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HISTORICAL TRAUMA, DISCRIMINATION, SELF-EFFICACY, CULTURAL  
AFFILIATION, SOCIOECONOMIC STATUS AND OBESITY WITHIN A NATIVE  
HAWAIIAN POPULATION

by

Sadé E.C. Soares

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Graduate Education Office (A 1045), 4301 Jones Bridge Road, Bethesda, MD 20814



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Name of Candidate: Sadé Soares  
Doctor of Philosophy Degree  
June 11, 2019

DISSERTATION AND ABSTRACT APPROVED:

DATE:

\_\_\_\_\_  
Dr. Patrick DeLeon  
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY AND GRADUATE SCHOOL OF NURSING  
Committee Chair

\_\_\_\_\_  
Dr. Tracy Sbrocco  
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY  
Dissertation Advisor

\_\_\_\_\_  
Dr. Marian Tanofsky-Kraff  
DEPARTMENT OF MEDICAL & CLINICAL PSYCHOLOGY  
Committee Member

\_\_\_\_\_  
Dr. Teresa Combs  
USUHS GRADUATE SCHOOL OF NURSING  
Committee Member

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To Aggie, thank you for instilling in me a love of learning. Being a witness to your sacrifices and strength has guided me to strive for the seemingly unattainable and maintain a persistent spirit! I am forever grateful to you!

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To the Kanaka Maoli of the Hawai'ian Kingdom, I pray that I have appropriately and respectfully portrayed the challenges and resilience of the Native Hawai'ian people who I am now connected to through both family and this work.

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Sadé Soares  
Medical & Clinical Psychology  
Uniformed Services University  
June 21, 2019

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## ABSTRACT

Historical trauma, discrimination, self-efficacy, cultural affiliation, socioeconomic status, and obesity within a Native Hawai'ian population.

Sadé Soares, Ph.D., 2019

Thesis directed by: Tracy Sbrocco, Ph.D., Thesis Advisor, Medical and Clinical  
Psychology

**Background:** Native Hawai'ians experience poverty and obesity at greater rates compared to other racial/ethnic groups in Hawai'i and the greater United States. The historical trauma experienced by Native Hawai'ians is a potential explanatory variable for economic barriers associated with poverty and for health outcomes and disparities. The associations of historical trauma, discrimination, self-efficacy, and cultural affiliation on the socioeconomic status and health of Native Hawai'ians were examined in the present study.

**Objective:** This dissertation surveyed Native Hawai'ian individuals to investigate the relationships between historical trauma, self-efficacy, discrimination, cultural affiliation, socioeconomic status, and obesity. The long-term goal of this work is the development of culturally tailored health promotion and disease prevention policies and programs for Native Hawai'ians.

**Methods:** Utilizing an online survey, participants completed measures assessing historical trauma, self-efficacy, perceived discrimination, and Native Hawai'ian cultural affiliation, socioeconomic status, and body mass index. Multiple linear regressions were conducted to examine the relationship between historical trauma on the following variables: self-efficacy, cultural affiliation, socioeconomic status, and obesity. The role of self-efficacy as a mediating factor in the relationships between historical trauma and SES and obesity was examined. Cultural affiliation was examined as a moderating variable in the relationships between historical trauma and SES and obesity. Discrimination, age and gender were covariates in all models.

**Results:** Study participants (N=146) were mostly female (76.7%) and married (57.5%), with a mean age of 43 years (SD = 11.5). Counter to prediction, historical trauma was not associated with SES or BMI. However, greater endorsement of historical trauma was associated with increased cultural affiliation. Self-efficacy did not mediate relationships as expected. However, self-efficacy was positively associated with SES and negatively associated with BMI. Cultural affiliation did not moderate relationships as expected but was positively associated with SES. Perceived discrimination was negatively associated with self-efficacy and SES, and positively associated with BMI.

**Discussion:** The present study did not find historical trauma to be associated with SES or BMI. However, historical trauma was positively associated with cultural affiliation. Sociocultural factors related to present day functioning, including cultural affiliation and discrimination, were associated with SES and BMI. And, self-efficacy, appeared to be a pivotal construct in understanding the relationship among present-day sociocultural factors and health outcomes that may be used to guide behavior change. Although not



examined directly in this study, the potential impact of the multi-ethnic composition of the Native Hawai'ian population is worth further study. Experiences, socioeconomic and health outcomes may differ by racial-ethnic subgroups of Native Hawai'ians. Furthering our understanding of these groups may assist in developing culturally tailored programs to improve the health and well-being of Native Hawai'ians. Importantly, this work should extend beyond cross sectional studies and examine the longitudinal relationships of sociocultural variables and health outcomes among racial-ethnic subgroups. And, given many Hawai'ian organizations are motivated by the Hawai'ian cultural revitalization movement, the timing is right to conduct this work.

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## **CHAPTER 1: Background**

### **INTRODUCTION**

Indigenous and Native Peoples continue to experience unique and persistent health disparities. Historical trauma theory provides a model to conceptualize these disparities and offers culturally salient solutions. Historical trauma is defined as the emotional and psychological wounding within Native and Indigenous populations in response to the cumulative effects of colonization, subordination, and continued discrimination (2; 14; 37; 86; 241; 281). These ongoing traumas may have lasting effects on the developmental, emotional, psychological, and spiritual well-being of both the individual and collective group (2; 14; 37; 38; 86; 87; 89; 102; 141; 168; 208; 238; 241; 281; 282). Moreover, maladaptive social and behavioral patterns, such as poverty, low education attainment, and negative health behaviors, which followed these traumas are viewed as a “disease of time” (2; 37; 241). This description of historical trauma as a “disease of time” refers to the etiology of present-day maladaptive patterns that began in the past but were maintained due to re-experiencing of the historical trauma and maintained systems of oppression (2). As these traumas are re-experienced and re-interpreted, they are absorbed into the culture and transmitted generationally, providing context for disparities in health and well-being (2; 37). Although examinations of historical trauma began in the 1990’s, there continues to be a paucity of research regarding the impact of historical trauma on the well-being of certain native groups, including Native Hawai’ians (38; 241).

Native Hawai’ians are the Indigenous population of the Hawai’ian Islands, who make up the majority of the Pacific Islander population within the United States (118). While residing in one of the healthiest and economically vital states in the United States,

Native Hawai'ians paradoxically experience poor socioeconomic status and poor health outcomes within their own homeland. They face high rates of unemployment or underemployment, low educational achievement, and economic uncertainty (185). They are also disproportionately impacted by physical health disparities, particularly obesity and obesity-related diseases (246). Therefore, it is crucial to identify both contributors and viable solutions to population-specific health problems within this important group.

The health disparities perspective provides a lens through which adverse population health outcomes may be better understood. Health disparities refers to health differences that negatively and disproportionately impact a population, and that population can be defined by racial and/or ethnic minority (173). The Office of Minority Health imparts that health disparities are interconnected with social and economic disadvantage due to historical experiences of exclusion and/or discrimination (173).

One key contributor to health disparities within the Native Hawai'ian community is historical trauma. When examining population health differences among ethnic minority and Native/ Indigenous peoples, researchers have examined trauma-related factors, such as role strain, acculturation, experiences of discrimination, and exposure to culturally innocuous traumas (40; 62; 84; 105; 119; 120). While these variables are important contributors to disparity, they have been demonstrated to be insufficient in explaining the socioeconomic and health disparities experienced by Native Hawai'ians and other minorities (53; 96; 133; 160; 178; 179). Historical trauma and the related factors of cultural affiliation and self-efficacy are presented in this dissertation as more significant influencers of Native Hawai'ian health and well-being. Native Hawai'ian literature often describes the pervasive and far-reaching effects of historical trauma on the



population (70; 135; 150; 161; 162; 166; 194; 270). However, this phenomenon remains largely under-studied within the Native Hawai'ian community, with only one study to date empirically examining the impact of historical trauma on health within the Native Hawai'ian population (198).

## **Summary**

The objective of this dissertation is to examine the impact of historical trauma on two outcome variables, socioeconomic status and obesity, within the Native Hawai'ian population. It is hypothesized that historical trauma is associated with low socioeconomic status and obesity. It is also hypothesized that the relationship between historical trauma and the outcome variables is mediated by self-efficacy and moderated by cultural affiliation. Age, gender, and discrimination are examined as covariates in all analyses. This dissertation will review these variables and their interactions within the Native Hawai'ian population. Research conducted exclusively on the Native Hawai'ian population is limited. Thus, where data are unavailable, Native Hawai'ian issues will be discussed within the larger context of racial/ethnic minorities, Indigenous/ Native peoples, and the Native Hawai'ian/ Pacific Islander group.

## **THE NATIVE HAWAI'IAN PEOPLE**

### **Rationale for Examining the Native Hawai'ian Population**

A central focus of this dissertation is to distinguish the Native Hawai'ian population from that of other related broader groups. The rationale for this is two-fold. First, population-specific research has been difficult as Native Hawai'ians have been subsumed within larger census data groups until Census 2000 (100; 161). Second, the Native Hawai'ian population has experienced mass depopulation, demonstrated slow

growth, and been predicted to have no remaining “pure-blood” members by the middle of this century (118; 135; 161; 181). Therefore, aggregating data on this changing population is important to identify current challenges as well as to serve as a comparison for future research, indicating progress as well as setbacks.

What follows is a description of how Native Hawai’ians are defined as a racial group, the complexities associated with this definition, and the changes over time. These changes are important to note because they reflect the trauma experienced by Native Hawai’ians as well as the cultural renaissance among the Hawai’ian people. In addition, as noted above, population-specific research requires well thought out definitions. Next, a brief history of the Native Hawai’ian people and some of the key cultural customs and values is presented in order to place the historical trauma in context.

Native Hawai’ians are one group within the Pacific Islander population. As a whole, the Pacific Islander population comprises less than one percent of the total United States population (118; 267). The Pacific Islands refer to the region of the Pacific Ocean that is comprised of hundreds of islands within Melanesia, Micronesia, and Polynesia. The U.S. Census Bureau identifies a Pacific Islander as an individual who descended from the original peoples of Hawai’i, Guam, Samoa, or other Pacific Islands (270).

According to the Department of Hawai’ian Homelands, a Native Hawai’ian is a descendent of the pre-1778 Native Hawai’ian inhabitants of the Hawai’ian Islands who maintain at least 50 percent Hawai’ian blood quantum (75). Blood quantum is a strategy used to define and codify native ancestry and refers to the percentage of an individual’s blood attributable to native heritage (44; 242). It is determined by the number of generations of native ancestors from which an individual descended (44; 242). The

Bureau of Indian Affairs issues Certificates of Degree of Indian Blood Cards for Native Americans; and blood quantum is and has been used to identify Native Hawai'ian homestead rights so Native Hawai'ians do not lose access to their land (44; 75; 242). Currently, the blood quantum requirement is under debate as legacy homestead laws, written 100 years ago, prohibit heirs less than 25 percent Native Hawai'ian bloodlines from inheriting land within their families (74; 109). Additionally, blood quantum is not utilized to legally define Native Hawai'ians outside of homestead laws. Federal programs aimed at Native Hawai'ians, such as the Native Hawai'ian Education Act, identifies a Native Hawai'ian as someone who descended from the pre-1778 aboriginal people of Hawai'i as evidenced by genealogical records, certified birth records, and/or elder or community resident verification (275).

Due to the considerable decline in population and widespread racial mixing that will be described in the ensuing paragraphs, classification as Native Hawai'ian is somewhat obscure. Within research literature and national population statistics, Native Hawai'ians are identified as any descendant of the inhabitants of the Hawai'ian Islands prior to 1778, regardless of blood quantum (105; 118; 176). For the purposes of this dissertation, self-identification is deemed sufficient.

### **Classification and Population Data**

A central aspect of this study is to conduct empirical research on the Native Hawai'ian population as population-specific research has been previously limited due to aggregation of racial groups in Census data and prior research. The federal government did not employ the racial classification of "Native Hawai'ian" as a stand-alone category until Census 2000. Although Native Hawai'ians were counted within the US Census after

Hawai'i became a state in 1960, a population estimate was not available at the national level (100). In fact, Hawai'ians were only enumerated within the state of Hawai'i (100). On the national census, Hawai'ians could only identify under the "other" racial category. Therefore, nationally, the Hawai'ian population was not accurately recognized. In an attempt to address this misrepresentation, Census 1990 allowed Native Hawai'ians to identify within the larger Asian and Pacific Islander category (100; 118). However, this classification combined several distinct groups, including Chinese, Japanese, Filipino, Korean, Eskimo, Aleut, Hawai'ian, Vietnamese, Asian Indian, Guamanian, and Samoan (100; 118).

In Census 2000, the Native Hawai'ian and Other Pacific Islander population were separated from the Asian category and classified as its own group (105). Under this categorization, used for both Census 2000 and Census 2010, Native Hawai'ian was listed as an individual classification, allowing this group to finally be recognized within the national census and related data (118). Additionally, during this census, Americans were able, for the first time, to self-identify as multiple races (118). This identification as mixed race was crucially important for the accurate self-identification and population characterization of Native Hawai'ians who are largely multiracial (118; 138).

Though Native Hawai'ians are now accurately represented on the nation's census, Native Hawai'ian research and statistics are continuously merged within the context of Asian Americans and other Pacific Islanders (118). The Native Hawai'ian and other Pacific Islander label encompasses more than 50 Pacific Islander cultural groups (35; 118), so research that did not study Native Hawai'ians as a separate group conflates

multi-racial data, resulting in a paucity of meaningful and accurate data on the Native Hawai'ian population.

Racial combining also negatively influenced research that examined population trends, health and well-being needs, and quality of life issues among Native Hawai'ians (161). For instance, current data support that Native Hawai'ians and Asians experience unique health problems and even similar diagnoses impact each population differently. One example is that Asian Americans are approximately 50 percent less likely to experience a heart attack compared to Native Hawai'ians in Hawai'i (175). Native Hawai'ians also demonstrate a consistently lower life expectancy compared to Asian residents of Hawai'i; with Asians living between three and eleven years longer than Native Hawai'ians (293). In addition, misclassification of racial and ethnic identity has led to inaccurate cause of death conclusions within the Native Hawai'ian/ Pacific Islander population; and it is estimated that race was coded incorrectly over 17 percent of the time for Asians and Pacific Islanders (22). Identification of population-specific best practices and interventions also remain limited due to these practices (161). Furthermore, collapsing Native Hawai'ians into larger groups has caused them to be overlooked for federal and state funding opportunities that promote health research on at-risk populations (161).

### **Changing Composition of Native Hawai'ians**

In addition to the limited focus on the Native Hawai'ian population on a national level, this group warrants direct attention due to the declining population of “pure-blood” Native Hawai'ians. Currently, the total Native Hawai'ian population is increasing. Approximately 174,460 to 527,000 Americans self-identify as Native Hawai'ian alone or

in combination with other racial groups, making them the largest proportion of all Pacific Islanders at 32 to 43 percent (118); (269). Due to interracial marriages and multiracial identification, the number of individuals self-identifying as Native Hawai'ian is predicted to reach and/or surpass that of pre-European contact by 2050 (138).

Conversely, “pure-blood,” single-race Native Hawai'ians are in jeopardy of extinction. A century after European arrival to Hawai'i, 90 percent of Native Hawai'ians had died, mostly due to diseases brought by these newcomers (135). Population estimates around the time of Western contact range from 300,000 to 800,000 (135; 161). One hundred years later, by the late 1800's, less than 50,000 “pure-blood” Native Hawai'ians remained (135; 161). In 1984, the Office of Hawai'ian Affairs conducted the only study to date that assessed distribution of Native Hawai'ians by blood quantum (184). The Office of Hawai'ian Affairs is a state agency with a mission to promote and protect the rights of Native Hawai'ians (187). Following the considerable decline in Native Hawai'ian rates after Western contact, this study estimated that less than four percent of Hawai'ians had 100 percent blood quantum (184). Moreover, it is predicted that pure-blood Hawai'ians will no longer exist by the year 2050 (181).

In summary, Native Hawai'ians have experienced great population change and their composition and legacy are greatly interwoven with historical traumas. These challenges continue; thus, it is important to document population challenges and strengths which can provide research-based and culturally relevant context to better understand Native Hawai'ian health and well-being disparities. Within this dissertation Native Hawai'ian refers to any descendant of the Hawai'ian Islands who self-identify with this group.

## **NATIVE HAWAI'IANS: A BRIEF HISTORY**

Understanding a brief history of Native Hawai'ian peoples, including their ancient traditions, colonization, and statehood are important in order to provide a context for understanding the historical trauma endured by this group. This historical context also highlights important cultural characteristics that are critical to ensuring better health and a better future. According to archaeological evidence, Native Hawai'ians were the first individuals to discover the Hawai'ian islands sometime between 200 to 600 AD (104; 161). Native Hawai'ians had a well-established language and culture under the ruling of four chiefdoms (135; 161; 223; 244). Within this culture existed two fundamental units of social organization: the *'ohana*, or the family, and the *'aina*, or the land (108; 161). The *'aina* was divided into the *ahupua'a*, or “pie-shaped” segments, of the island, which began at the ocean to the top of the mountains (108; 161). This system of land division allowed for every family to have access to the two main food sources: the ocean for fishing and the land with agriculture (108; 161). In the late 18<sup>th</sup> century, King Kamehameha consolidated all of Hawai'i under one kingdom and the Hawai'ian islands became a unified monarchy (135; 161). Under a single rule, Hawai'i quickly experienced economic growth, with commerce in pineapple, sugar, and shipping industries (135). By the late 19<sup>th</sup> century, Hawai'i became a fully recognized nation-state with multiple international treaties (70; 135; 194).

