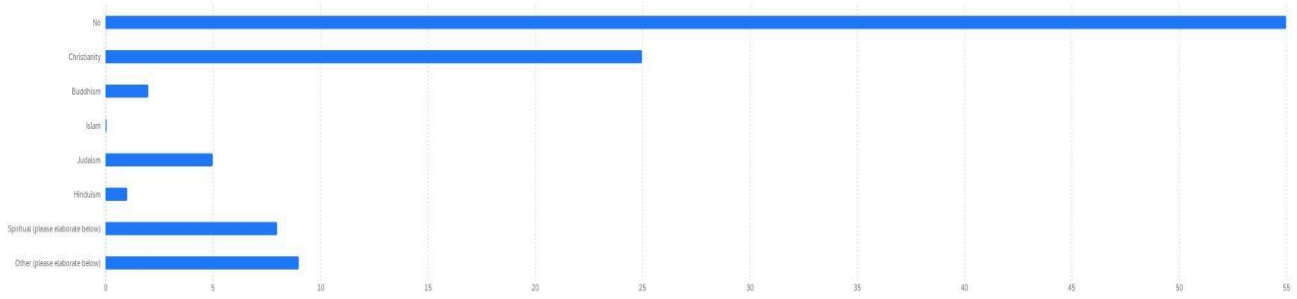

Figure 3: Participants identification with a religious or spiritual group. 81 (76%) participants reported that they did not belong to a church, temple, mosque, or spiritual organization, while 25 (24%) reported that they did. 55 (52%) of respondents reported not identifying with a religion or spiritual group, 25 (24%) identified with christianity, 8 (8%) identified with a spiritual group, 5 (5%) identified with judaism, 2 (2%) identified

with buddhism, 1 (1%) identified with hinduism, and 9 (9%) reported identifying with another religion or spiritual group.

Figure 4: The role of each participant at the University. 65 (55%) of respondents were students, 33 (28%) were staff, and 21 (18%) were faculty.

Departments	**Representation**
Academic Affairs	4
Athletics	3
ITS	3
Academic Success Center	2
Budget & Finance	2
Chancellor's Office	2
HWP	2
Physics	2
Student Affairs	2
Natural Sciences	1
Admissions and Financial Aid	1
Art	1
Campus Operations	1
Chemistry	1
Education	1
English	1
Environmental Studies	1
History/Philosophy/Drama	1
Humanities	1
Languages	1
Library	1
Marketing and Communication	1
New Media	1
Philosophy	1
Psychology	1

Study Abroad	1

Table 2: Faculty/Staff representation by department.

3.2 Individual Factors

Your role at UNCA		Activity Work Overall Score	Activity Leisure Overall Score	Alcohol_Overall	Diet_Overall	HungerAwareness_Overall	Purpose_Overall	Family_Overall	Stress_Overall	Tribe_Overall
Student	Mean	2.9174	3.3560	4.7826	40.9661	1.3190	25.1379	24.0172	23.8571	26.8036
	N	64	61	46	59	58	58	58	56	56
	Std. Deviation	.33749	.36386	2.64922	7.05878	.34240	4.53233	6.50369	7.08501	5.95871
Faculty	Mean	2.8214	3.1429	3.3333	42.5294	1.2451	27.4118	27.4118	22.3529	30.0000
	N	20	19	18	17	17	17	17	17	16
	Std. Deviation	.35864	.43903	2.05798	5.48996	.24380	3.35520	4.12400	7.99954	4.00000
Staff	Mean	2.6696	3.2304	4.4583	41.8710	1.2419	24.3000	27.0690	23.0000	27.1154
	N	32	31	24	31	31	30	29	29	26
	Std. Deviation	.41758	.33131	3.28341	6.01521	.27500	5.62108	4.02608	6.55199	7.46366
Total	Mean	2.8325	3.2844	4.3977	41.4766	1.2846	25.2667	25.4231	23.3627	27.4082
	N	116	111	88	107	106	105	104	102	98
	Std. Deviation	.37692	.37525	2.76073	6.51319	.30943	4.77829	5.74320	7.05114	6.18918

Table 3: Means and Standard Deviation for the 8 subscales used. Categories are broken up by student, faculty, and staff with cumulative results at the bottom.