Despite this modernization, Native Hawai'ians maintained their collective identity closely intertwined with spiritual beliefs. The Hawai'ian term for Native Hawai'ians is *Kānaka Maoli*, which originally described “pure-blood” Hawai'ians, but has now come to represent individuals who are descendants of the original people of Hawai'i (12; 135). Spiritual beliefs of modern Native Hawai'ians have firm roots in the beliefs of their

ancestors, the Kānaka Maoli. The Kānaka Maoli believed the Hawai'ian Islands were born from an "earth mother" and "sky father" who gave birth to people, as well as kalo, the taro plant (135). Therefore, natural elements, such as land, produce, wind, and rain were viewed as ancestors and relatives who shared an interdependent and familial relationship with the Kānaka Maoli (134; 135; 137). The genealogy and history of the gods, chiefs, people, and the land were believed to be intertwined with one another. As such, land was valued based on its spiritual importance and the cumulative experiences and achievements of familial generations who worked and lived on it (134; 135; 191). Thus, land ownership was in direct opposition to Native Hawai'ian culture (134; 135; 191). The concepts of 'ohana and 'aina remain very important priorities for social organization among Native Hawai'ians today (135).

### **Introduction of Europeans**

Within the late 1700s, the first Europeans arrived at the Hawai'ian Islands. Following European arrival, Native Hawai'ians were introduced to new diseases, such as syphilis, smallpox, measles, and tuberculosis, leading to mass depopulation (135; 161). One hundred years following initial contact with Europeans, only ten percent of the Native Hawai'ian population remained (135). With the gradual increase of Westerners and their influence in Hawai'ian government, the Native Hawai'ians' communal land system was disrupted and replaced with private ownership (135). European missionaries also developed boarding schools for Hawai'ian children that often restricted the influences of the Native culture (6; 135; 161). These schools, which removed Hawai'ian children from their native homes, strictly enforced Christianity, English, and Western culture (6). The gradual loss of land and culture culminated in 1893 with the *Onipa'a*, or



forced removal of the Hawai'ian queen by a US military-supported group of businessmen and missionary descendants (135). Despite a petition signed by over 95 percent of the Hawai'ian population in protest, the Hawai'ian islands were annexed in 1898 and became a state in 1959 (135). Notably, Native Hawai'ian literature maintains that this group has never relinquished their status as a sovereign nation and continue to view their statehood as an illegal act (161; 216). Furthermore, a 1993 Congressional resolution formally apologized to the Native Hawai'ians for the illegal overthrow of their kingdom and “the long range economic and social changes ... that have been devastating to the population” (1). This historical trauma of losing kin, land, spirituality, and sovereignty likely became embedded in Native Hawai'ians' collective memory and continues to be a source of grief (79; 286; 287);(11; 38; 198).

### **Post-Annexation Hawai'i**

After losing their sovereignty Native Hawai'ians continued to experience challenges with retaining their culture and ways of life. The US military later utilized the Hawai'ian island of Kaho'olawe for bombing practice, destroying the landscape and disregarding Native Hawai'ian's cultural perspectives regarding land usage (161). Native Hawai'ians also experienced discrimination and racism; and they were depicted as lazy, ignorant, and primitive by Western professionals (161). They also underwent cultural and religious suppression. Use of the Hawai'ian language was not only discouraged, but prohibited; and the Hawai'ian language was not recognized or utilized in professional or legal settings (177); (162). Costs of land has increased, forcing Native Hawai'ians into impoverished areas and homelessness (135);(162). Moreover, although the agricultural and aquacultural system was previously capable of supporting its own population,

Hawai'i is now dependent on outside sources for 85 to 90 percent of its sustenance (111; 248).

Hawai'ians rapidly became and continue to be a minority in their native land. Given the decline in the Native Hawai'ian population, particularly of men, immigrant workers from the Philippines, China, and Japan were enlisted to work the sugar and pineapple plantations (161). After becoming a state, Hawai'i quickly became an ethnocultural center; and by the early 1900's, Native Hawai'ians now had Caucasian, African American, Puerto-Rican, Portuguese, other Pacific Islanders, as well Asian populations as neighbors (161). Today, the majority of individuals residing in the state of Hawai'i are non-Hawai'ian; and Native Hawai'ians comprise just 5.9 to 21.3 percent of Hawai'i's population (245; 258).

In summary, this abbreviated historical account aimed to underscore the Native Hawai'ian trauma experience, which significantly altered traditional ways of life. This history sets the foundation for enhanced appreciation of population-specific research and continued disaggregation of Native Hawai'ian data from larger multi-racial groupings. Understanding the Native Hawai'ian historical background also provides context for the following discussion on Native Hawai'ian health and well-being outcomes as well as influential variables.

## **POPULATION HEALTH AND WELL-BEING OUTCOMES**

Following the experiences described above, the Native Hawai'ian population has continued to experience poor health and social outcomes, both collectively and individually. With regard to mental health, nearly 16 percent of Native Hawai'ians report experiencing depression, in comparison to 11 percent of other groups in Hawai'i (185).

Native Hawai'ians have the highest rates of substance abuse, particularly tobacco usage and heavy drinking, compared to any other racial/ethnic group in Hawai'i (185). This group also reports high rates of domestic violence, child abuse and neglect, as well as suicide (150; 185).

Furthermore, within this population rates of obesity, diabetes, cancer, cancer-related mortality, and all-cause mortality are among the most prevalent compared to all other groups in Hawai'i (185). Additionally, Native Hawai'ians experience greater rates of poverty and lower educational achievement related to other ethnic minorities in Hawai'i (185). These psychological and behavioral health concerns provide an important context to understanding the Native Hawai'ian people. This dissertation will focus on two key variables, socioeconomic status and obesity, as possible outcomes of historical trauma within the Native Hawai'ian population.

### **Socioeconomic Status**

Socioeconomic status refers to the social position of an individual or group. It is usually measured by incorporating education, income, and occupation (8). Native Hawai'ians experience high rates of economic hardship. The 2015 American Community Survey reported that 17.3 and 20.5 percent of Native Hawai'ians in the nation and in Hawai'i, respectively, live in poverty (268; 271). This number increases up to 45 percent when children are introduced into the household (268; 271). This percentage is higher than the national (15.5 percent) and state of Hawai'i (11.2 percent) averages (65; 156; 271; 273; 274). Native Hawai'ians also experience homelessness at greater rates than other groups in Hawai'i; and over 30 percent of homeless individuals in Hawai'i are of Native Hawai'ian descent (121; 247).

The per capita income, or average income per person, for Native Hawai'ians is also low compared to both state and national averages; and this trend has continued for the past ten years (186; 272). Between 2006 and 2015, Native Hawai'ians averaged a per capita income of approximately \$20,000 nationally and \$19,000 statewide, almost \$10,000 less than the national and Hawai'i state averages (261; 262; 264-266; 268; 271). The national average during this time was \$29,322 and the statewide average was \$30,610 (65; 272-274). As Native Hawai'ians tend to have larger family sizes compared to both state and national averages (263; 269), mean family income is also important to analyze. Unfortunately, mean family income is not recorded for the Native Hawai'ian population in census accounts; therefore, median family income will be reported (186). Over the past ten years, Native Hawai'ians experienced a median family income of approximately \$63,800 nationally and \$67,800 statewide (261; 262; 264-266; 268; 271). Native Hawai'ian median family income lags behind national (\$67,231) and Hawai'i (\$82,426) averages by approximately four to fifteen thousand dollars (272).

Living in rural environments, or non-urban areas with a population less than 2500, also impacts an individual's socioeconomic status outlook (257; 259). Those who live in rural areas are more likely to experience poverty and require government-assisted supplemental programs (15; 257). Only 6.1 percent of Hawai'i's total land is classified as urban; however, approximately 92 percent of the population reside in these areas (112). In one of the most rural parts of Hawai'i, the island of Ni'ihau, Native Hawai'ians make up approximately 88 percent of the 170 residents (245). High rates of poverty may also be explained by two other factors of socioeconomic status: educational achievement and occupational achievement.

## ***Education***

Research suggests that education is a strong determinant of future employment and income. Data from the joint US Census Bureau and Bureau of Labor Statistics Current Population Survey demonstrate a significant relationship between low education attainment and poverty (24; 25). As education level decreased, poverty increased (24; 25). Approximately five percent of individuals with a Bachelor's degree, 14 percent of individuals with a high school degree, and 29 percent of individuals without any degree lived below the poverty line (73).

Native Hawai'ians continue to demonstrate low educational achievement (24; 25) in comparison to other Hawai'ians and the nation as a whole. Only 37 percent of Native Hawai'ians have earned a high school degree/General Education Diploma equivalent compared to 88 percent of all Americans and 91 percent of all adults in Hawai'i (65; 215; 273). Unfortunately, high school graduation rates for Native Hawai'ians, in Hawai'i, are among the lowest of underrepresented minority groups (65). Understandably, the disparity in education continues within higher education. Only 18 percent of Native Hawai'ians hold a bachelor's or higher degree, with 12.7 percent holding a Bachelor's degree and 5.3 percent a graduate degree (65). Statewide, 30.8 percent of all adults who reside in Hawai'i hold a Bachelor's degree or higher, which is comparable to the national average of 33 percent (215; 273).

When compared to both state and national averages, there remain evident gaps in secondary and higher education. The reasons for these gaps in education are many and complex. It is probable that past traumatic experiences and continued invalidation of Native Hawai'ian culture deeply affected the collective coping skills and self-efficacy of the Native Hawai'ian population, leading to limited education acquisition. Additionally,

the focus on educational and occupational achievement in Western society likely contradicts Native Hawai'ian cultural values, which places priority on the family and community as well as the individual's role in maintaining these relationships (159).

### ***Employment***

The Native Hawai'ian population also faces difficulty with employment. In 2013, the Bureau of Labor Statistics reported that Native Hawai'ians and other Pacific Islanders had the highest labor force participation rate at 70 percent compared to all other races (47). While their labor force participation was greater than that of the total US population (63.2 percent), Native Hawai'ians experienced high rates of unemployment (47). Compared with a national unemployment rate of 7.4 percent at the time, Native Hawai'ians and Pacific Islanders had an unemployment rate of 10.2 percent (47). Bureau of Labor Statistics data demonstrate that the unemployment rate among Native Hawai'ians and Pacific Islanders may now match the national average. However, US Census Bureau data and Hawai'i state data illustrate that this population continues to fare unfavorably regarding unemployment (48; 49; 265; 266; 268; 271). Per the latter sources, Native Hawai'ian and Pacific Islander unemployment rate ranges from 5.7 to 10 percent, while the national unemployment rate is approximately 6.3 percent (48; 49; 265; 266; 268; 271). This high rate of unemployment may be a product of limited educational attainment as well as the type of career fields Native Hawai'ians enter.

The majority of Native Hawai'ians work in occupations that are less likely to provide upward mobility and stability. Over seventy percent of Native Hawai'ians are employed in “service,” “sales and office,” “natural resources, construction, and maintenance,” and “production, transportation, and material moving” occupations (264-

266; 268; 271). Compared to management, business, science and arts occupations, employees in these less-skilled occupations demonstrate low earning potential (51). The Bureau of Labor Statistics reported that the following occupations earn between \$23,800 and \$49,000 per year: service, maintenance, sales, office, transportation, and construction (51). In contrast, management, business, science and arts occupations earn on average salaries between \$49,600 and \$79,000 (51).

An individual's occupation provides needed income and purchasing power; and less-skilled occupations tend to be unstable and provide fewer opportunities to evolve into a career (237). Individuals in these occupations are more likely to also be low wage earners, a demographic characterized by limited educational attainment after high school and frequent job turnover (32). According to the 2008 National Study of the Changing Workforce, 61 percent of low wage employees earned a high school degree or less as their highest level of education (32). Only 26 percent of low wage employees, compared to 54 percent of high wage employees worked for their current employer for 5 or more years (32). Therefore, upward mobility and improvement in socioeconomic status are greatly limited in less-skilled occupations.

Occupation also determines an individual's schedule and available time, is a factor of familial stress, and contributes to overall health. The 2008 National Study of the Changing Workforce demonstrated that low wage employees are more likely to work part time (32 percent versus 9 percent high wage earners), less likely to receive paid vacation days and paid holidays (65 percent versus 85 percent high wage earners), and less likely to be allowed time off to care for personal illness or to care for a sick child (32). In 2008, only 48 percent of low wage earners were allowed at least five days off for personal

illness, compared to 70 percent of high wage earners (32). Additionally, only 35 percent of low wage earners, compared to 53 percent of high wage earners, were allowed at least five days off per year to care for a sick child without loss of pay or vacation time (32). Limited opportunities to attend to both personal and familial sicknesses may exacerbate health ailments and be a major factor of stress.

Furthermore, less-skilled occupations tend to be more dangerous and/or physically demanding, unstable, and less likely to evolve into a career (237). When compared to professional services, employees in the construction as well as transportation fields experienced greater cases of illness and/or injury and days away from work (50). The 2015 Bureau of Labor Statistics' occupational injuries/illnesses profiles indicate that 4.5 percent of transportation employees and 3.5 percent of construction employees were injured or became ill during the calendar year compared to 1.4 percent of professional and business service employees and 4 percent of those in the education field (50). Additionally, transportation and construction fields reported a greater number of cases with lost days of work due to illness/injury in comparison to education and professional services field (50). Occupation has the potential to impact overall well-being; therefore, special attention must be paid to this phenomenon.

### ***Socioeconomic Status and Obesity***

Overall, socioeconomic position has long-term effects on health that are cumulative over a lifetime (24; 25). Within the United States, educational attainment and income are the most common predictors of the effect of socioeconomic position on health (24). Income provides a direct measure of material resources, and educational attainment strongly predicts income potential (25). With each increasing level of education, income



increases and the likelihood of experiencing poverty decreases. According to the Bureau of Labor Statistic's Current Population Survey, individuals with a high school diploma earn approximately \$650 per week, while those with a doctoral degree earn over \$1600 per week (46). Thus, high socioeconomic status individuals, who have achieved greater education and income levels, experience greater financial potential to improve their quality of life.

Socioeconomic status also impacts overall health and mortality (4; 39; 110; 171; 189; 236). Generally, individuals of lower socioeconomic status are more likely to experience chronic diseases, such as diabetes, heart disease, and cancers; infectious disease, such as the flu and HIV/AIDS; and psychological and physical disabilities (4; 20; 239; 291). Research has consistently demonstrated the increased risk of morbidity and mortality as socioeconomic conditions decrease (4; 5; 203). Utilizing data from a 54-year longitudinal study, researchers found that an individual's socioeconomic status at age 18 significantly predicted mortality over the lifespan (203). With one standard deviation increase in socioeconomic status, risk of mortality decreased between 16 and 18 percent (203).

Socioeconomic status may also influence health by its impact on living standards, allowing access to better quality food and housing, leisure-time activities, and health-care services (25). For example, low socioeconomic status individuals are likely to reside in more polluted environments with limited access to recreational physical activity, libraries, healthy foods, health care, and neighborhood safety (4). Low socioeconomic status individuals also experience increased marketing for and easy access to cigarettes, alcohol, and fast foods as well as limited options for restaurants, supermarkets and

pharmacies (4; 167). High levels of stress within these groups also fosters consumption of foods high in fats and sugars (4). Thus, lower socioeconomic status may impact health outcomes, such as obesity and obesity-related illnesses.

## **Obesity**

High rates of obesity are a second concern within the Native Hawai'ian population. A comparison of obesity rates and obesity-related health complications between Native Hawai'ians and other racial/ ethnic groups residing in Hawai'i reveals a health disparity. Hawai'i is ranked 47<sup>th</sup> nationally as the state with the third lowest percentage of obese residents (149). However, this health status does not translate to Native Hawai'ians in Hawai'i. Instead, Native Hawai'ians have the highest rates of obesity within the state and demonstrate rates of obesity higher than the national average (176; 188).

The Centers for Disease Control and Prevention define obesity as a condition in which an individual's weight is more than what would be considered healthy based on that person's height (57). The most widely used standard for measuring obesity is body mass index. Body mass index is a measure of a person's weight in kilograms divided by the square of their height in meters (57). A body mass index of 25 to 30 kg/m<sup>2</sup> falls within the overweight category; and an individual is determined to be obese if he/she has a BMI of 30 kg/m<sup>2</sup> or greater (57).

Currently, compared to 20 to 25 percent of Hawai'i residents, 74.7 percent of Native Hawai'ians are overweight or obese, with over 42 percent meeting criteria for obesity (176). Disparities also exist when contrasting Native Hawai'ian obesity

prevalence with national averages. Approximately 37 percent of US adults are obese; and roughly 33 percent are overweight (188).

Individuals who are obese are at increased risk for many adverse health conditions. These health conditions include cancers, coronary heart disease, stroke, high blood pressure, high cholesterol, Type 2 Diabetes, osteoarthritis, sleep apnea, reproductive problems, neurological and psychological problems, and general difficulty with physical functioning (56; 149).

Within Hawai'i, Native Hawai'ians experience obesity-related disease at rates higher than most other ethnic groups. Native Hawai'ians have the highest rates of heart attack, heart disease, stroke, and kidney disease, compared to any other group in Hawai'i (176). Compared to non-Hispanic Whites, Native Hawai'ians and Pacific Islanders are 30 percent more likely to be obese, 70 percent more likely to be diagnosed with coronary heart disease, four times as likely to die from a stroke, and twice as likely to be diagnosed with diabetes (176). High blood pressure, diabetes, and diabetic complications, such as vision problems, are also prevalent among the Native Hawai'ian population (176). Native Hawai'ians also represent the second highest group with a cancer diagnosis in Hawai'i (176).