3.2.1 Baecke Questionnaire of Habitual Physical Activity

The ANOVA test found significant differences as it relates to natural activity level while on campus (F (2,113)= 4.936, p=.009). The significance was found between students and staff (p=.006). There was no significant difference between students and faculty or faculty and staff. Students were the most naturally active while on campus, followed by faculty, with staff being the least physically active while on campus (Figure 5).

There was no significant difference between students, faculty, or staff as it relates to physical activity during leisure time (F(2,108)= 2.877, p=.061). Faculty scored the lowest, followed by staff, with students being the most active during leisure time.

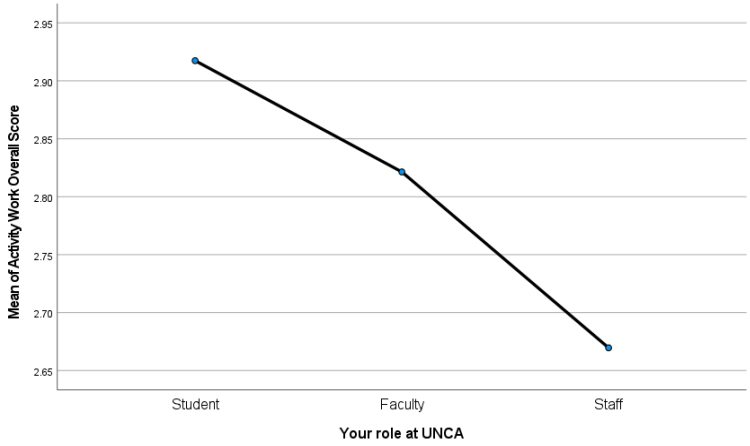

Figure 5: Significant (p<.05) ANOVA scores for Baecke Questionnaire of Habitual Physical Activity work subscale.

3.2.2 Alcohol Use Disorders Identification Test (AUDIT)

There was no significant difference between students, faculty, or staff as it related to alcohol use (F(2,85)=1.825, p=.168). Faculty scored the lowest, followed by staff, with students having the highest propensity towards drinking.

3.2.3 Mini Eating Assessment Tool

There was no significant difference between students, faculty, or staff as it related to eating a plant forward diet (F(2,104)= .455, p=.635). Students scored the lowest, followed by staff, with faculty scoring the highest

3.2.4 Intuitive Eating Scale-2

There was no significant difference between students, faculty, or staff as it related to eating intuitively and having healthy habits around food (F(2,103)= .788, p=.458). Faculty and staff scored similarly on this section, with students having the highest score.

3.2.5 Religiosity

This subscale was not scored for differences. Results on this scale are in the demographics section.

3.2.6 Life Engagement Test

There was no significant difference between students, faculty, or staff as it related to feeling a sense of purpose (F(2,102)=2.412, p=.095). Staff scored the lowest, followed by students, with faculty feeling the greatest sense of purpose.

3.2.7 Beach Center Family Quality of Life Scale

The ANOVA test revealed significance as it related to family interaction scores (F(2,101)= 4.192, p=.018). The significance was found between students and staff (p=.047). Students scored the lowest with family interaction, with faculty and staff having similar scores (Figure 6).

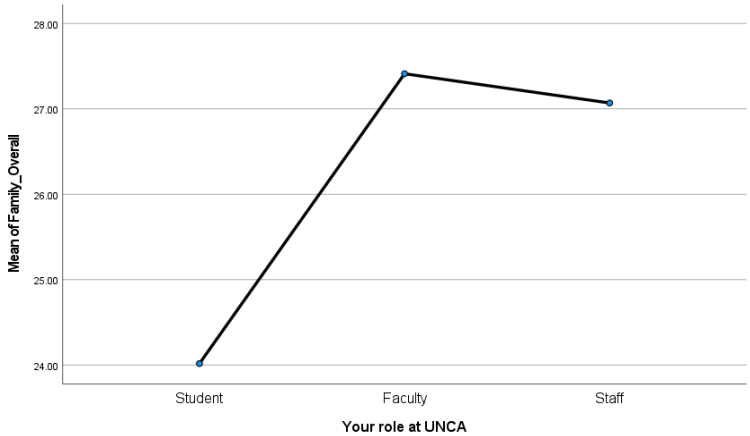

Figure 6: Significant (p<.05) ANOVA scores for Beach Center Family Quality of Life Scale.