### **Brief Summary**

Compared to other groups, Native Hawai'ians disproportionately experience lower education levels, less-skilled occupations, higher unemployment, and poverty. These economic difficulties may impact health and well-being, including obesity and obesity-related health conditions. Native Hawai'ians are also disproportionately obese compared to both state and national averages. However, there is a dearth of research that

has examined the underlying mechanisms and provided plausible explanations for these socioeconomic and health disparities.

## **RATIONALE FOR CURRENT STATUS OF NATIVE HAWAI'IAN WELL-BEING**

Several factors, including adverse or negative life events have been proposed to explain health disparities within Native populations. Notably, historical trauma has been demonstrated to be a significant factor even after accounting for contemporaneous stressors (280; 284; 286). For example, Whitbeck et al. found that stressful life events, such as exposure to familial substance abuse, violence in the home, and poor scholastic outcomes, did not moderate the significant relationship between historical trauma and depression among Native American adolescents (286). In another study, historical trauma significantly explained the relationship between perceived discrimination and alcohol abuse among Native American women (284). As these studies indicate, historical trauma may be a significant determinant of health.

### **Historical Trauma**

#### ***Historical Trauma Defined***

Historical trauma is defined as a cluster of traumatic events that engenders maladaptive social and behavioral patterns; and these negative patterns are absorbed into the culture and transmitted generationally (2). Discourse regarding historical trauma predominantly references the colonization and forced assimilation of Native and Indigenous populations and the related psychological and physical health sequelae (14; 37; 38; 40; 86; 87; 89; 102; 141; 168; 208; 238; 241; 281; 282). A core focus is placed on the long-term, cumulative, and contemporary psychological and emotional injury sustained over a lifetime and across generations (37; 89). Historical trauma also includes

continued and contemporary injustices, marginalization, and discrimination, which may exacerbate past trauma/traumas (37; 38; 86; 241).

Within the trauma literature, historical trauma is also referred to as cultural, multigenerational, or intergenerational trauma (140; 164). A cultural trauma is defined as an overwhelming event that undermines central tenets of a culture (238). The terms multigenerational and intergenerational are used interchangeably to represent the transmission of trauma and its negative consequences across generations (14; 208; 238). The definition of historical trauma includes the sentiments of both cultural and multigenerational traumas yet places a unique focus on Native and Indigenous groups. Therefore, for the purposes of this dissertation, the term historical trauma will be used to represent the historical and cumulative traumatic experiences of the Native Hawai'ian population, to include mass population decline, colonization, discrimination, cultural exploitation, and other forms of suppression as well as the intergenerational transmission of negative population health outcomes.

### ***Historical Trauma Differs from Other Forms of Trauma and Discrimination***

As historical trauma is still a relatively new construct, it is important to discuss its similarities and differences from other traumas. Five qualities differentiate historical trauma from other traumatic experiences: the act of colonization, continuation into contemporary time, inclusion of prejudice and discrimination, intentionality, and collective and intergenerational impact (241). First, colonization refers to the experience in which a foreign group holds institutionalized power and privilege over an Indigenous population (241). This experience undermines native people, their cultures, and their way of life (161; 168; 281). Native Hawai'ians experienced European and American

colonization for over 100 years before becoming a territory of the United States (161). Second, historical trauma theory asserts that the traumatic experience is not singular or based only on past traumas. Instead, the process of colonization is viewed as ongoing and contemporary as Indigenous peoples continue to have limited influence in their homelands as well as experience discrimination and affronts to their cultural ways (168). Third, historical trauma accounts for systems of racism and discrimination. Discrimination is defined as the unfavorable treatment of someone because of his/her association with a certain race (277). While colonization, cultural suppression, and subordination of native peoples implies discrimination in an overt manner, historical trauma also accounts for more subtle forms of discrimination, such as assumptions that Indigenous groups were indolent, unintelligent, and in need of saving (161). Previous research also demonstrates that historical trauma correlates with perceived discrimination in both adolescent and adult samples (284; 286). Fourth, historical trauma is caused by intentional behaviors, often due to power and prejudice, as opposed to uncontrollable causes of nature or accidental impressions (90; 161; 168). Unlike accidental trauma, historical trauma and other deliberate traumas threaten basic assumptions about the world being orderly and just (40; 282). These intentional traumas also threaten trauma survivors' assumptions about their individual worthiness (40; 282). Finally, historical trauma is experienced collectively and transmitted inter-generationally. Unlike individual trauma, both the individual and the collective and social group experience the historical trauma and its effects (87). Within the context of historical trauma, individual and collective traumas may exacerbate each other, disrupting communal life and challenging core social and cultural values (135; 142). Moreover, maladaptive emotional and

behavioral coping mechanisms are shared and transmitted from one generation to the next (241).

### *Outcomes of Historical Trauma*

Historical trauma includes guilt, shame, and distrust in the population's collective memory; and this trauma may lead to various maladaptive coping strategies, such as repression, denial, depression, disassociation, doubt, helplessness, and devaluation of self and culture (2; 14; 36-38; 86; 89; 140-142; 208). Within Native American communities, historical trauma has been correlated with increased substance use and abuse as well as depressive and anxious symptoms (11; 79; 286; 287). In a study of 306 Native Americans who resided on reservations, Ehlers et al. found that 66 percent of participants met criteria for a substance dependence diagnosis; and these individuals scored significantly higher on the historical trauma scales (79). Specifically, these participants also endorsed more distress related to historical trauma compared to participants who did not meet criteria for substance abuse (79). Another study of 459 Native American youth and their female caretakers revealed that 33 percent of Native American youth thought about historical trauma on a weekly basis and endorsement of these thoughts was significantly associated with depressive symptoms (286).

### *Impact of Trauma on Socioeconomic Status and Obesity*

To date, no studies examining the impact of historical trauma on socioeconomic status and/or obesity have been identified. Therefore, research that highlights the impact of childhood trauma, traumatic stress, and chronic stress are presented to elucidate the impact of trauma and present some rationale for the role of historical trauma on this dissertation's outcome variables. Research relating to the impact of trauma on both

socioeconomic status and obesity suggests that the experience of trauma is associated with both lower socioeconomic standing and greater obesity.

Regarding socioeconomic status, a comparison of 92 previously homeless adults with 395 individuals without prior homelessness revealed that childhood adversity increased the likelihood of subsequent homelessness (115). Using data from a nine-year early childhood longitudinal study, Goodman, Miller, and West-Olatunji examined the role of trauma in academic achievement of 3,387 fifth grade students (103). Results showed that students who met criteria for traumatic stress were three times more likely to have an Individualized Education Plan (special education for children with disabilities), compared to those with no trauma history (103);(276). Children meeting criteria for traumatic stress scored significantly lower on tests of achievement than their peers without trauma experiences: 11.9 points lower on reading, 10.9 points lower on mathematics, and 5.7 points lower on science (103). Using data from the Behavioral Risk Factor Surveillance System, Liu et al. found that adverse childhood experiences were associated with unemployment (151). Specifically, men who had one or more adverse experiences were twice as likely to be unemployed compared to those who did not report childhood trauma (151). Among women, those who reported four or more adverse experiences were 1.6 times more likely to report being unemployed than those without trauma (151). Therefore, the experience of trauma is likely to negatively impact socioeconomic status.

Trauma also impacts obesity-related outcomes. The Adverse Childhood Experiences Study, an ongoing longitudinal study of 17,000 individuals, found that children who experienced abuse and/or neglect were 28 to 45 percent more likely to be



obese in adulthood compared to children who did not experience abuse (290). Additionally, a meta-analysis of 41 studies revealed a significant association between childhood trauma and obesity, such that childhood maltreatment was associated with a 36 percent greater risk of adult obesity (68). Adjusting for individual study characteristics, socioeconomic status, some health behaviors, and other covariates did not significantly impact the meta-analysis results (68). Moreover, other outcomes of trauma such as depression and posttraumatic stress disorder as well as stress-induced changes to diet preferences and eating amount may all coincide to engender obesity. Tomiyama et al. found that among a sample of 59 participants, those who self-reported as experiencing high distress, after a stress test, also had more abdominal fat, greater body mass index, and more reported emotional eating compared to the low-stress group (253). In another study of 561 women, self-reported perceived stress was significantly associated with greater non-nutritious food intake, lack of control over eating, and more frequent binge eating (106). Additionally, among rodent samples, stress has been associated with increases in fat, overall body weight, and high caloric food intake (62; 67; 192). These studies demonstrate that stress and the chronic stress of trauma may alter eating patterns and is associated with greater obesity compared to those with no trauma history.

### **Summary**

Historical trauma may be a contributing factor to present day socioeconomic disparities and obesity within the Native Hawai'ian communities. Native Hawai'ians experienced a population decline of over 90 percent, cultural displacement, loss of land, loss of sovereignty, and discrimination during colonization (135; 161). The trauma from these experiences, along with continued marginalization, may have led to various

psychological disorders, maladaptive behavioral patterns, and physical health ailments, including low socioeconomic status and obesity. The following model provides a pathway from historical trauma to community and individual level outcomes as well as a lens through which this study's variables can be better understood in relation to historical trauma.

### **HISTORICAL TRAUMA MODEL**

Several historical trauma models and frameworks have been presented to depict the impact of historical trauma on population health. One example is Mohatt et al.'s "narrative model for understanding the impact of historical trauma on health" (165). Another is Walters and Simoni's "indigenist model of trauma," which highlights coping mechanisms and health outcomes regarding American Indian women's experience of historical trauma (281). While these models introduce important aspects of the historical trauma response, such as the use of narratives and the importance of cultural buffers, both fail to detail the following: historical trauma experiences specific to native populations, methods of intergenerational trauma transmission, and generational differences in the trauma experience (165; 281). For the purposes of this dissertation, Sotero's historical model will be utilized as it presents an all-encompassing framework of historical trauma, can be adapted for the Native Hawai'ian experience, places an emphasis on the impact of colonization, demonstrates the intergenerational transmission of the effects of trauma, and includes the role of continued present-day marginalization as well as protective factors. While Sotero's model will not be tested in this dissertation, it provides a framework to conceptualize the role of historical trauma in Native populations' health

outcomes. Additionally, this model provides the theoretical underpinnings which guide this dissertation's research model.

Sotero's historical trauma model attempts to explain how trauma is transmitted from one generation to the next (241). This conceptual model provides a rationale for the unique health disparities within Native and Indigenous populations. Based on Sotero's model, historical trauma begins with a mass trauma experience in which a dominant group overpowers a Native population (241). The first generation's response to the trauma impacts their psyche, physiology, and community structures. These changes, along with continued social marginalization, then negatively influence the environment in which future generations are born and live. This dissertation will utilize Sotero's historical trauma model to guide conceptualization of socioeconomic status and obesity prevalence among Native Hawai'ians.

### **Immediate Generation**

Sotero's model maintains that historical trauma begins with the successful subjugation of a population by a dominant group [See Fig. 1, Mass Trauma Experience] (241). This subjugation requires overwhelming physical and psychological violence, segregation and/or displacement, economic deprivation, and cultural dispossession (2; 241). This subjugation is often achieved using bio-warfare, military force, incarceration, and laws that prohibit freedom of movement, economic development, and cultural expression (2; 38);(69; 281). For Native Hawai'ians, the introduction of infectious diseases was the beginning of this subjugation (161; 241). Colonization, boarding schools, laws prohibiting cultural practices, and displacement from land, politics, and economy closely followed (135; 161). As overtly suppressive policies receded, their

legacies remained in the form of racism, discrimination, and social and economic disadvantage (78; 241; 281; 289).

According to Sotero's model, the response to trauma is trifold: psychological/emotional, and social and physical [See Fig.1, Trauma Response] (2; 38; 89; 241). Psychologically, Sotero posits that victims of historical trauma experience posttraumatic stress disorder, depression, as well as panic and anxiety that results in anger/aggression, terror/fear, social isolation, grief, shame, withdrawal, loss of self-worth, and numbness [See Fig.1, Trauma Response, Psychological Response] (241). Due to such emotional responses, in combination with increased stress, social problems arise or are exacerbated (241). Social responses include suicide, domestic violence, substance abuse, child maltreatment, unemployment, and poverty, all of which work to further disrupt family and community structures [See Fig.1, Trauma Response, Social Response] (241). Studies have indicated that the experience of trauma elevates the likelihood of developing a mental health disorder (224); and chronic trauma has been demonstrated to create "deep emotional scars" that affect patterns of interpersonal relationships, skill mastery, and role performance (41; 43; 224). Big Foot and Braden suggest that this trauma experience erodes the unity and strength of a community and cultural environment (30).

Physiologically, first generation victims may experience a weakened immune system, endocrine impairment, adrenal maladaptation, and even changes in gene expression as their bodies respond to this severe and chronic stress [See Fig.1, Trauma Response, Physical Response] (101; 240; 241). These physiological changes are due to alterations in the body's hypothalamic-pituitary-adrenal axis. The HPA axis is the part of the neuroendocrine system that controls reactions to stress as well as regulates digestion,

the immune system, mood and emotions, and sexuality (41). The physiological response to stress is intended to be short-term; however, the chronic adversity of historical trauma may alter the body's physiological responses as individuals repeatedly re-experience stressors. Thus, the distress associated with historical trauma may alter the functioning of the sympathetic nervous and endocrine systems as individuals who have experienced a prior trauma physiologically react more quickly to new stressors; and this causes cortisol and epinephrine to be released at a faster rate (139). Cortisol regulates many bodily processes, including metabolism and the immune system, and significantly impacts the body's stress response (72; 139). Frequent release of cortisol can cause the hypothalamic-pituitary-adrenal axis to shut down (174). Furthermore, the biological stress systems, regulated by the hypothalamic-pituitary-adrenal axis, may be permanently changed in response to stress and/or trauma (143; 147; 148; 182). In response to trauma, hypothalamic-pituitary-adrenal markers, such as changes in hormone-releasing receptors, have been demonstrated to predict the development of mental health disorders (146); and the onset as well as severity of posttraumatic stress disorder has been linked to alterations in the expression of genes involved in immunity activation (146; 226). Trauma is also deemed a stronger predictor of medical difficulties than physical injury, lifestyle factors, or comorbid depression (224; 283).

### **Subsequent Generations**

Historical trauma may also impact subsequent generations through psychosocial, genetic, physiological, and environmental pathways as well as the influence of social/economic/political systems and social and legal discrimination [See Fig. 1 Modes of Intergenerational Transmission] (241). Psychosocial factors, such as maternal

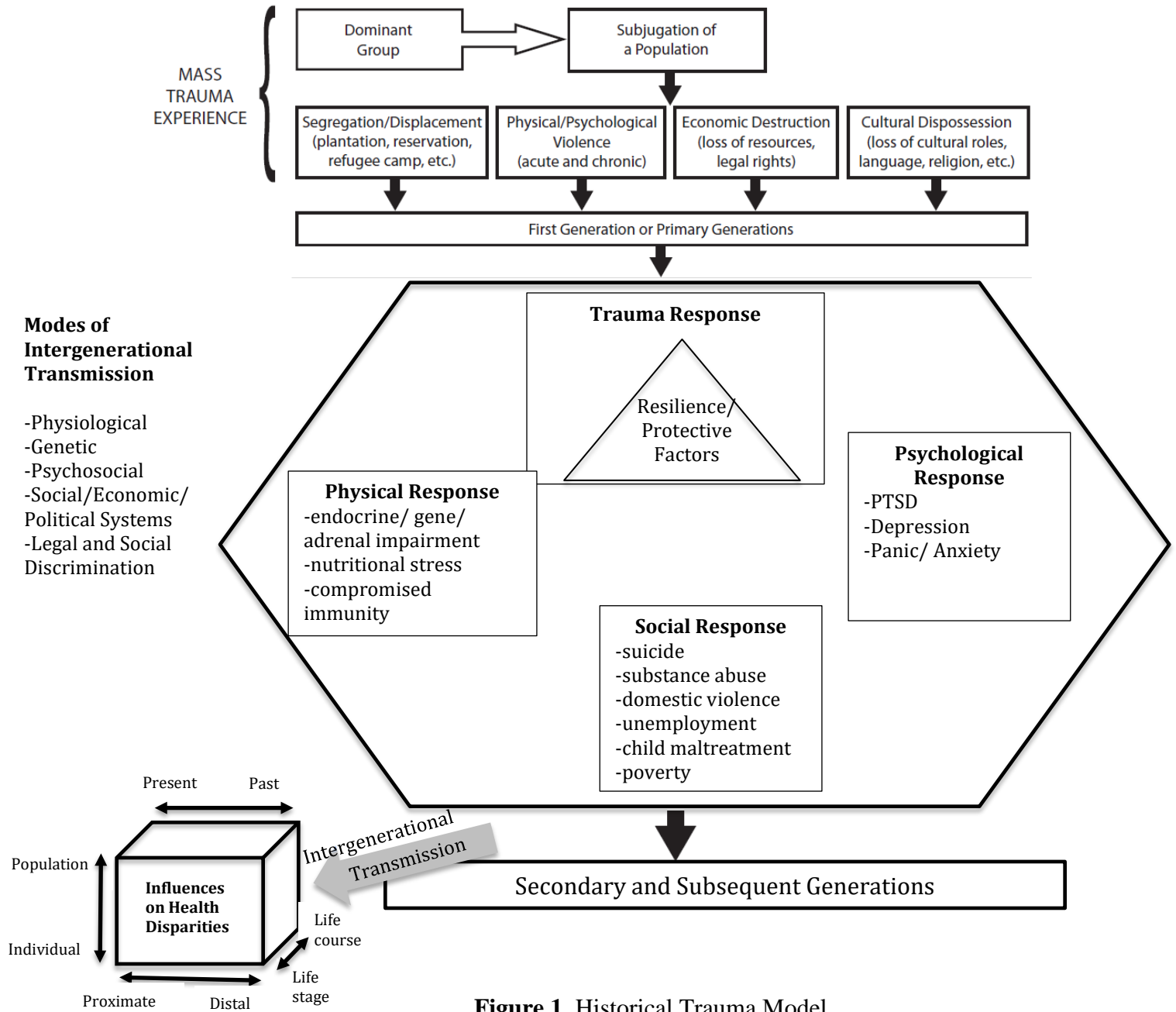
malnutrition and stress, may impact the well-being of later generations. Mothers who experience malnutrition may subsequently deliver low-birth-weight children and produce low-quality breastmilk (256). Maternal stress may also compromise capacity for parenting, especially as maladaptive coping strategies, such as substance abuse, are employed (69). Maternal care and emotional state are also major determinants of behavioral stress response in offspring (81; 155). Furthermore, the maladaptive social behaviors of first generation trauma survivors, such as substance abuse, physical/sexual abuse, and suicide, perpetuate the intergenerational cycle of trauma as they directly traumatize community youth and are transmitted through learned behavior (241);(69; 71; 80; 144; 158).

Historical trauma theory also maintains that subsequent generations experience secondary trauma through the storytelling and oral traditions of the group (241). Through this oral perpetuation of the past, traumatic events become preserved within the collective memory of the population. Younger generations are taught to share in the pain of their ancestors and they experience their own trauma through the loss of culture and language (2; 36; 89). First-hand experience of social and legal maltreatment, discrimination, poverty, injustice, and social inequality represent traumatic experiences of their own and perpetuate the collective trauma (241). These current-day occurrences serve to validate ancestral experiences and reinforce the historical trauma experiences of the group (36; 241; 289).

Genetically, trauma may impair gene function and expression via changes to the hypothalamic-pituitary-adrenal axis. These changes are then transmitted to offspring. Research supports that mental illnesses, such as depression and posttraumatic stress

disorder, can also be transmitted genetically (81). Physiologically, evidence suggests that fetuses adapt to in-utero stressors that can alter the child's bodily functioning. Changes in the mother's HPA axis results in fetal exposure to excess glucocorticoid hormones (205); and children born to mothers with anxiety demonstrate increased cortisol levels, causing dysregulation within bodily functions (183; 278).

Finally, Sotero posits that the cumulative effects of historical trauma result in overwhelming social and physical problems within the victimized community (241). The amassing of disease and social distress across each subsequent generation leads to population-specific health disparities [See Fig.1, Influences on Health Disparities] (241). However, resiliency and protective factors may moderate the effects of historical trauma, limiting the transmission of maladaptive patterns to subsequent generations [See Fig.1, Trauma Response] (241).



**Figure 1. Historical Trauma Model**

**Empirical Research and Review of Model**

The historical trauma model attempts to conceptualize centuries of trauma and decades of trauma-related literature. In doing so, this model endeavors to present a thorough outline of the individual and environmental interactions involved in both the



trauma experience and the trauma response. A strength of this model lies in the incorporation of psychological, social, and physiological factors that impact communities as well as the interactions between the past and the present and the individual and population level responses. Additionally, this model recognizes that victims of historical trauma are individuals with agency who have the capacity to make choices. Outlined in the model is the possibility for individuals to employ personal and community protective factors to mitigate the negative outcomes of this trauma. Furthermore, the historical trauma model aims to highlight the unique experience of colonization, legitimize Native and Indigenous communities' responses to colonialism and continued marginalization, and underscore the importance of cultural vigor within these communities.

In developing this comprehensive model, however, Sotero presented a conceptualization that is rather broad and difficult to test. While discourse on historical trauma is prevalent in Native and Indigenous health disparities literature, historical trauma has only been empirically evaluated in a few studies. Moreover, these studies have mainly examined this construct in relation to the psychological and social responses detailed in the historical trauma model (11; 79; 198; 280; 284; 286; 287). A pathway from historical trauma to physiological changes has not been quantitatively examined. Additionally, the means by which intergenerational transmission occur have not been investigated; instead, an assessment of the generational distance from the original traumas is deemed to demonstrate transmission (286). Furthermore, establishing causal multigenerational linkages is difficult; and this historical trauma model does not address the possibility that social transmission of historical events may be constrained by limited

data and recall bias (140). Moreover, the historical trauma model does not detail which protective factors or sources of resiliency are likely to be utilized.

Sotero's historical trauma model may include several shortcomings. Despite these limitations, Sotero's model will be utilized in this dissertation as it provides a comprehensive review of the historical trauma paradigm, demonstrating the pathways from historical trauma to salient concerns in Native populations. In order to measure the historical trauma model, Whitbeck, Adams, Hoyt, and Chen developed the Historical Loss Scale (285). This scale was the sole quantitative measure of historical trauma identified, to date.

### ***Measuring Historical Loss***

Whitbeck, Adams, Hoyt, and Chen developed the Historical Loss Scale to measure the historical trauma framework within a Native American population (285). Since this study was the first empirical evaluation of the model, the investigators sought to identify that historical loss remains a relevant issue within the cognition of contemporary Native Americans and to establish a link between those perceptions of loss and related symptoms using the historical trauma model. Focus groups were conducted on two Mid-Western reservations and two scales were developed. These were the Historical Losses Scale and Historical Losses Associated Symptoms Scale. The Historical Losses Scale, created to achieve step one of this investigation, consists of 12 types of loss, each with six response categories related to how often the individual thinks of the loss/event. Items included were deemed relevant to the Native American historical trauma experience, such as loss of land, language, spiritual ways, and people, as well as losses due to maladaptive coping, such as alcoholism and loss of self-respect (285). The

Historical Losses Associated Symptoms Scale was developed to help establish the link between loss and related symptoms (285). Items include sadness, shame, feelings of isolation, loss of sleep, fear, rage, and feeling that the trauma is re-occurring (285). Both scales demonstrated high internal reliability, meaning that they consistently measure the intended construct. The Historical Loss Scale has a Cronbach's alpha of .92; and the Historical Loss Associated Scale had a Cronbach's alpha of .89 (285).

The investigators then attempted to measure historical trauma within American Indian families with children on four reservations: two in upper Midwestern US states and two in Ontario, Canada (285). Overall, Whitbeck et al.'s findings indicated that historical losses were prevalent in the minds of American Indians who were generations removed from the initial historical traumas. One-fifth to one-half of participants endorsed thinking daily or more about historical losses (285). Forty-two percent of participants reported thinking about loss of land at least on a monthly basis and more than one-third thought about loss of language at least daily (285). Feelings associated with historical loss were also prominent. Almost fifty percent of respondents reported experiencing intrusive thoughts at least some of the time; over thirty percent felt policies that led to historical losses were happening again; over twenty percent felt anger often; and sixteen percent reported often having feelings of sadness or depression (285). Overall, historical trauma was significantly associated with negative symptoms, such as depression and anger (285).

The aforementioned Whitbeck et al. study was the first to empirically evaluate the historical trauma model (285). This study set the foundation for future research in this field by establishing the significance of historical trauma and related emotional and

behavioral symptoms within Native American communities (285). Additional research to support the historical trauma model indicates that frequent thoughts about historical trauma are associated with increased anxiety and depression (11; 79). In a sample of Native American adults, higher scores on the Historical Loss Scale were associated with alcohol dependence and greater likelihood to meet diagnostic criteria for substance dependence (79; 284). Historical trauma symptoms from the Historical Loss Associated Scale were also significantly associated with alcohol and illicit drug use (287). Furthermore, historical trauma was found to have a more significant impact on overall distress and depressive symptoms compared to negative life events, such as family financial strain, exposure to violence, and loss of a loved one (280; 286).

### *A Native Hawai'ian Sample*

While previous research has focused predominantly on the Native American population, the historical trauma model may apply to Native Hawai'ians. The Native Hawai'ian and Native Americans histories are similar, yet only one study to date has empirically examined historical trauma in the Native Hawai'ian population. Pokhrel and Herzog adapted the Historical Loss scale to a Native Hawai'ian population and aimed to examine the relationships among historical trauma, perceived discrimination, and substance use (198). Specifically, the investigators hypothesized that the relationship between greater historical trauma and higher substance use is mediated through greater perceived discrimination in day-to-day life (198). They conducted a cross-sectional online survey sample of 128 self-identified Native Hawai'ian college students who were recruited from three community colleges in Oahu, Hawai'i (198).

To measure historical trauma, eight items relevant to Native Hawai'ian experiences were adapted from the American Indian Historical Traumatic Events scale, which originally contained 13 items (198). Each item described a potentially traumatic event, such as desecration of traditional land, and asked participants to identify if they experienced the event personally and/ or if it happened to a previous generation (198). To measure how often individuals thought about historical loss, eight items were adapted from Whitbeck et al.'s Historical Loss Scale (198; 285). Perceived ethnic discrimination was assessed by asking participants how often they experienced instances of day-to-day unfair treatment because of their ethnicity (198). Finally, cigarette, alcohol and marijuana use within the previous 30 days was measured; and alcohol, specifically, was measured in terms of frequency of becoming drunk (198).

Pokhrel and Herzog found that historical trauma is relevant to the experience of Native Hawai'ians. Participants generally endorsed that the trauma occurred to previous generations. Current generation participants rated "non-natives occupying, visiting, or living on Native land" as the most salient trauma experience, with 14.6 percent endorsing first-hand experience of this (198). The following three historical trauma experiences were most frequently cited as having been experienced by participants' parents, grandparents, and/or great-grandparents: "non-natives occupying, visiting, or living on Native land" at 69.5 percent, "forced to not speak native language or practice cultural expression" at 61 percent, and "desecration of traditional lands" at 46.9 percent. Participants also reported thinking about the following historical losses at least once a year or on special occasions: 87 percent think about loss of language, 81 percent think about loss of ancestral land, and 66 percent think about loss of self-respect from poor

treatment by government officials (198). Additionally, roughly 75 percent of the participants reported experiencing ethnic discrimination on at least one occasion (198).

Overall, Pokhrel and Herzog found that historical trauma alone did not correlate significantly with substance use. However, historical trauma was positively correlated with perceived ethnic discrimination; and this discrimination correlated significantly with higher substance use. This finding differs from previous research which demonstrated that the effects of perceived racism became nonsignificant when historical loss was added to the model (284). The researchers identified their experimental limitation in failing to measure cultural identification or ethnic pride since they posited that individuals with higher scores on measures of historical trauma are likely to be more culturally aware; and cultural identification can be a source of resiliency (198). The investigators also removed four items from the Historical Loss scale, including “loss of family ties due to boarding schools,” which may have been relevant to the Native Hawai’ian experience or could have been modified to be more meaningful to this population.

### **Perceived Discrimination/ Racism**

While historical trauma theoretically accounts for perceived discrimination, racism, and other forms of marginalization, the Historical Loss scale does not inherently measure this construct. Discrimination refers to the unfavorable treatment of someone because of his/her association with a certain race (277). Research indicates that perceived discrimination is positively associated with historical loss (284). Perceived discrimination has also been demonstrated to be positively correlated with cultural affiliation as well as negative health outcomes, such as alcohol abuse, hypertension and cortisol dysregulation

(128; 133; 284). Thus, perceived discrimination was examined as a covariate in all analyses.

### **Furthering the Line of Research**

This dissertation aimed to further this line of research by providing more detailed assessment of historical trauma within the Native Hawai'ian population as well as identifying new mediating, moderating, and outcomes variables. First, this dissertation further operationalizes and extends the assessment of historical trauma among Native Hawai'ians. The primary aim was to examine the relationship between historical trauma and the outcome variables of socioeconomic status and obesity. Second, although historical trauma is often discussed in Native Hawai'ian literature, this dissertation is one of few to examine the impact of historical trauma on health outcomes. At present, Pokhrel and Herzog's study is the first and only empirical study of historical trauma in this population. Third, this dissertation explored the gaps in literature that Pokhrel and Herzog identified. These researchers noted that other factors, aside from ethnic discrimination, may be mediating the relationship between historical trauma and adverse population outcomes (198). In this dissertation, self-efficacy was examined as a mediating factor. Fourth, Pokhrel and Herzog accurately noted the importance of cultural affiliation as a factor of resiliency within populations impacted by historical trauma (198). This dissertation analyzed the moderating value of cultural affiliation between historical trauma and the outcome variables of socioeconomic status and obesity. Fifth, the proposed dissertation aims to provide a broader understanding of the impact of historical trauma as prior research has mostly focused on emotional and substance use outcomes. In this dissertation, self-efficacy and cultural affiliation were presented as two

constructs that may be valuable in understanding the mechanisms by which historical trauma impacts present-day Native Hawai'ian socioeconomic status and obesity.

### **SELF-EFFICACY: A MEDIATOR BETWEEN HISTORICAL TRAUMA AND ADVERSE OUTCOMES**

Within this dissertation, self-efficacy is offered as a mediating variable between historical trauma and the outcome variables of socioeconomic status and obesity. Self-efficacy refers to personal judgments of how well one can implement courses of action required to address prospective situations (17). Bandura maintained that self-efficacy judgments may influence how much effort individuals will expend on any given task and how long people will persist when faced with obstacles or aversive experiences (17). Self-efficacy is manifested in the undertaking and confident performance of a task by those who deem themselves to be capable as contrasted with the avoidance of activities when individuals believe their coping abilities have been exceeded (16). Particularly, high self-efficacy has been demonstrated to be associated with greater cognitive effort and higher learning in endeavors that participants considered to be challenging (218).

A cross-sectional study of 275 medical science university students examined the relationships between self-efficacy and academic motivation (212). Self-efficacy was found to be significantly correlated with intrinsic motivation as well as academic motivation (212). This study aligns with earlier self-efficacy research in which self-efficacy was positively correlated with mental effort and achievement. Salomon's seminal work compared children's self-efficacy and achievement on tasks of differing cognitive effort: watching television and reading a text (218). A sample of 124 sixth grade children rated reading text as requiring more mental effort than watching television; and self-efficacy was positively correlated with the reading task as opposed to



watching television (218). Specifically, 79 percent of participants attributed their success in understanding the printed material to internal causes, such as ability and effort (218). On the contrary, only 23 percent of participants attributed internal causes to their success in understanding the television material (218). Therefore, self-efficacy was demonstrated to be an important factor in completing tasks of greater cognitive effort (218). Moreover, students were assessed on tests of inference making as well as factual recognition regarding the information from both media forms (218). On these tests of achievement, students who read the text obtained significantly higher scores (218). Therefore, self-efficacy was demonstrated to be associated with greater cognitive effort in difficult tasks as well as higher learning.

Research has also demonstrated the import of self-efficacy in activities that are difficult to sustain, such as deterring substance use relapse. In a quasi-experimental study of 121 adults aged 18-65, Elfeddali et al. examined the role of self-efficacy in smoking relapse among individuals who agreed to quit smoking within the same two-week period (83). Participants were assessed before quitting and at one month and three months post-quitting (83). Researchers found that low self-efficacy at baseline significantly predicted relapse (83). These data suggest that when faced with challenging tasks, self-efficacy may be a critical factor of success. It is, therefore, posited as an important element in overcoming historical trauma and achieving socioeconomic and physical health goals.

### **Development of Self-Efficacy**

According to Bandura, self-efficacy is developed through four principal sources of information. These sources of information include individual performance attainments; physiological states from which individuals partly judge their capabilities, strength, and

vulnerability; vicarious experiences of observing the performance of others; and verbal persuasion and other social influences (17). These sources of information have varying levels of impact on one's self-efficacy and are described in the ensuing paragraphs.

First, individual attainments are deemed the most influential source of self-efficacy development because they are based on one's individual performance (17). When success is experienced, self-efficacy increases. However, when failure occurs, especially failure that is early in the course of attempts and coincides with exertion of effort, self-efficacy is lowered (17).

Second, individuals tend to assess their physiological states as indicators of their capabilities (17). They may judge their bodies' states of arousal as a sign of vulnerability and impending failure (17). Since high arousal may debilitate performance, individuals are less inclined to expect success when experiencing states of tension, anxiety, and fear (17). For example, when engaged in rigorous exercise, individuals may interpret their fatigue and muscle aches as indicators of physical inefficacy (17).

Importantly, human beings do not rely solely on their personal experiences to assess their individual self-efficacy. They are also influenced by the self-efficacy of others and the judgments of others. Third, self-efficacy is developed vicariously from the experiences of similar others (17). Individuals who witness the successful performance of similar others are likely to perceive that they too are capable of those achievements (17). Likewise, observing the failures of others who are perceived to possess similar competencies, despite high effort, lowers the self-efficacy of observers (42). According to Bandura, this process is more than simple social comparison. Modeling by similar others

presents information to the vicarious learner about the predictability of environmental events as well as effective strategies for handling challenging situations (17).

Fourth, self-efficacy is also developed from verbal persuasion when others attempt to encourage a target individual to believe he/she possesses capabilities that will enable him/her to achieve. Although verbal persuasion alone is limited in its power to create enduring changes in self-efficacy, it can supplement other sources of self-efficacy information to enhance individual efficacy appraisals (17). Specifically, verbal persuasion has been demonstrated to have the greatest impact if deemed realistic to the target individual (17). The individual can then utilize this persuasion as a source of strength to put forth sufficient effort to succeed (17; 58; 59).

Once individuals receive information from the aforementioned sources, self-efficacy judgments influence behavior by impacting emotions and thought patterns (17). Overall, self-efficacy judgments influence motivation level, quality of thinking, resiliency, and vulnerability to stress (17; 18). Individuals who determine that they are inefficacious focus on their personal deficiencies and the potential difficulties of the situation, perceiving the problem to be more daunting than is reality (17). These foci divert attention away from determining how to best address the issue (17).

To summarize, self-efficacy impacts how individuals perceive and respond to stress and challenges. Higher self-efficacy allows for increased motivation and a focus on solutions as opposed to personal limitations. Self-efficacy can be developed by various methods, with successful individual experiences being the most influential. Physiological arousal, vicarious experiences, and social persuasion all interact to influence self-

efficacy. These sources of self-efficacy are likely to be negatively impacted by historical trauma.