3.2.8 Perceived Stress Scale

There was no significant difference between students, faculty, and staff as it related to perceived stress (F(2,99)= .346, p=.708). Faculty scored the highest, followed by staff, with students perceiving the most stress.

3.2.9 Interpersonal Support Evaluation List-12 (ISEL-12)

There was no significant difference between students, faculty, or staff as it related to interpersonal support (F(2,95)=1.725, p=.184). Students scored the lowest, followed by staff, with faculty feeling the most interpersonal support.

3.3 Perceptions of Support

Your role at UNCA		UNC-Asheville supports my ability to live a naturally active lifestyle.	UNC-Asheville supports my ability and educated me on the importance of drinking responsibly.	UNC-Asheville provides sufficient plant-based food options for when you choose to eat plant-based, while you are on campus.	UNC-Asheville supports my ability to eat consciously and have healthy eating habits.	UNC-Asheville supports my belonging to any religious institution or spiritual group of my choosing.	UNC-Asheville supports my ability to have or develop a sense of purpose.	UNC-Asheville supports my ability to connect with my family (biological or chosen) when I am at school, when desired.	UNC-Asheville supports my ability to manage my stress and educates or provides ways for me to downshift.	UNC-Asheville supports my ability to connect with peers and form close relationships with others.
Student	Mean	3.68	2.89	3.12	3.12	3.02	3.69	3.31	3.07	3.46
	N	62	62	59	58	58	58	58	57	56
	Std. Deviation	.785	1.042	.948	.880	.848	1.046	1.096	1.083	1.026
Faculty	Mean	3.26	2.68	3.50	2.88	3.00	3.41	3.12	2.41	2.71
	N	19	19	16	17	17	17	17	17	17
	Std. Deviation	1.098	.946	.816	.697	.000	1.004	.857	.870	.920
Staff	Mean	2.71	2.57	3.55	3.29	3.26	3.10	3.52	2.33	3.07
	N	31	30	31	31	31	30	31	30	29
	Std. Deviation	1.039	1.040	.925	.783	.965	1.094	.851	1.028	.884
Total	Mean	3.34	2.77	3.30	3.13	3.08	3.48	3.34	2.75	3.23
	N	112	111	106	106	106	105	106	104	102
	Std. Deviation	1.000	1.027	.938	.829	.818	1.075	.994	1.086	1.004

Table 4: Means and standard deviations for perceptions of university support from students, faculty and staff. Cumulative results are at the bottom.

3.3.1 Baecke Questionnaire of Habitual Physical Activity

The ANOVA test revealed significant differences as it relates to the perception of how the University supports each group's ability to live a naturally active life (F(2,109)=11.592, p=<.001). The significance was found between students and staff (p=<.001). Staff perceived the lowest support from the University, faculty second, with students perceiving the most amount of support from the University (Figure 7).

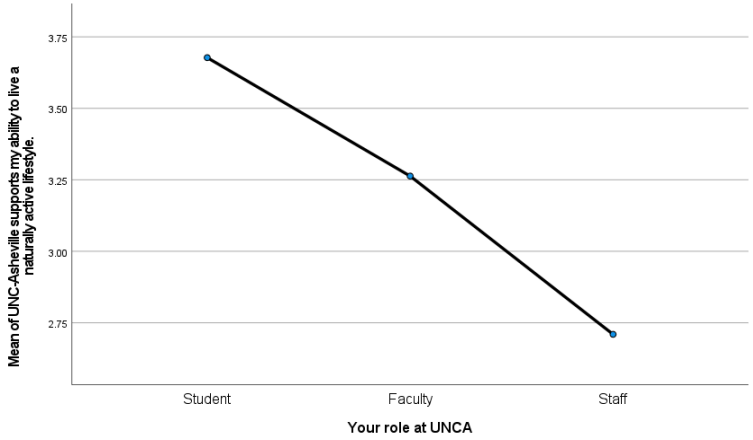

Figure 7: Significant (p<.05) ANOVA results for University support for habitual physical activity.

3.3.2 Alcohol Use Disorders Identification Test (AUDIT)

There was no significant difference between students, faculty, and staff as it related to perceptions of how the University supports their ability to and education around drinking responsibly (F(2,108)=1.058, p=.351). Staff perceived the lowest rate of university support, faculty second, with students perceiving the most support.

3.3.3 Mini Eating Assessment Tool

There was no significant difference between students, faculty, and staff as it related to perceptions of how the University supports their ability to eat a plant forward diet when desired (F(2,103)=2.634, p=.077). Students perceived the lowest rate of university support, faculty second, with staff perceiving the most support.

3.3.4 Intuitive Eating Scale-2

There was no significant difference between students, faculty, and staff as it related to perceptions of how the University supports their ability to eat consciously and have healthy eating habits (F(2,103)=1.351, p=.264). Faculty perceived the lowest rate of university support, students second, with staff perceiving the most support.

3.3.5 Religiosity and Substance Use

There was no significant difference between students, faculty, and staff as it related to perceptions of how the University supports their belonging to any religious institution or spiritual group (F(2,103)=.985, p=.377). Faculty perceived the lowest rate of university support, students second, with staff perceiving the most support.

3.3.6 Life Engagement Test

The ANOVA test revealed significant differences as it related to the perception of how the University supports each group's ability to feel or develop a sense of purpose. (F(2,102)=3.134, p=.048) The significance was found between students and staff

(p=.038). Staff perceived the lowest support from the University, faculty second, with students perceiving the most amount of support from the University (Figure 8).

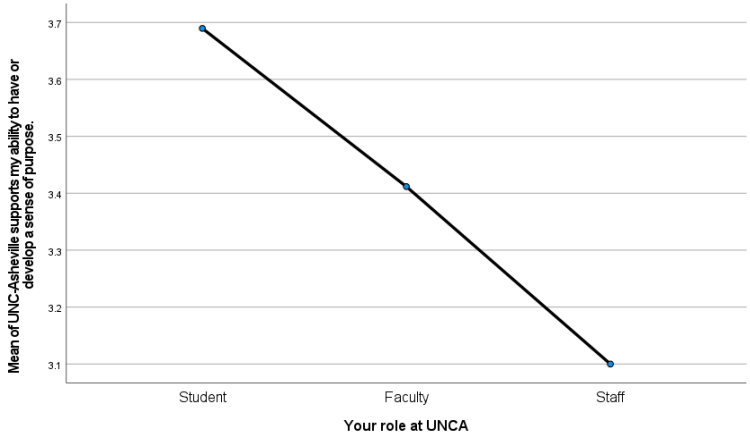

Figure 8: Significant (p<.05) ANOVA result for University support for purpose.

3.3.7 Beach Center Family Quality of Life Scale

There was no significant difference between students, faculty, and staff as it related to perceptions of how the University supports their ability to connect with their biological or chosen family while at school (F(2,103)=.936, p=.395). Faculty perceived the lowest rate of university support, students second, with staff perceiving the most support.

3.3.8 Perceived Stress Scale

The ANOVA test revealed significant differences as it related to the perception of how the University supports each group's ability to appropriately manage their stress. (F(2,101)=6.049, p=.003). The significance was found between students and staff (p=.006). Staff perceived the lowest support from the University, faculty second, with students perceiving the most amount of support from the University (Figure 9).