### **Historical Trauma, Native Hawai'ians, and Self-Efficacy**

Long-term exposure to inferior treatment and devalued status may adversely impact individuals' self-concept, ideas of self-worth, and future aspirations (77; 82). The impact of historical trauma on self-efficacy within Native Hawai'ians will be reviewed below. A major aspect of historical trauma is the loss of traditional ways of life; and many Indigenous people cite personal feelings of shame and guilt, which may limit opportunities to experience success (89; 241). When coupled with the economic disenfranchisement of historical trauma, opportunities for either personal or economic successes may become difficult. Additionally, as generations of a community experience the violence, economic hardships, and loss of culture that came along with historical trauma, their physiological stress response may become dysregulated over time (233). As perceptions of self-efficacy include appraisals of our physiological reactions to taxing situations, individuals may interpret these stress responses as an inability to cope, which may limit their capacity to focus on problem-solving and goal-setting (17). Vicarious experiences also impact the self-efficacy of Native Hawai'ians. Research has demonstrated that groups who experience historical trauma develop maladaptive coping strategies, such as substance abuse (79; 287). As younger generations witness the coping strategies and activities of others, they then make judgements of their own possibilities utilizing these data (17; 169). Finally, Native Hawai'ian self-efficacy may be impacted by verbal and social persuasions. Through overt and covert discriminatory practices, Native Hawai'ians received constant "persuasion" that they needed outside governing and were

incompetent and inferior (107; 152; 153);(201). Research across several countries demonstrates that groups viewed as lower in social status internalize these negative stereotypes, may experience negative self-fulfilling prophecy, and experience low performance (95; 249).

In one study, Native Hawai'ian children were presented photos of individuals of different ethnic backgrounds and asked to select one based on positive social attributes. These children selected photos of White and Japanese individuals as opposed to Native Hawai'ians (150), which indicated that Native Hawai'ian children may have internalized a negative perspective of the social status and efficacy of their people. Therefore, an accurate examination of the health and social well-being of Native Hawai'ians may be incomplete without considering the social context of historical trauma and its effects on self-efficacy. Additionally, self-efficacy has also been linked to both outcome variables of the proposed study: socioeconomic status and obesity. This dissertation evaluated whether historical trauma negatively impacts self-efficacy of Native Hawai'ians.

### **Self-efficacy and Socioeconomic Status**

Socioeconomic status is largely influenced by one's occupation; and education greatly impacts occupational trajectories (8). According to Bandura, self-efficacy is a strong predictor of an individual's occupational trajectory as it shapes his/her aspirations (19). People with higher self-efficacy not only consider a wide range of career options, they also engage in activities to prepare themselves for the pursuit of those options and remain steadfast in their goals when decided (19). Self-efficacy research also demonstrates that this phenomenon directly mediates the relationship between other

variables, such as sex and familial socioeconomic status, and career aspirations and choices.

In addition to the aforementioned studies describing the impact of self-efficacy on academic achievement, researchers also examined the mediating role of effort regulation in understanding the impact of trauma on academic outcomes (33). While effort regulation is not exactly interchangeable with self-efficacy, as noted earlier, self-efficacy judgments may influence the amount of effort as well as persistence individuals expend on a task, especially when faced with adversity (17). In the examination of effort regulation's role in academic outcomes, first year grade point average and second year enrollment information were collected for 484 first year university students who reported lifetime exposure to traumatic events (33). Researchers found that effort regulation significantly mediated the relationship between trauma symptomatology and first year grade point average (33). Additionally, since grade point average was found to have the strongest effect on second year enrollment, a significant indirect effect of effort regulation on second year enrollment was identified (33). This study illustrates the important role self-efficacy may play in educational attainment, which continues to be a major determinant of later occupation and overall socioeconomic status.

In another study, researchers tested the hypothesis that self-efficacy would mediate the relationship between sex and career choice (28). The authors maintained that women's occupational self-efficacy would be constricted by societal beliefs which held that women were incapable of mastering the skills within occupations traditionally held by men (28). Although the 101 men and 134 women within the study were equal in verbal and quantitative skills, women rated themselves as inefficacious in roles

traditionally held by men (e.g., accountant, engineer, and physician) and highly efficacious in traditional female roles (e.g., elementary teacher, medical technician, and travel agent) (28). Notably, men rated themselves as highly efficacious in all roles, supporting researchers' hypothesis. Furthermore, regardless of sex, self-efficacy was found to be positively correlated with the range of career options considered and the amount of energy invested in these careers (28).

In a longitudinal study, Bandura et al. examined social and cognitive influences on children's career aspirations, including the role of family socioeconomic status as well as parental and individual self-efficacy (19). The relationships among familial socioeconomic status, parents' self-efficacy to promote their children's academic achievement, parents' academic aspirations, children's self-efficacy, and children's occupational aspirations were examined with a sample of 272 children and their mothers (19). The investigators found that parental self-efficacy and parental aspirations mediated the relationship between familial socioeconomic status and children's career aspirations. As such, high socioeconomic status parents felt strongly about their efficacy in promoting their children's education and held high expectations for their children's career (19). However, none of the following variables had a direct effect on the child's self-efficacy or career aspirations: familial socioeconomic status, parental self-efficacy, or parental aspirations. Instead, the child's individual self-efficacy was found to mediate the relationship between parental self-efficacy and the child's career aspiration. Overall, the child's individual self-efficacy predicted his/ her career considerations (19).

The previous studies demonstrate the important role of self-efficacy in determining scholastic achievement and career considerations. These studies also identify

self-efficacy's role in explaining the relationship between several variables, such as trauma and familial socioeconomic status, and an individual's personal achievement and aspirations. Thus, self-efficacy is deemed a fitting variable that can provide meaningful elucidation of the relationship between historical trauma and socioeconomic status of Native Hawai'ians.

### **Self-efficacy and Obesity**

Self-efficacy has also been demonstrated to impact obesity-related behaviors and weight loss. One study found that self-efficacy, along with health behavior knowledge, predicted changes in BMI among a sample of males with overweight (88). Another study, among 130 women with overweight and obesity, examined the impact of self-efficacy when coupled with a behavioral weight loss treatment. While both groups initially demonstrated weight loss, the self-efficacy enhancement cohort demonstrated greater weight loss and weight loss maintenance at 12- and 18-month follow up (52). By contrast, the behavioral treatment demonstrated significant weight regain at follow up (52).

Targeting self-efficacy may also have long-lasting effects on obesity-related behaviors. Shin et al. examined the role of self-efficacy in improving weight loss with a specific focus on eating self-efficacy (230). They found that participants who endorsed high overall self-efficacy as well as self-efficacy to resist food when available were able to achieve greater weight loss (230). Low self-efficacy has also been associated with disordered eating. Utilizing data from a study designed to prevent weight gain in women who eat out often, researchers examined the associations among eating self-efficacy, binge eating, and emotional eating (21). Among a sample of 43 women with overweight



and obesity, binge eating was found to be significantly negatively correlated with eating self-efficacy (21). As such, high endorsement of binge eating is associated with low self-efficacy (21).

As obesity increases the risk of type 2 diabetes, several studies have examined the role of self-efficacy in diabetes-related self-care as well as improved health and weight loss. Generally, these studies found that self-efficacy was positively associated with the maintenance of dietary self-care behaviors, reduced fat intake, and improved overall nutritional intake (7; 123; 180; 227; 250). These studies demonstrate that self-efficacy significantly impacts obesity-related behaviors and outcomes.

### **Brief Summary**

The experience of historical trauma may have negatively impacted the self-efficacy of Native populations via negative affective states, physiological stress response, vicarious learning of maladaptive coping mechanisms, and social persuasion. Additionally, research indicates that self-efficacy is an essential factor in determining career and socioeconomic status as well as obesity and health behaviors. Therefore, self-efficacy was examined in this study as a mediating variable between historical trauma and outcome variables of socioeconomic status and obesity.

### **CULTURAL AFFILIATION: MODERATING THE RELATIONSHIP BETWEEN HISTORICAL TRAUMA AND SOCIOECONOMIC STATUS/ OBESITY OUTCOMES**

Loss of culture remains one of the most prominent aspects of historical trauma (140; 164). Therefore, an examination of the impact of cultural affiliation on population outcomes within the Native Hawai'ian community is warranted. First, it is necessary to provide a definition of culture. Various definitions of culture have been proposed within

the fields of psychology and anthropology. Based upon Kroeber and Kluckhohn's meta-analysis of culture definitions, culture includes six components: a description of common activities and behaviors, a historical reference to heritage and tradition, norms and rules, psychological aspects of learning and approaches to problems, structural and organizational elements of the given society, and genetic origins of the people who make up the culture (145; 299). Overall, culture is understood as an integral aspect of all human groups that manifests from individuals' knowledge and beliefs about themselves, others, and the world (133). Culture also refers to the way of life and shared identity of a collective group of people (133). This shared identity is socially transmitted and regulated via political, legal, and social systems. Finally, these systems include both external representations, such as observable behaviors and tangible artifacts, and internal representations, such as inferred traits and social hierarchies (133).

Relatedly, cultural affiliation is defined as the shared group identity that can be traced between current Native Hawai'ians and their historical counterparts (172). Cultural affiliation involves personal identification with the culture, feelings of affiliation with others within the culture, participating in culturally-salient activities, and endorsing culturally-sanctioned beliefs (117; 206). Importantly, cultural engagement is viewed as a possible source of resilience within the Native Hawai'ian community (102; 162). Outlining and examining differences between Native Hawai'ian culture and Western culture provide a foundation from which to better understand the current socioeconomic status and health status within this group.

### **Comparing Native Hawai'ian and Western Cultures**

A brief description of the Native Hawai'ian culture is presented to distinguish its components from that of Western culture and to provide context for its utility in Native Hawai'ian well-being. The Native Hawai'ian culture is collectivist. As a result, the concept of self is interdependent and based in a relationship among the individual, society, nature, and the gods (108; 161). In Hawai'ian literature, these relationships are thought to be inseparable and any imbalance among them may be deemed detrimental to each component (161). When these relationships are aligned, it is believed that "*lokahi*" is achieved and the individual experiences a sense of unity among mind, body, spirit/gods (*ke akua*), land (*aina*) as well as others (*kanaka/ohana*) in the community. (161; 204). Therefore, the Native Hawai'ian perspective of self and well-being is holistic and rooted in caring for the self, others, the land, and cultural divinities (125; 161). While Hawai'ian culture focuses on an integrated view of the self, with responsibilities to care for the community and the environment, Western ideals often value a more independent and self-sufficient sense of self. Specifically, the Western, including American, view of the self is as an independent and autonomous entity whose behavior is primarily influenced by his/her unique internal attributes (abilities, motives, and values) (219; 220; 234).

### **Acculturation and Native Hawai'ians**

Due to colonization and immigration of other racial groups into Hawai'i, the ethnocultural landscape of these islands has transformed. Native Hawai'ians are no longer the majority in Hawai'i, and due to intermarriage, many Hawai'ians are of mixed race and/or ethnicity (118). Seventy to 90 percent of Native Hawai'ians identify as multiracial (118; 181; 185); and, as described earlier, less than four percent of Native

Hawai'ians are likely to be "pure-blood" (184). Therefore, addressing acculturation is important when attempting to assess Native Hawai'ian cultural affiliation.

Acculturation is defined as the psychological and lifestyle change that occurs when different cultural groups come into contact, attempt to live together, and adapt to their environment (26; 27). Due to a history of exposure to multiple cultures, some level of acculturation is expected within the Native Hawai'ian population. In the context of Native Hawai'ian history, it is important to examine acculturation from two different perspectives: that of the acculturation due to colonization and that of acculturation due to ethnic and racially diverse immigrant populations.

### ***Acculturation and Colonization***

Initial interest in acculturation research attempted to examine the effects of European colonization on indigenous peoples (27; 116). Specifically, Native and Indigenous scholars have likened colonization to involuntary acculturation as these groups were often denied access to their cultural ways (26; 27; 140; 285). When diversity is supported within a society, groups of varying cultures are deemed to have more opportunities to succeed because the larger society recognizes the need for and engages in culturally sensitive practices, such as healthcare and multicultural curriculum in schools (26; 27). However, when cultural pluralism is not accepted, there remain variances in the relative amount of acceptance of specific groups (26; 27). Furthermore, these less-accepted groups tend to experience rejection, discrimination and hostility, as well as marginalization through involuntary assimilation (26; 27). When examining the Native Hawai'ian experience, involuntary acculturation occurred through the implementation of compulsory boarding schools, removal of Hawai'ian language from

everyday culture, suppression of Native Hawai'ian religion and cultural practices, and forced statehood (1; 6; 135; 161; 216).

### ***Acculturation and Multicultural Hawai'ians***

The second aspect of Native Hawai'ian acculturation is related to adaptation to their multicultural neighbors. Foreign employees from various countries were hired to replace the gap created by the decline in the Native Hawai'ian population (161). One example of Native Hawai'ian acculturation due to increased multiracial contact was the development of Pidgin language, a colloquial Hawai'ian dialect. Pidgin is a combination of English, Hawai'ian, Japanese, Portuguese, and Cantonese languages that emerged on Hawai'i's sugar plantation in the middle to late 19<sup>th</sup> century (207; 211; 235). Forged through the desire to communicate with their multiracial neighbors, Pidgin remains the most common form of colloquial communication among Native Hawai'ians (207; 211; 235).

### ***Acculturation and Native Hawai'ian Well-being***

Acculturation from the Native Hawai'ian perspective can relate to various competing cultures, both Western culture and the varying cultures of foreign immigrants. Therefore, acculturation will not be directly measured within this dissertation. However, a short review of the role of acculturation to Western culture on Native Hawai'ian well-being provides context and support for an examination of Native Hawai'ian cultural affiliation. Findings from Native Hawai'ian acculturation research have indicated varying outcomes about the role of acculturation to Western culture as well as the role of Native Hawai'ian cultural affiliation on Native Hawai'ian well-being.

One study examined the relationship between Hawai'ian cultural affiliation and suicide among approximately 3000 Hawai'ian and non-Hawai'ian adolescents (296). Researchers found that Native Hawai'ian adolescents had significantly higher rates of suicide attempts. Moreover, identification with Hawai'ian culture was associated with increased risk of attempting suicide (296). Another study examined the relationship between acculturation and Type 2 diabetes (130). In a cross-sectional study of 495 Native Hawai'ian adults, researchers found that those who identified mostly with Native Hawai'ian culture had the highest prevalence of Type 2 diabetes, followed by those who affiliated with both Western and Native Hawai'ian culture (130).

In contrast, other studies have found identification with mainstream American culture to be detrimental to the health of Hawai'ians. When examining the relationship between acculturation and hypertension among 94 Native Hawai'ian adults, researchers found that Hawai'ians who strongly identified with Western/mainstream American culture were more likely to report having hypertension (129). Another study examined the relationship between affiliation with Hawai'ian culture and psychological well-being among a sample of 184 Native Hawai'ian college students (222). Findings indicated that Hawai'ians who endorsed high identification with their native culture reported low psychological distress and overall higher scores on psychological well-being measures (222).

Taken together, these studies demonstrate that research is inconclusive about the role of acculturation as well as Native Hawai'ian cultural affiliation on Native Hawai'ian well-being. Researchers posit that living and working within a capitalist Western society while attempting to maintain native values can be particularly stressful (159). Qualitative

research with Native Hawai'ian community leaders, parents, and youth examined the conflict between Western and Hawai'ian values in regard to work (159). Investigators found that attempting to integrate into American culture was stressful across generations (159). It is also likely that the historical trauma experience further exacerbates the dissonance between native and Western cultures. Since Native Hawai'ians may have adapted to several varying cultures, in addition to Western culture, acculturation will not be directly examined in this manuscript. Instead, the utility of Native Hawai'ian cultural affiliation to impact well-being will be examined.

### **Hawai'ian Cultural Affiliation and Outcome Variables**

Native Hawai'ians may have trouble navigating their lives within Western society while maintaining their traditional culture ideals. However, affiliation with Hawai'ian culture may ameliorate these stressors as well as highlight the strength of the individual within their Native Hawai'ian community. Specifically, cultural affiliation may influence the relationship between historical trauma, socioeconomic status, and obesity-related health issues, such that individuals with high cultural affiliation may experience increased social and well-being outcomes.

### ***Cultural affiliation and Socioeconomic Status***

No studies that directly investigated cultural affiliation and socioeconomic status within the Native Hawai'ian population were identified. However related research suggests that cultural affiliation may be associated with high scholastic achievement and increased likelihood of employment. A study examining culture-based education in Hawai'i with fifth to twelfth grade students demonstrated that cultural affiliation in schooling positively influences scholastic achievement (136). Students enrolled in

Hawai’ian schools that taught and immersed learners in the following scored higher on academic tests than students who were not culturally affiliated: Native Hawai’ian values, beliefs, practices, and language (136). Culturally-immersed students scored higher on tests of math and reading test scores compared to children in other schools (136). Furthermore, almost 89 percent of culturally affiliated students reported personal expectations to graduate from college compared to approximately 74 percent of non-culturally affiliated students (136).

In another study, the relationship between native cultural affiliation and socioeconomic well-being was examined among a sample of 9,359 Indigenous Australians (76). Researchers found that individuals with strong cultural attachment were significantly more likely to be employed than Indigenous people with moderate or minimal attachment (76). Furthermore, educational attainment increased as cultural affiliation increased. As such, participants with moderate and strong cultural affiliation completed approximately one-third of a year more education than those with limited cultural affiliation (76). These studies provide promising evidence of the positive influence of cultural affiliation on socioeconomic outcomes.