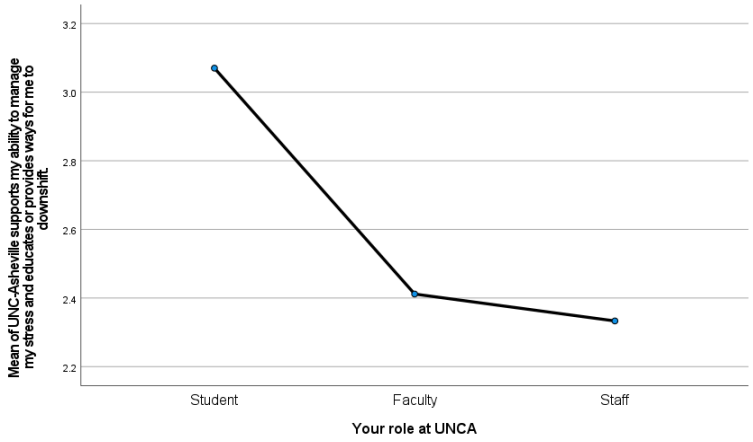

Figure 9: Significant (p<.05) ANOVA result for university support for reducing stress.

3.3.9 Interpersonal Support Evaluation List-12 (ISEL-12)

The ANOVA test revealed significant differences as it relates to the perception of how the University supports each group's ability to connect with a healthy and supportive tribe. (F(2,99)=4.505, p=.013) The significance was found between students and faculty (p=.016). Faculty perceived the lowest support from the University, staff second, with students perceiving the most amount of support from the University (Figure 10).

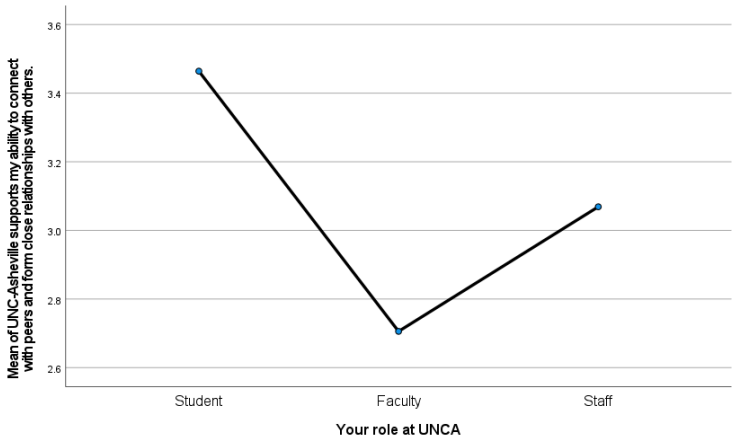

Figure 10: Significant (p<.05) ANOVA result for university support for connecting with the right tribe.

4. Discussion

Given that investigating the relationship between Blue Zones and universities has not been discussed in prior literature, the findings cannot easily be related to previous research. This study serves as a snapshot of the current health climate at the studied University and works to reveal if there are certain factors from the Blue Zones that need more attention.

4.1 Wellness Survey Hypotheses

The data shows that students from the university scored well on 5 of the 9 scales: AUDIT, IES-2, Life Engagement Test, FQOL, and ISEL-12 scales. This correlates to the Blue Zone factors of "Wine @ 5", "80% Rule", "Purpose", "Loved Ones First", and "Right Tribe". The 4 scores that did not meet positive score requirements were both subsets of the Baecke Questionnaire of Habitual Physical Activity, Mini EAT, and Perceived Stress Scale. This correlates to the Blue Zone factors of "Move Naturally", "Plant Slant", and "Downshift". With these results, the hypothesis that students will score well on ≤ 4 blue zone categories is rejected. The data shows that faculty and staff from the university scored well on 5 of the 9 scales: AUDIT, IES-2, Life Engagement Test, FQOL, and ISEL-12 scales. This correlates to the Blue Zone factors of "Wine @ 5", "80% Rule", "Purpose", "Loved Ones First", and "Right Tribe". The 4 scores that did not meet positive score requirements were both subsets of the Baecke Questionnaire of Habitual Physical Activity, Mini EAT, and Perceived Stress Scale. This

correlates to the Blue Zone factors of “Move Naturally”, “Plant Slant”, and “Downshift”. With these results, the hypothesis that faculty/staff will score well on ≥5 blue zone categories is confirmed.

Students, faculty, and staff scored well on the same five scales. However, there were significant differences between student and staff scores when measuring physical activity while on campus and family connectedness. Students scored higher on the physical activity section, most likely because of the nature of a college campus. For students, it truly is a campus, but for staff, it is more of a conglomeration of office buildings. While the same resources are available for both parties, i.e. gym, quad, gardens, etc, they are utilized differently. Students, especially those on campus, naturally walk back and forth to different buildings. A typical day for a student might look like dorm, cafeteria, class, dorm, library, cafeteria, class, class, dorm, cafeteria, dorm. Even off campus students have to walk to and from their car, and while on campus might be walking between buildings. Staff members, on the other hand, most likely have a reliable parking spot, walk to their office, work, and then go home. Physical activity is more of an intentional effort rather than a natural part of their schedule.

For family connectedness, staff scored an average of 3 points higher than students. This is the largest difference in test scores for any subsection. This is most likely related to two factors: location and life stage. Students can come from any state, or even country. The campus is their home away from home. This is not the case for staff members. While their extended family doesn’t have to be living in the area, their immediate family does; only 4 out of the 119 participants lived outside of county limits. There is a higher possibility for connectedness due to the proximity. Life-stage is the other possibility for the difference in scores. This stage of a student’s life comes with challenges of adjusting to their new freedom. This doesn’t mean that students are completely dissociated from their families, in fact Hadiwijaya et. al (2017) describes the idea that 16-20 year olds are in the process of getting closer to their parents, after distancing themselves in the years of early adolescence.[12]

The highest standard deviations among the total number of participants was in the sections on Plant Slant, Downshifting, and Right Tribe. This signifies that respondents have markedly different experiences in these sections. Although this isn’t told through the data, these sections are representative of inequalities throughout the United States. Diet and stress levels are factors of health that are consistently brought up in conversations around social determinants of health.[5] For students, conversations around finding the “right tribe” in college run in tandem with conversations around mental health. Several respondents discuss how athletics is a large part of finding their tribe. For those where bonds aren’t forged through a shared jersey, seeking and finding a tribe is a much harder task. While clubs and peer groups are often available, they aren’t always easy to find or know if they are still active. As well, the stressful schedule of college students makes it difficult to add another thing into the mix. For faculty and staff, tribes can be formed at or outside of work. Differences in personalities, responsibilities, family status, and more can affect one’s ability to seek out a tribe. The high standard deviation for these three categories relate to inequities in health outcomes.

4.2 Perception of Support Hypotheses

Student perception scores for all sections were close to the neutral score of 3. This could mean several things: ambivalence, indifference, inattention, or ignorance. The highest score was a 3.69 for the “Purpose” section while the lowest score was a 2.89 for the section pertaining to alcohol. With the results, the hypothesis that students will perceive the University to score well on ≤3 blue zone categories is confirmed.

Although differing from students, faculty and staff scores were similarly around the neutral score of 3. The highest scoring section was for “Plant Slant”, with perceptions of a 3.5 for faculty and 3.55 for staff. The lowest scoring section was for “Downshift”, with perceptions of supporting their ability to downshift scoring a 2.41 for faculty and 2.33 for staff. With these scores, the hypothesis that faculty and staff will perceive the University to score well on ≤3 blue zone categories is confirmed.