### ***Cultural Affiliation and Obesity***

Cultural affiliation may also impact obesity and obesity-related factors. However, the role of cultural affiliation in obesity development and maintenance is challenging to identify because various subcultures exist within the Native Hawai’ian culture. Different subcultures exist around food and body size among Native Hawai’ians versus Native Hawai’ians of nobility. Secondly, different subcultures are associated with “local” Hawai’ian foods and the traditional Hawai’ian diet.



Valuing an overweight/obese body size may have been historically influenced by social status in Native Hawai'ian communities. Historical writings and art depicted Native Hawai'ians as slim and muscular (157; 163). There existed, however, a culture of extreme obesity among the nobility in Hawai'i, similar to many other aristocracies (157). Due to the excessive weight of many of the noble class, sometimes reaching three to four hundred pounds, Native Hawai'ians were collectively assumed to value a larger body (157). However, it was the symbolic and communal purposes of food that Native Hawai'ians valued (163). The communal aspect of food was typically demonstrated in the Hawai'ian luau, a meal historically shared among members of Hawai'ian society once per day (163). While obesity was not valued, a larger body was often viewed as a sign of social health, or that others cared for you (163).

There are limited data on the ideal body size within the Native Hawai'ian population. However, studies indicate that Native Hawai'ians tend to maintain high body mass indices and/or endorse that a larger body size are generally preferred within their ethnic group (254; 294). Nonetheless, Native Hawai'ians self-reported being dissatisfied with their bodies if they had high body mass indices and maintained negative attitudes regarding larger body sizes(254; 294). These studies may provide support for the non-obese yet large body size ideal of Native Hawai'ians. However, these data may also be demonstrating acculturation as Native Hawai'ians believed that the ideal Western body size is smaller than that selected by Whites (254). Due to the ambiguity of body size ideals within this population, the physical characteristics and diet of ancient Hawai'ians provide a more accurate view of the impact of Hawai'ian culture on obesity.

The second cultural discrepancy to address is that between “local” Hawai’ian food and the traditional Hawai’ian diet. While the communal and symbolic importance of food remains consistent in the Hawai’ian culture, the quality and type of foods eaten have changed considerably. Prior to Western contact, Native Hawai’ians consumed a diet consisting largely of fruits and vegetables with a small portion of meat. These foods mainly included taro, bananas, sweet potatoes, breadfruit, and some fish; and this diet was low in fat and high in complex carbohydrates (55; 157). Conversely, due to cultural mixing and rising costs of food, the current “local” Hawai’ian diet is high in fat and low in complex carbohydrates. Local foods are typically “plate lunches,” which consist of rice, macaroni salad and meat. Popular snacks include burgers and spam musubi, a piece of spam on top of rice and wrapped with seaweed. Moreover, fruits and vegetables are usually underrepresented on “local” food plates.

While current “local” Hawai’ian foods are likely to promote weight gain and metabolic ailments, research has demonstrated that returning to traditional Hawai’ian foods may reverse the impact of obesity. The Waianae Diet is based on the traditional Hawai’ian diet, which is high in complex carbohydrates and fiber and low in fat (231). After three weeks on this diet with the ability to eat to satiety, Native Hawai’ian participants had an average weight loss of 17 pounds (231). Significant decreases in cholesterol and blood pressure were also noted. Moreover, at a 7.5 year follow up, participants maintained a weight loss of 15 pounds, on average (232). During the diet, participants were taught by Native Hawai’ian healers about practices that promote well-being and ancient cooking methods (231). Notably, revival of the Native Hawai’ian culture was deemed an important motivating factor for participant involvement (231). A

review of this literature suggests that limited engagement in Native Hawai'ian cultural values and traditions is likely to promote obesity and an unhealthy lifestyle.

### **Cultural Salience**

As traditional Hawai'ian culture featured a predominantly healthy lifestyle, it is important to address the potency of a collective re-focus on cultural ways to buffer the impact of historical trauma. Returning to traditional Hawai'ian foods had a positive impact on overall weight and obesity-related health problems (231; 232). Cultural affiliation and engagement may also be a source of resilience as well as an overall factor of health within this population.

A focus on culture serves to de-stigmatize native populations and support the legitimacy of their cultural practices. Research examining the role of culture in Native Hawai'ian health found that cultural knowledge and practice were essential factors in Native Hawai'ian's description of their health (162). A revival of Native Hawai'ian culture initiated in the 1970s, bringing the establishment of the Office of Hawai'ian Affairs as well as the Hokule'a voyages (161). The Office of Hawai'ian Affairs promotes and protects the rights of Native Hawai'ians (187). The Hokule'a's worldwide voyages display Native Hawai'ians' heritage of canoeing, exploring, and caring for the environment (199). These acts of Hawai'i's cultural revival demonstrate attempts to reconstruct a strong cultural identity, which is deemed critical in promoting individual and community well-being following collective trauma (252). The following is an excerpt from a conversation with Bruce Blankenfeld, who has been sailing with the Hokule'a since 1977 and serving as a navigator since 1992:

In reference to questions about the role the Hokule'a voyages on the impact on Native Hawai'ians and asserting their cultural identity, Bruce Blankenfeld responded with the following:

“It was a way of bringing back the core understanding, beliefs, wisdom, and values back into the community. We were rediscovering the culture. We weren't just practicing it, but we were living our culture and getting better at it. The common thread throughout the Pacific is the canoes and voyaging. [These voyages help us to gain] a solid identity of who we are and our connection to the rest of the Pacific. [Our ancestors] were intelligent and courageous people who dared to achieve an impossible dream. People feel better about themselves and their culture and place in it. Then they can reach out to other areas of health and excellence. People who have sailed have expanded their awareness about the environment, gained more confidence, and [accessed] a new way of thinking: 'It's always a journey, no failure. There is strength in weathering the storm.' In the 70's and 80's when the sovereignty movement was expanding, people would get really angry, but now the emotion and mindset had changed. Now, we are moving forward with strength, dignity, and understanding (31).”

Cultural affiliation may serve to moderate the relationship between historical trauma and adverse outcomes within the Native Hawai'ian population. As Hawai'i is largely ethnically diverse and many Native Hawai'ians are of mixed racial and ethnic backgrounds, acculturation to some degree is expected. Particularly, acculturation to Western society has demonstrated varied outcomes in Native Hawai'ian literature. Research has indicated, however, that cultural affiliation may promote higher academic achievement as well as employment rates. Furthermore, a return to traditional Hawai'ian foods has been effective in weight loss and decreasing obesity-related symptoms. More research is needed on the role of cultural affiliation and socioeconomic factors in this population. For these reasons and to present the Native Hawai'ian culture as a potentially viable factor of resiliency, Hawai'ian cultural affiliation was examined in this dissertation as a moderating factor between historical trauma and the outcome variables of socioeconomic status and obesity.

## **SUMMARY**

The literature review provided thus far aimed to present and support the rationale for examining the Native Hawai'ian population and the possible associations of historical trauma and well-being. Like other native and Indigenous peoples, Native Hawai'ians lost kin, land, and way of life and continue to experience distress associated with these traumas. Trauma and discrimination research delineate pervasive negative outcomes of trauma experiences, demonstrating linkages between trauma and lower socioeconomic outcomes as well as increased likelihood of obesity. Research indicates that self-efficacy may mediate the relationship between trauma and socioeconomic outcomes. The importance of self-efficacy in maintaining healthier lifestyle behaviors has also been demonstrated. Moreover, while more research is needed to better elucidate the relationship between cultural affiliation and socioeconomic status, the literature reviewed provides promising indication of the positive influence of cultural affiliation on academic achievement and employment outcomes. Additionally, traditional Native Hawai'ian culture is deemed to promote health; and cultural affiliation may reduce the likelihood of obesity. Taken together, historical trauma in the Native Hawai'ian community may impact socioeconomic status and obesity through its effect on self-efficacy. Furthermore, cultural affiliation may moderate the impact of historical trauma on socioeconomic status and obesity.

## **THE CURRENT STUDY**

This dissertation aimed to elucidate the relationships among historical trauma, discrimination, self-efficacy, Hawai'ian cultural affiliation, socioeconomic status, and obesity within a Native Hawai'ian population. To date, only one study has empirically

examined historical trauma in the Native Hawai'ian community. Examining possible mediating and moderating factors between historical trauma/discrimination and well-being is important in furthering this line of research. Additionally, studies on historical trauma tend to focus on emotional and substance use outcomes related to historical trauma. This dissertation highlighted socioeconomic status and the physiological outcome of obesity as important variables that may negatively impact Native Hawai'ian well-being.

This dissertation was innovative in several regards. First, limited research exists that focuses only on the Native Hawai'ian population. Data on Native Hawai'ians is usually not collected, not reported due to statistical insignificance, or reported within the larger scope of Native Hawai'ian and Pacific Islanders. Second, limited research exists that examines the effects of historical trauma and discrimination in this population. Third, literature that addresses cultural affiliation as a moderating factor will be meaningful to the population of interest, as Native Hawai'ians have experienced generations of cultural suppression and change. Study findings may also be useful for informing policy on expanding opportunities for cultural affiliation and practice within the Native Hawai'ian population.

The purpose of this dissertation was to examine the relationships between historical trauma, the independent variable, as well as discrimination, and the dependent variables of socioeconomic status and obesity in individuals who self-identify as Native Hawai'ian. The relationship between historical trauma and self-efficacy as well as cultural affiliation were also examined. Self-efficacy and cultural affiliation were expected to impact the relationship between historical trauma and the dependent

variables, such that self-efficacy explained the relationship and cultural affiliation changed the strength of the relationship between the independent and dependent variables. It was hypothesized that historical trauma would significantly impact socioeconomic status and obesity. This hypothesis was based upon the proposed mechanism whereby historical trauma engenders chronic stress and low self-efficacy; and this low self-efficacy inhibits motivational and self-care factors, leading to low socioeconomic status and obesity. This study was a cross-sectional correlational design.

### **Aims and Hypotheses**

#### **Historical Trauma, Discrimination, and Well-Being. Rationale for Specific Aim 1:**

Literature suggests that historical trauma is associated with several negative well-being outcomes (2; 11; 14; 36-38; 79; 140-142; 286; 287). Particularly, Native Hawai'ians face high rates of poverty, unemployment, and obesity compared to non-Hawai'ians (47; 65; 118; 156; 176; 268; 273; 274). Historical trauma may adversely influence self-efficacy development through negative vicarious and social experiences, allowing for limited authentic mastery experiences, and leading to dysregulated physiological stress response (17; 79; 82; 98; 169; 233; 286; 287). Additionally, a key aspect of historical trauma is disruption of native/cultural ways of life; and Native Hawai'ians endorse continued difficulty maintaining and balancing their cultural values in Western society (140; 159; 241). As discrimination continues to impact well-being in minority communities and is an important factor of historical trauma, this variable was added as a covariate in this analysis. Furthermore, age and gender were also examined as covariates in this analysis.

**Specific Aim 1:** The first study aim was to determine the relationships among historical trauma, discrimination, and the following related factors: socioeconomic status, obesity, self-efficacy, and cultural affiliation.

Hypothesis 1a. Historical trauma was hypothesized to be associated with socioeconomic status (SES). Both objective and subjective measures of SES were utilized. Objective SES was operationalized using measures of education, occupation, and income. Individuals who endorsed experiencing more thoughts of historical trauma were expected to be of lower SES.

Hypothesis 1b. Historical trauma was hypothesized to be associated with obesity. Individuals who endorsed experiencing more thoughts of historical trauma were expected to have a greater body mass index (BMI).

Hypothesis 1c. Historical trauma was hypothesized to be associated with self-efficacy such that individuals who endorsed experiencing more thoughts of historical trauma were expected to have lower self-efficacy than those who endorsed few or no thoughts of historical trauma.

Hypothesis 1d. Historical trauma was hypothesized to be inversely associated with cultural affiliation such that individuals who endorsed experiencing more thoughts of historical trauma were expected to have low cultural affiliation.

**Self-efficacy as a Potential Mediator. Rationale for Specific Aim 2:** Research demonstrates that self-efficacy is an important factor in fostering personal aspirations as well as the motivation to engage in activities necessary to achieve these goals. Particularly, when tasks require greater cognitive effort and are difficult to sustain, self-efficacy has been demonstrably related to persistence and higher achievement (83; 218).



Self-efficacy has also been demonstrated to mediate the effects of factors, such as trauma, social expectations, and parental self-efficacy, on individual achievement and socioeconomic factors (19; 28; 33). Regarding obesity, studies show that self-efficacy is associated with greater weight loss and weight loss maintenance, less disordered eating, and improved diabetes self-care behaviors (21; 52; 88; 230; 250). Age, gender, and perceived discrimination were examined as covariates in this analysis.

**Specific Aim 2:** The second aim of this study was to examine the extent to which self-efficacy mediated the relationships between historical trauma, discrimination, and the dependent variables of socioeconomic status and obesity.

Hypothesis 2a. Self-efficacy was hypothesized to explain the relationship between historical trauma and socioeconomic status. Individuals with higher self-efficacy were hypothesized to fall within a higher socioeconomic status than those who endorsed lower self-efficacy.

Hypothesis 2b. Self-efficacy was hypothesized to explain the relationship between historical trauma and obesity. Individuals with higher self-efficacy were hypothesized to have lower body mass index (obesity) than those who endorsed lower self-efficacy.

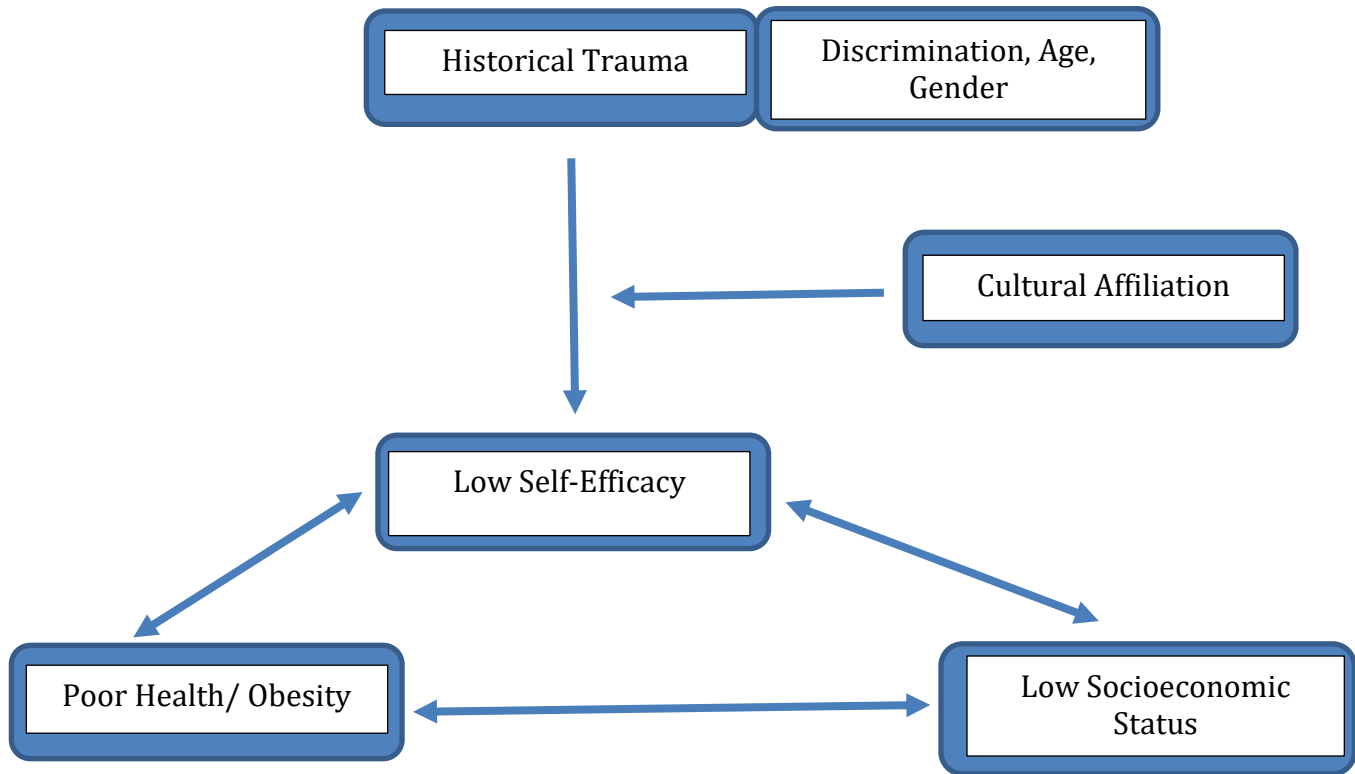
**Cultural Affiliation as a Potential Moderator. Rationale for Specific Aim 3:** Cultural affiliation is regarded as a source of strength and resilience in Native and Indigenous populations (102; 162). Research examining the impact of cultural affiliation on Native Hawai'ian overall well-being is inconclusive. However, research suggests that cultural affiliation is associated with positive academic outcomes in Native Hawai'ian children as well as greater rates of educational attainment and employment in an Indigenous

Australian sample (76; 136). Furthermore, research on Native Hawai'ian health demonstrates that returning to a traditional diet and engaging in cultural practices promotes a healthy lifestyle (162; 231; 232). Age, gender, and perceived discrimination were examined as covariates in this analysis.

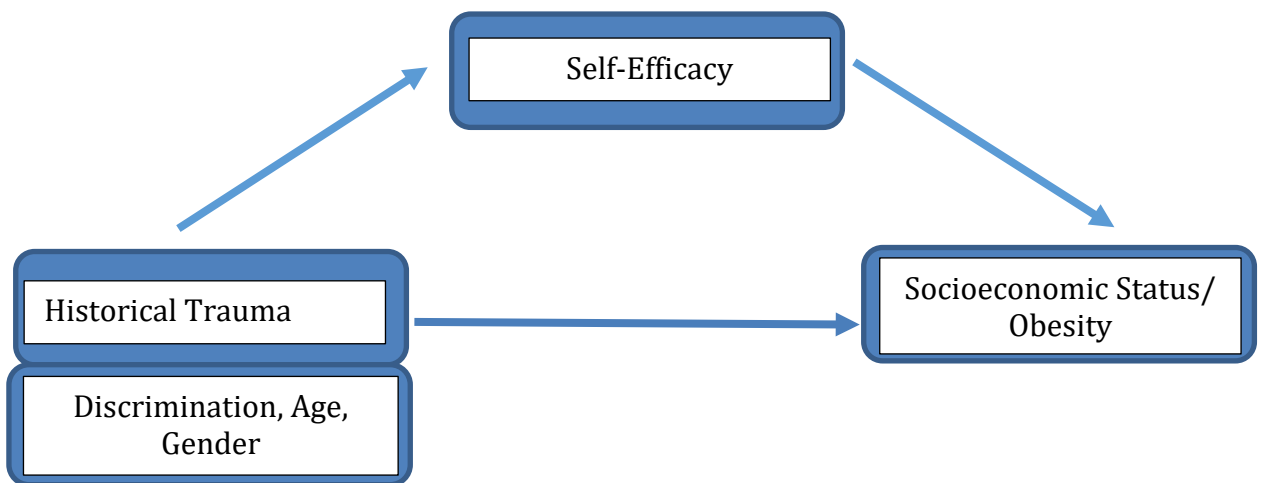
**Specific Aim 3:** Aim 3 assessed the extent to which cultural affiliation moderated the relationships between historical trauma and the outcome variables of socioeconomic status and obesity.

Hypothesis 3a. Cultural affiliation was hypothesized to moderate the impact of historical trauma on socioeconomic status. Specifically, cultural affiliation was expected to amplify the relationship such that individuals with greater cultural affiliation were hypothesized to be of higher socioeconomic status than those with low cultural affiliation.

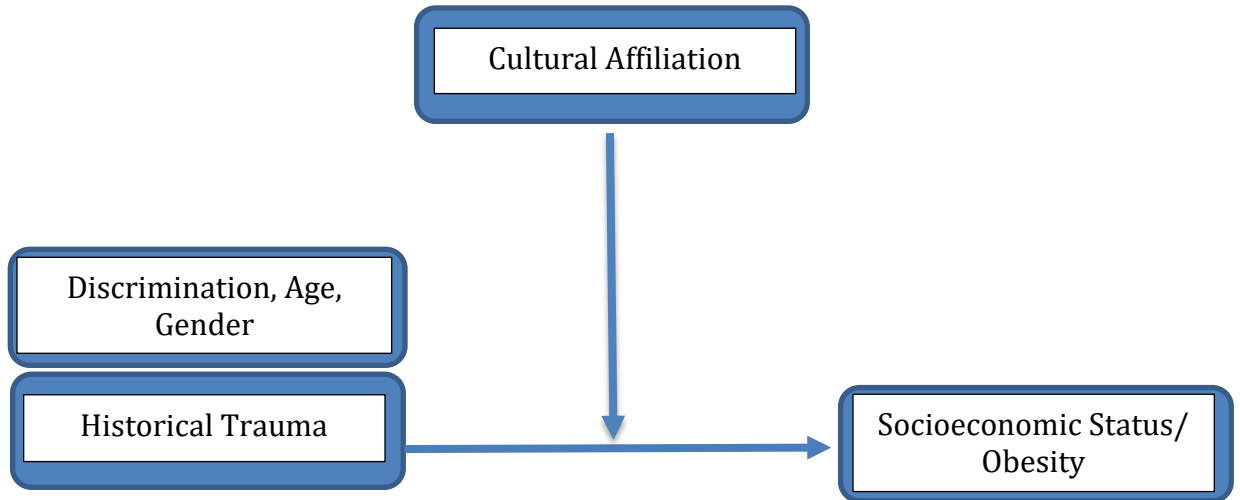
Hypothesis 3b. Cultural affiliation was hypothesized to moderate the impact of historical trauma on obesity. Individuals with greater cultural affiliation were hypothesized to have lower body mass index (obesity) than those with less cultural affiliation.



**Figure 2.** Abbreviated Framework



**Figure 3.** Mediation Framework



**Figure 4.** Moderation Framework

## **CHAPTER 2: METHODS**

### **STUDY DESIGN**

A cross-sectional correlational design was used to examine the role of historical trauma and discrimination on socioeconomic status and obesity in Native Hawai’ian adults. The relationship between historical trauma and self-efficacy as well as self-efficacy and the outcome variables (socioeconomic status and obesity) were examined to determine whether self-efficacy functioned as a mediator. Cultural affiliation was examined as a moderating variable between historical trauma and the outcome variables (socioeconomic status and obesity). Perceived discrimination was examined as a covariate in all analyses. Demographic variables, including gender, age, and racial identification were collected. All data were collected using an online survey delivered through Survey Monkey. All measures related to study inclusion criteria were “forced

choice” or required a response before the participant could move further on the survey. Zip code, additional racial/ethnic identification, and open-ended questions about cultural engagement did not require a response.

## **RECRUITMENT**

Participants were a convenience sample of Native Hawai’ians recruited through flyers distributed to Native Hawai’ian centers and organizations. Flyers detailing the purpose and website link to the study were emailed to community health centers as well as Native Hawai’ian-focused organizations with the request to distribute and display the flyer to their constituents [See Appendix 12 for list of organizations that were contacted and Appendix 13 for flyer verbiage]. Native Hawai’ians experienced a population decline of over 90 percent following European arrival; and it is likely that less than four percent of the Native Hawai’ian population are single-race (135; 161;184). Moreover, it is predicted that pure-blood Hawai’ians will no longer exist by the year 2050 (181). Thus, it was expected that most participants would identify as Native Hawai’ian but also select additional races with which they identify. In the 2010 Census, 70 percent of Native Hawai’ians identified as multiracial; and in 2016, only 10 percent of Native Hawai’ians/Other Pacific Islander identified as single-race (273). While almost 24 percent of Hawai’i’s residents identify as mixed race, data detailing the composition of Native Hawai’ian multiracial identification is obscure. The following are prominent racial categories within Hawai’i in descending order: Asian, White, Hispanic/Latino, and Native Hawai’ian/Other Pacific Islander (268; 271). It is likely that Native Hawai’ians who identify as multiracial also identify with one of these races.

Recruitment focused on all Hawai'ian Islands, except for Kaho'olawe. The island of Kaho'olawe is uninhabited due to its use as a bombing range during World War II and continued unexploded ordnance hazards (126). Recruitment efforts targeted Native Hawai'ian adults between the ages of 25 and 64 years. This age range was selected based on several factors. The majority of students in the United States enroll in postsecondary education between the ages of 18 and 29 (170), with a median time to earn a Bachelor's degree of 45 to 103 months (54). Additionally, the majority of individuals employed in the labor market are between the ages of 20 and 64, with a major increase in employed personnel occurring around age 25 (45). Additionally, a large decline in employment occurs at age 65, with over 65 percent of individuals leaving the workforce at this age (45). As socioeconomic status is a function of education, occupation, and income, the age range of 25 to 64 aimed to target individuals who were likely to have had the opportunity to engage in behaviors that impacted their socioeconomic status. Interested participants were informed that the purpose of the study is to understand how historical trauma impacts Native Hawai'ian well-being. All recruitment materials included a study email address, which participants could have utilized to contact the Principal Investigator directly. No participants contacted the principal investigator.

**Benefit to DOD:** Native Hawai'ians and other Pacific Islanders have and continue to serve in military conflicts and are overrepresented in the military (29). A better understanding of factors contributing to the health and well-being of servicemembers, their families, and veterans benefits the Department of Defense and the nation. Additionally, Native Hawai'ian land has been utilized for training and preparation for war; and Hawai'i continues to be utilized as a location for several military bases. Native

Hawai'ian historical trauma is interwoven with US military and politics; and enhanced understanding of this trauma can directly contribute to continued and future partnerships due to improved cultural sensitivity and awareness.

### **Inclusion and Exclusion Criteria**

Each survey response was screened to determine if it met the following inclusion criteria:

- 1) Self-identification as Native Hawai'ian
- 2) 25 to 64 years of age at time of survey completion

Survey responses were excluded if they did not meet the inclusion criteria and/or provided incomplete responses to the included questionnaires.

### **Post-Survey Page**

Potential participants were provided with a series of frequently asked questions and answers (FAQs) before being presented the survey measures as well as at the end of the survey, detailed in Appendix 14. These FAQs described the purpose of the survey, offered definitions of the variables being studied, presented the inclusion criteria, described informed consent, and presented any incentives for participation. Specifically, within the informed consent verbiage, participants were informed of their right to withdraw from the protocol at any time during the study. On the post-survey page, Appendix 15, participants were also provided an email contact for the Principal Investigator and the number for the national suicide prevention line. The number for the national suicide prevention line was included in the case that participation in this survey caused emotional distress.

## MEASURES

Participants completed the following six measures in the order presented below.

1. **Demographic information (Appendix 1).** Questions addressing demographic information are provided in Appendix 1. Demographic information, including age, gender, and racial identification, was collected. The Pew Research Center categorization for ethnicity was incorporated providing individuals 28 subgroups to identify with thereby allowing for more specific classification (195).

Knowledge of immigration patterns into Hawai'i as well as major Pacific Islander groups determined the detailed background list in **Appendix 1**. Participants were also asked to provide their zip code as this may provide meaningful data, related to urban and rural differences, in exploratory analyses. Height and weight were also collected to determine body mass index (obesity).

2. **Historical Trauma: Historical Loss Scale(285) (Appendix2).** Historical loss was assessed using the Historical Loss Scale, presented in Appendix 2. This scale measures how often individuals think about a type of historical loss. It has a Cronbach's alpha of .92 (285), demonstrating good internal reliability. The Historical Loss Scale was created with a focus on Native American historical trauma experiences (285). Utilizing information from research as well as responses from a panel of experts, this scale was modified slightly for use in this study to highlight the Native Hawai'ian historical trauma experience. The adapted scale includes nine of the original 12 items and two adjusted items, for a total of 11 items. The following item was removed: "losses from the effects of alcoholism on our people." Additionally, "loss of families from the reservation to government relocation" was revised to "loss of our people due to disease after European



contact.” “Loss of trust in whites from broken treaties” was also changed to “loss of trust in government due to the illegal overthrow of the Hawai’ian kingdom.”

The original response categories ranged from several times a day, coded as “1,” to never, coded as “6” (285). Scoring was reversed such that less frequent endorsement of thoughts relating to historical loss equated to a lower score (284).

3. **Socioeconomic Status: (a) The Hollingshead Four-Factor Index of**

**Socioeconomic Status(120): (Appendix 3).** The Hollingshead Four-Factor Index measures social status based on the following four domains: marital status, retired/employed status, educational attainment, and occupational prestige(120).

Education is measured on a seven (7) point rating, with “7” being graduate/professional training, “1” representing less than 7<sup>th</sup> grade education, and “0” being no schooling (120). Occupation is rated on a 9-point scale, with “9” representing executive level work, “1” representing laborers and students, and “0” representing no work/ unemployment (120). The Hollingshead Four-Factor Index is a widely utilized measure of socioeconomic status that has been demonstrated to show good inter-measure agreement, with Pearson’s  $r$  ranging from .42 to .86 (60). This measure has been found to have good inter-rater agreement, with a Pearson’s  $r$  ranging from .73 to .91 (60).

**(b) The MacArthur Scale of Subjective Social Status(3) -Community Ladder**

**(Appendix 4).** This scale is a measure of subjective socioeconomic standing.

Presented pictorially as a ladder, participants identify where they feel they stand on the ladder compared to others in their community (3). This measure was adapted, and participants were asked to rate themselves on two ladders, one

compared to others in Hawai'i (SES Hawai'i) and one compared to others in their community or ohana (SES Ohana). This scale has been demonstrated to have good test- retest reliability, with Spearman's rank order correlation coefficient of .62 (190), Kappa values of .58 (99), and interclass correlation coefficient of .64 (99).

4. **Generalized Self-Efficacy Scale (225)(Appendix 5).** This 10-item scale is a self-reported measure of self-efficacy that assesses individual's beliefs about their personal abilities to handle adversity, problem-solve and achieve their goals. The Cronbach's alpha for this scale is between .76 and .90, demonstrating good internal reliability (225). Scores for each item are summed, producing a total score ranging between 10 and 40. Higher scores indicate more self-efficacy (225).
5. **Cultural Affiliation: Nā Mea Hawai'i Scale(206) (Appendix 6).** This 21-item questionnaire measures knowledge of Hawai'ian vocabulary, customs, history, and culture as well as participation in Hawai'ian culture. One point is given for each item response that is either correct or that corresponds with Hawai'ian culture. (206). Higher scores indicate greater affiliation with Hawai'ian culture. During scale creation, item analysis demonstrated that Hawai'ian responses were significantly different from Japanese and Caucasian individuals (206), providing an indication of scale validation.
6. **Perceived Discrimination: The Everyday Discrimination Scale(61) (Appendix 7).** This 9-item scale measures every-day and more chronic experiences of discrimination and has been utilized in a Native Hawai'ian population previously (160). Participants respond to questions asking how often they have experienced

varying forms of discrimination on a six-point Likert scale, ranging from never (a score of zero) to every day, (a score of five). Therefore, a higher score signifies more frequent experiences of discrimination. This measure has been demonstrated to have a Cronbach's alpha ranging from .87 to .90 (61; 124; 288).

## **DATA ANALYTIC PLAN**

All analyses were conducted using SPSS, Version 25.0; and tests were two-tailed. All analyses were conducted for each outcome variable separately. Data were examined for outliers and screened for normality. Influential outliers with Cook's distance values greater than one were examined (94). See Appendix 9 for a summary of planned analyses.

### **Data Analytic Plan for Specific Aim 1**

Simple and multiple linear regressions were used to examine the effect of historical trauma and on each of the following dependent variables: socioeconomic status (hypothesis 1a), obesity (Hypothesis 1b), self-efficacy (Hypothesis 1c), and cultural affiliation (Hypothesis 1d). Historical trauma was the independent or predictor variable, and  $Y_{1-4}$  represents the four dependent variables. Discrimination, age, and gender were added as covariates in the model.

### **Data Analytic Plan for Specific Aim 2**

#### ***Hypothesis 2a***

In order to examine the potential role of self-efficacy in mediating the effects of historical trauma on the outcome variables (socioeconomic status and obesity), multiple linear regressions were conducted, with self-efficacy as the mediating variable.

Discrimination, age, and gender were added as covariates in the model. The *Process* bootstrapping Macro was utilized to conduct mediation analyses (Hypothesis 2a).

Recent research has indicated that bootstrapping is the most effective method for mediation analyses, preferable to Baron and Kenny and to the Sobel methods. While Barron and Kenny's method has been the most widely utilized mediation analysis, several limitations have been noted. Most importantly, the Barron and Kenny method does not test the indirect effect of the *ab* path (path that flows from the independent variable to mediator to outcome variable); and it is the indirect effect that demonstrates mediation (94; 298). Barron and Kenny's method provides the direct effect, which aids in interpretation of the mediation relationship (298) and encourages the use of the Sobel test to calculate the indirect effect (113). However, due to the lack of power of the Sobel test, bootstrapping is recommended (113). Bootstrap methods sample with replacement from the experimental sample size. For each bootstrap sample, estimations of the *a* and *b* paths as well as their products are calculated (202; 298). The average of the *a* and *b* products is the indirect effect of the mediation analysis. The relationships among study variables are depicted in Figure 3.

### ***Hypothesis 2b***

Simple linear regressions were used to examine the effect of self-efficacy on the outcome variables of socioeconomic status ( $Y_1$ ) and obesity ( $Y_2$ ). Discrimination, age, and gender were added as covariates in the model.

### **Data Analytic Plan for Specific Aim 3**

#### ***Hypothesis 3a***

Moderation analysis using the *Process* macro were utilized to examine the moderating effect of cultural affiliation on the relationship between historical trauma and the outcome variables: socioeconomic status ( $Y_1$ ) and obesity ( $Y_2$ ). The following variables will also be added to the model: discrimination, age, and gender.

### ***Hypothesis 3b***

Simple and multiple linear regressions were used to examine the effect of cultural affiliation on the outcome variables of socioeconomic status ( $Y_1$ ) and obesity ( $Y_2$ ). Discrimination, age, and gender were also added as covariates in the model

### **Sample Size Estimation**

A sample size of 150 was based upon an *a priori* power analyses and allowing for 25 percent drop-out. Detailed information is provided in Appendix 8.

## **CHAPTER 3: RESULTS**

The sample size and demographic characteristics are presented. Next, responses on survey outcome measures are presented to characterize the sample. Third, findings for each of the hypotheses are described.

### **DEMOGRAPHICS**

The sample used for analyses included 146 self-identified Hawai'ian adults. Participants completed the survey online using Survey Monkey. No identifying information was collected that could connect survey submissions to any specific participant/s. Upon data completion, 185 survey attempts were recorded in Survey

Monkey. Of these, seven individuals did not meet study criteria due to reported age or non-identification as Native Hawai’ian. Thirty-two did not complete any part of the survey or left entire measures incomplete. Importantly, several program directors stated they initiated the survey in order to assess and relay survey information to potential participants. Therefore, a total of 146 completed submissions were maintained for data analysis.