Although quantitative data revealed neutrality on support with smaller standard deviations, the most revealing data from this study was from the qualitative data on how the campus populations perceive university support on these topics. By allowing participants to score and then elaborate, there were several comments about how it isn’t the “university’s job”, “business”, or “has nothing to do” with support for a particular factor. These types of responses appeared in sections pertaining to alcohol education, mindful eating, religiosity, developing purpose, connecting with family, and finding the right tribe. Most of these comments appeared to come from faculty or staff members. Although this attitude may reflect the need of an institutional shift, it also represents the possible need of a cultural shift in workplace responsibility. It was established that the United States medical spending is not geared towards preventative care.[3] Similarly, attitudes from the study suggest the workplace might not be geared towards bolstering wellness, but patching up holes. Employees spend much of their time around work, often still consumed by stress after work, so perhaps it is the responsibility of the employer to take care of their employees in this way. Actively supporting employee wellness goes a long way in establishing a culture of wellness. Returning to the garden metaphor, the more the tender of the garden feeds its plants, the more the garden will produce.

4.3 Implications

For students, quantitative data around support suggests more positive outcomes than faculty or staff members, with qualitative data supporting the idea. This would come from the idea that the role of a higher education institution; the end goal is to better the students to the best of their ability. The factors that appear to need the biggest change are relating to alcohol education, diet, and stress management. Students cited that outside of a module during orientation, responsible alcohol practices are not discussed. Mention of university support for stress management usually came in the form of faculty or staff mentors, not from practices that the university implemented, like a potential wellness day. Relating to diet, students had the lowest mean score and perceived support score, the only section with this occurrence. This is potentially because students are usually reliant on dining halls or on campus restaurants for their meals, with off-campus meals coming from fast-food due to time and budgetary constraints. Less agency when it comes to meals could lead to burnout from dining hall

food, which could reflect the support to eat a healthy diet. There was little discussion surrounding education around eating healthy, it was primarily what was provided by the dining hall. This shows a need for student education and agency into what they eat.

Education on these topics is unnatural to discuss in traditional courses, and forgotten in the years after orientation. The NCAA has a program called “Life Skills” where student-athletes are involved in programming that teaches them about life outside of the classroom. There is room for this type of programming to be opened to the general student population. It is in situations such as these that discussions around alcohol, stress management, diet, and other life lessons can take place.

For a majority of the sections, faculty members’ mean scores were in between those of students and staff. However, there are a couple of sections that stand out; namely the sections related to “Downshift” and “Purpose”.

Faculty members scored the lowest on the Perceived Stress Scale, signifying the highest amount of stress. Several students cited that it was faculty and staff members that had the largest impact on helping their stress levels. Although faculty have Chairs, Program Directors, Deans, and the Provost who serve as support structures, the type of support derived from these individuals may be different from the support that students experience from faculty and staff. The faculty mentor groups such as the Center for Teaching and Learning workshops, learning circles, Faculty Fellows, and Faculty Ombuds could better serve in the role of mentorship and peer support.

Faculty members scored the highest on the Life Engagement Test. This is potentially due to the idea that the nature of education is to support another’s growth. By consistently interacting with students and supporting them, there is a more tangible connection to purpose than other positions. However, many responses warned that situations in the university are inhibiting their sense of purpose. One respondent replied, “Faculty do not feel very supported currently, which leads folks to feeling less of a sense of purpose in their work.”

Through reducing stress, providing support, and investing in faculty members, universities can continue to foster faculty member’s sense of purpose. This trickles down into the students who develop the most from invested faculty members.

“I’m staff - not applicable”. While no other response was as blunt as this one in response to how the university supports their staff’s development of a sense of purpose, it is reflective of a common theme across sections. Staff members perceived the least amount of support in 4 out of the 9 factors: living an active lifestyle, education around alcohol, developing purpose, and downshifting stress. The lowest score out of the 9 factors was in the “Downshift” section. Similar to faculty, while there may be support structures in place, they aren’t serving the same purpose as those for students, and arguably, not even the same as the support structures for faculty members. One respondent pointed out that “staff need Ombuds” which is a position that an employee holds that is a support system for others in their department. Ombuds play a critical role in connecting peers to support, hearing complaints in a supportive, not HR, way, and providing connection. Overall, there seems to be a lack of investment in supporting staff member’s wellness and a growing discontent among staff members. While they may be employed by the university, they don’t feel invested in, and this idea has been internalized by many.

4.4 Future research

With this survey being the first in the discovered literature that discusses the connection between Blue Zones and college campuses, there are several avenues of future research. First, investigating the programs and services offered by the university and data on usage could provide valuable information on the opposing side to the participant's perception. Measuring it against perception scores could allow the research team to gauge reach and further reveal what steps can be taken to improve these services. Another avenue would be to conduct interviews with the participants to receive more specific responses to our questions and clear up any miscommunication related to diction that developed as a result of the online survey. A third option would be to add data on the environment around the campus because it is known that health and wellness is a cumulation of several factors, and while campuses often represent pockets in the larger area, they do not exist in a vacuum.

4.5 Limitations

The demographic data shows that the majority of participants were white and female. Among students, the majority of participants (66%) were from either the Psychology (25) or Health and Wellness (18) departments. This is unrepresentative of the campus population as a whole. These are the groups that are more often represented in studies of this type. Voices from individuals that are underrepresented in health research were underrepresented in this study as well. There are social determinants of health that are not discussed as a result of this underrepresentation. Another limitation of this study might have been the timing of release. A frequent point of discussion in the open-ended answers were around budget issues for the University, particularly among faculty and staff members. While the timing of this study was not in response to this news, it could have swayed answers more negatively. It has been established that financial status plays a role in health, wellness, and longevity. Although recognized as a limitation, the research team decided to leave this factor out for two main reasons. As mentioned, the recent budget issues make this topic a contentious subject for faculty and staff. For students, it is unlikely that they know their families yearly salary and their own is most likely little to none. While we acknowledge the importance of financial status in predicting wellness, the information that would've been gained would be inconsequential to the main research questions. Since the research team opted to use previously validated surveys, the questions didn't perfectly align with the ideas of the Blue Zones. Perhaps with further research, questions can be adapted for more specific use.

4.6 Summary

This study aimed to investigate the wellness of the campus community and their perceptions of how the University supported their efforts. Through investigating wellness, inferences can be made about health, since physical, mental, and social wellness are all connected and define health.[7] While most of the survey was concerned with scoring personal wellness, the most revealing answers on what can be improved came from the questions on support. In being an institute of higher education, the

students are the most important piece. Programs and funding seem to be focused on students, or at least with students in mind. However, students cited the importance of faculty and staff in their higher education experience, either through education or mentorship, not as much on programs specifically designed to increase wellness in the factors that were covered. This highlights the importance of investing in the environment that creates wellness. The nature of colleges and universities is that students will come for four years, maybe a little more, and then move on. This revolving door is not seen as much in faculty or staff. By investing in a culture that breeds wellness, it will trickle down through the ranks and support all members of the University. While the tribes are often smaller than on the university scale, “behavior in social circles is contagious”.[10] Culture is hard to cultivate on an individual scale. This highlights why the programs through the Blue Zone communities are focused on the Life Radius.[10, 11] By investing in the policies and long-standing environments, physical, social, and mental well-being doesn’t have to be created, but guided by spheres of influence. The campus population spends such a concentrated amount of time on campus that they could be affected even more so than in Life Radiuses on the city scale.

As was mentioned in several responses, money is an issue for universities around the country. After COVID-19, financial structures are not stable and the focus for some is just on staying afloat.[14,15] Given this, complaints from the participants about budget struggles are not only applicable for this study, but can be assumed for others as well. However unfortunate it may be, money is a large deciding factor in health outcomes; socioeconomic status is an identified social determinant of health.[5] If a university has the capacity to create physical changes such as a mental health coordinator for faculty/staff, improvements to the available meals, or other changes then that is great. However, if the university does not have the financial capacity to institute physical changes, working to create cultural changes through encouraging support groups, reflective behavior, and check-ins allows wellness to breed naturally.
The limited number of Blue Zones exemplifies the rarity of this holistic type of wellness. These communities have been around for generations; culture has been passed down each step and spread across community members. Given the fast paced and high stress world of higher education, these practices will be difficult to implement. However, implementing a better culture takes one step at a time. In the end, students are the main priority of universities. However, by investing in the entire population, the garden grows healthier.

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