Tables 1 through 3 summarize the demographic characteristics of the 146 study participants. Table 1 presents age, gender, racial/ethnic characteristics, and marital status of participants. The sample was majority female (76.7%), with 34 male and 112 female participants. Participants’ age range matched the study criterion of being between 25 to 64 years old. The average age was 42.97 years (SD= 11.54). Female respondents were approximately one year older than male participants,  $t(48.597)=.219, p=.039$ .

While all participants were required to identify as Hawai’ian, very few pure-blood Hawai’ians remain (184). Therefore, participants were asked to select and/or write in other racial/ethnic backgrounds with which they identify. These data are presented in Table 2. Ten participants did not identify with any other race. However, 83, approximately 57%, participants identified with three or more races, including Native Hawai’ian. In descending order, the largest racial/ethnic categories were as follows: Chinese (44.5%), Portuguese (38.4%), White (26.0%), Filipino (22.6%), and Japanese (21%).

**Table 1.** Age, Gender, Marital Status, and Racial/Ethnic Characteristics of Participants.

Variable	N	Mean (SD)	Range	Percentage
<b>Age</b>	146	42.97 (11.54)	25-64	
Male	34	42.6(13.0)	25-64	23.3%

Female	112	43.1(11.1)	25-64	76.7%
<b>Marital Status</b>				
Married	84			57.5%
Single	62			42.4%
<b>Other Racial/Ethnic Background</b>				
American Indian/Alaskan Native	4			2.7%
Black/African American	2			1.4%
Chinese	65			44.5%
Filipino	33			22.6%
Guamanian/Chamorro	1			.68%
Japanese	31			21.2%
Korean	5			3.42%
Portuguese	56			38.4%
Samoan	7			4.8%
Tahitian	2			1.4%
Tongan	1			.68%
Vietnamese	2			1.4%
White	38			26.0%
Yapese	1			.68%

*Note.* N= Sample size; SD = Standard Deviation

Table 2 summarizes respondents' education and employment characteristics.

Most of the sample was well-educated, with over 90 percent having some college experience and approximately 68 percent having a college and/or graduate degree.

Additionally, most participants were employed full-time (69.2%) or part-time (16.4%), compared to 10.2 percent who were unemployed and 4.1 percent who were retired at the time they took the survey. Of those employed, the majority were professionals (44.8%) and service-related workers (20.8%).

**Table 2.** Education and Employment Characteristics of Participants.

Variable	N	Percentage
<b>Education Level</b>		
Less than 7 <sup>th</sup> grade	0	0
Junior High School	1	.68%
Partial High School (10 <sup>th</sup> /11 <sup>th</sup> grade)	2	1.4%
High School Graduate	10	6.9%
Partial College	33	22.6%

Standard college/University Graduate	50	34.2%
Graduate professional Training/Degree	50	34.2%
<b>Employment Status</b>		
Employed Full Time	101	69.2%
Employed Part Time	24	16.4%
Unemployed	15	10.3%
Retired	6	4.1%
<b>Employment Type</b>		
Business Owner	11	8.8%
Executive	10	8.0%
Government Official	3	2.4%
Skilled tradesperson/laborer	8	6.4%
Professional	56	44.8%
Military/Law Enforcement	10	8.0%
Service-related	26	20.8%
Entertainer/artist	1	.8%

*Note.* N= Sample size; SD = Standard Deviation

Participants were also asked to provide their zip code; however, a response was not mandatory. See Table 3 for location characteristics based on reported zip code. Of the 143 participants who provided a valid zip code, 109 participants resided in the state of Hawai'i. Of these 109 Hawai'ian residents, 95 lived in Oahu. Importantly, only ten respondents from Hawai'i lived in rural areas as identified by the Hawai'i State Data Center and 2010 US Census (112). These numbers are identified in parentheses in Table 4. California, Idaho, Oklahoma, Texas, Utah, and Washington states were represented in at least two or more, respectively, of the other 37 responses.

**Table 3.** Location Characteristics of Participants.

Variable	N	Percentage
<b>State of Hawai'i</b>	109	74.7%
Lanai	1	
Hawai'i	4 (2)	
Kauai	1	
Maui	6 (3)	
Moloka'i	2 (2)	
Oahu	95 (3)	
<b>Non-Hawai'i Location</b>	37	25.3%



California	8	
Florida	1	
Guam	1	
Idaho	2	
Illinois	1	
Kentucky	1	
Maryland	1	
Michigan	1	
Military APO	1	
Missouri	1	
Nevada	1	
Ohio	1	
Oklahoma	3	
Texas	2	
Utah	4	
Virginia	1	
Washington	3	
Wisconsin	1	
No zip code	3	<i>Note.</i> Locations

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in parentheses denote number of rural locations; N= Sample size

#### **SUMMARY RESULTS FOR MEASURES**

Frequencies, means, and ranges for all study measures are presented in Tables 4 through 10. For each measure, results are summarized overall and by gender, location, and ethnicity categories. The ethnicity category highlights the most frequently endorsed backgrounds from Native Hawai’ian respondents. Differences in results based on ethnicity were not statistically significant. Due to the multi-ethnic background of most participants, separating ethnic backgrounds in a manner that could meaningfully be analyzed statistically was not feasible.

**Historical Trauma.** Table 4 presents overall outcomes for the Historical Loss Scale and outcomes by gender and ethnicity. In the current study, participants reported an average score of 37.6 (SD=11.8), out of a possible 66, regarding historical loss (285).

Female participants reported a larger range of scores and a slightly higher score average,  $t(47.041) = .587, p = .01$ .

**Table 4.** Historical Loss (Trauma) Scale Response Characteristics by Gender, Location, and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
Historical Loss (Trauma) Scale	146	37.6(11.8)	15-61
<b>Gender**</b>			
Male	34	36.5(13.8)	15-61
Female	112	38.0(11.2)	13-66
<b>Location</b>			
Hawai'i	109	37.57(11.6)	15-66
Other	37	37.84(12.6)	13-65
<b>Other Ethnicity</b>			
Chinese	65	37.5(10.4)	13-60
Filipino	33	38.0(12.4)	19-66
Japanese	31	36.0(11.1)	15-66
Portuguese	56	37.4(11.5)	15-66
White	48	37.5(13.8)	13-65

*Note.* N= Sample size; SD = Standard Deviation; \*\* represents statistical difference

On the Historical Trauma scale, the response categories ranged from “1 = “never” to “6 = “several times a day.” When responding to questions of historical trauma, a large majority of participants reported experiencing thoughts of each loss at least on a “yearly/special events” frequency. Thoughts about loss of family ties due to boarding schools was the exception, with 60 percent of respondents reportedly “never” thinking of this item. The issues respondents thought about the most daily were as follows: loss of respect by children and grandchildren for elders (46.6%), losing your culture (42.4%), and loss of respect by children for traditional ways (39%). Overall, approximately 96.6 percent of participants reported thinking of loss of language at least yearly or on special

occasions, making this item the most frequently considered issue regarding historical trauma. Of note, there are no pre-determined norms for this measure (198; 285).

Socioeconomic Status (SES). Responses for the Hollingshead and the MacArthur ladders (community, Hawai’ian) by gender, location, and ethnicity are presented in Table 5. The average score on the Hollingshead Four-Factor Index was 46.6 out of a possible 66 points (120). Participants were also asked to subjectively rate their SES compared to their community or ohana as well as all of Hawai’i (3). Participants rated their socioeconomic status slightly higher when they were asked to compare themselves to others in their communities or ohana (6.49) versus comparing themselves to everyone in Hawai’i (6.09). A paired samples t-test demonstrated that the means among these two ladders were statistically significantly different,  $t(145) = -72.5, p < .01$ .

**Table 5.** Socioeconomic Status Variables by Gender, Location and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
Hollingshead Four-Factor Index	146	46.6(10.3)	20-66
<b>Gender</b>			
Male	34	48.4(10.1)	30-66
Female	112	46(10.4)	20-66
<b>Location</b>			
Hawai’i	109	46.9(1.96)	20-66
Other	37	45.6(9.54)	21.5-63
<b>Other Ethnicity</b>			
Chinese	65	46.7(10.3)	28.5-64.5
Filipino	33	44.5(10.6)	29.5-66
Japanese	31	47.1(10.3)	28.5-66
Portuguese	56	45.9(11.3)	21.5-66

White	48	49.7(8.9)	30-66
<b>Macarthur Scale SES/Ohana Ladder</b>	146	6.49(1.96)	1-10
<b>Gender</b>			
Male	34	6.9(1.8)	3-10
Female	112	6.4(1.99)	1-10
<b>Location</b>			
Hawai'i	109	6.51(1.96)	1-10
Other	37	6.41(1.96)	1-10
<b>Other Ethnicity</b>			
Chinese	65	6.2(2.1)	1-10
Filipino	33	6.7(2.0)	2-10
Japanese	31	5.7(2.0)	2-10
Portuguese	56	6.7(1.8)	2-10
White	48	6.6(2.0)	3-10
<b>Macarthur Scale SES/Hawai'i Ladder</b>	146	6.09(2.0)	1-10
<b>Gender</b>			
Male	34	6.4(2.15)	2-9
Female	112	6.0(1.95)	1-10
<b>Location</b>			
Hawai'i	109	5.73(1.91)	1-10
Other	37	7.14(3.98)	2-10
<b>Other Ethnicity</b>			
Chinese	65	6.0(2.0)	2-10
Filipino	33	5.9(2.2)	1-10
Japanese	31	6.0(1.7)	3-10
Portuguese	56	5.8(2.0)	2-10
White	48	6.4(2.0)	1-10

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*Note.* N= Sample size; SD = Standard Deviation

Body Mass Index. Table 6 presents mean BMI for study participants. The average BMI across participants was 32.2 kg/m<sup>2</sup> (SD= 7.6 kg/m<sup>2</sup>). Eighty-nine percent of participants were overweight or obese. Approximately 36 percent of respondents were overweight, while 53 percent were obese. Of the obese individuals, 24 percent or 18 individuals, met criteria for Class 3 (severe) obesity (57). Only 11 percent were normal weight and one percent was underweight. Men generally had a lower BMI at 29.8 kg/m<sup>2</sup>,  $t(86.24) = 2.09, p=.018$ .

**Table 6.** BMI-Related Participant Characteristics by Gender, Location, and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
BMI	146	32.2(7.6)	17.5-62.2
<b>Gender**</b>			
Male	34	29.8(5.32)	17.5-42.1
Female	112	32.7(8.18)	18.5-62.2
<b>Location</b>			
Hawai'i	109	32.0(7.58)	17.5-62.2
Other	37	32.3(8.13)	20-60.7
<b>Other Ethnicity</b>			
Chinese	65	31.7(8.1)	17.5-57.4
Filipino	33	31.7(8.1)	17.5-62.2
Japanese	31	35.2(11.1)	18.5-62.2
Portuguese	56	32.1(7.7)	17.5-57.4
White	48	30.1(7.1)	19.6-62.2

*Note.* N= Sample size; SD = Standard Deviation; Mean & Range in kg/m<sup>2</sup>; \*\* represents statistical difference

Cultural Affiliation. The Nā Mea Hawai'i Scale. For the cultural affiliation scale, participants averaged 17.2 points (SD= 3.58) on the Na Mea Hawai'i scale, with scores ranging from six to 23 (206). A higher score on this measure indicates a greater

knowledge of and affiliation with Hawai’ian culture (206). These data are summarized in Table 7 by gender, location, and ethnic group.

**Table 7.** Mean Response for the Cultural Affiliation Nā Mea Hawai’i Scale by Gender, Location, and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
Na Mea Hawai’i Scale (Cultural Affiliation)	146	17.2(3.58)	6-23
<b>Gender</b>			
Male	34	16.5(3.65)	9-23
Female	112	17.4(3.55)	6-23
<b>Location</b>			
Hawai’i	109	17.8(3.27)	6-23
Other	37	15.6(10.5)	6-23
<b>Other Ethnicity</b>			
Chinese	65	17.5(3.6)	6-23
Filipino	33	16.8(3.6)	6-21
Japanese	31	16.5(3.4)	9-22
Portuguese	56	17.6(3.5)	6-23
White	48	16.5(3.9)	6-23

*Note.* N= Sample size; SD = Standard Deviation

Cultural Practices and Beliefs. To further understand cultural affiliation as a moderating factor in the current study, participants were asked to respond to the following open-ended question: *Do you participate in other practices or have other beliefs that are important to your culture and Hawai’ian identity that were not listed above?* Responses were organized into 12 major categories presented in descending order: emotional way of life, religious practice, environmental practice, historical focus, physical activity, education-focused, music/art, health/wellness, food-related, ceremonial, cultural event/festival, and political. Table 8 depicts these categories. These cultural

categories, along with related qualitative responses, are listed in Appendix 10. Ninety-three participants, or approximately 64 percent, stated they did engage in other practices/beliefs beyond those highlighted in the Nā Mea Hawai’i Scale.

Within the category of emotional way of life (66.7%), ho‘oponopono and prioritizing time with family were the most frequently identified practices. Religious practices (52.7%) highlighted praying, having a love for god, and attending church. Caring for the land/malama ‘aina and engaging in farming were the most common environmental (36.6%) practices. Regarding a focus on history (30.1%), most responses in this category were related to engagement in genealogy. Regarding physical activities (29%), hula/dance was the most common endeavor. Responses with a focus on education (28%), mostly related to educating others about Hawai’ian culture and history as well as learning the Hawai’ian language/olelo. Oli/chanting was the primary response in the music/art category (26.9%). The health/wellness category (20.4%) included lomi bodywork and tradition/plant-based healing/ lā‘au lapa‘au. Related to food (16.1%), cooking was the most frequent response, with a trend related to pounding or making poi. Cultural ceremonies (11.8%) highlighted the import of conducting certain protocol or rituals before entering a sacred space.

**Table 8.** Frequency of Cultural Practices and Beliefs Responses

<b>Cultural Category</b>	<b>N</b>	<b>Percent</b>
Cultural Ceremony	11	11.8%
Cultural Event/Festival	6	6.45%
Educational	26	28%
Emotional Way of life	62	66.7%
Environmental Practice	34	36.6%
Food-Related	15	16.1%

Health/ Wellness-Related	19	20.4%
Historical Focus	28	30.1%
Music/Art	25	26.9%
Physical Activity	27	29%
Political	4	4.3%
Religious	49	52.7%

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*Note.* N= Sample size

Obstacles to Engaging in Cultural Practices. Participants were also asked to consider what may be limiting them from engaging in cultural practices as much as they desire. Responses were separated into seven categories presented in descending order of frequency: time, self-imposed/limited knowledge, access to resources, money/cost, physical distance/convenience, knowledge of events/resources, and other. See Table 9 for these results as well as Appendix 11 for detailed qualitative responses. One hundred and sixteen participants provided reasons for their limited cultural engagement. Seventeen respondents maintained they were not limited in their cultural engagement. Two participants were uncertain about issues that limited their cultural participation; and eleven participants did not respond to this question.

Time was the most frequently endorsed limiting factor, with 49 percent of respondents stating they were too busy working to engage in desired cultural practices. Many others endorsed a self-imposed restriction (17.2%) as well as, and likely due to, their limited fund of Hawai’ian cultural knowledge. For example, participants endorsed feelings of uncertainty, embarrassment, and low sense of belonging, due to their limited cultural knowledge, inhibits their desire to engage in cultural events. Some respondents noted limited access to resources (16.4%) due to governmental and private ownership laws which limit access to sacred sites as well as certain vegetation. Approximately



fifteen percent of respondents endorsed financial limitations to cultural engagement, often highlighting the financial burden of living in Hawai'i. Eleven percent of participants highlighted the challenge of physical distance/lack of convenient access to cultural events. A minority of participants (4.3%) reported difficulty with awareness of cultural events, citing that only a few major events are publicized. Finally, the "other" category consisted of two participants whose health deters their cultural engagement and one participant who holds the view that Hawai'ians may be overly conflictual.

**Table 9.** Obstacles or Restrictions to Cultural Engagement

<b>Obstacle</b>	<b>N</b>	<b>Percent</b>
Access to Resources	19	16.4%
Knowledge of Events/resources	5	4.3%
Money/Cost	17	14.7%
Physical Distance/Convenience	13	11.2%
Self-Imposed/ Limited knowledge of Hawai'ian culture	20	17.2%
Time	57	49%
Other	3	2.6%

*Note.* N= Sample size

Generalized Self-Efficacy Scale. Overall mean response on the Generalized Self Efficacy Scale is presented in Table 10 along with the mean by gender, location, and ethnic group. The sample averaged 33.23 (SD = 4.80) out of a possible 40 points on the Generalized Self-Efficacy scale (225). Very few respondents indicated little to no ability to address challenges. The item with the highest frequency of "Not true at all" responses was "If someone opposes me, I can find the means and ways to get what I want," with seven respondents. Generally, most participants selected "exactly true" and/or

“moderately true” for the items on this scale. Approximately 61.6 percent of participants selected “moderately true” when responding to their belief in their ability to “stick to my aims and accomplish my goals; and approximately 58 percent indicated it is “exactly true” that they can “solve most problems if I invest the necessary effort.”

**Table 10.** General Self-Efficacy Means by Gender, Location and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
General Self-Efficacy	146	33.2(4.80)	18-40
<b>Gender</b>			
Male	34	34.4(3.97)	25-40
Female	112	32.9(4.98)	18-40
<b>Location</b>			
Hawai’i	109	33.05(4.90)	18-40
Other	37	33.8(4.50)	23-40
<b>Other Ethnicity</b>			
Chinese	65	33.1(5.0)	18-40
Filipino	33	32.5(4.8)	20-4
Japanese	31	32.5(6.0)	18-40
Portuguese	56	33.6(4.7)	18-40
White	48	33.6(4.6)	20-40

*Note.* N= Sample size; SD = Standard Deviation

Perceived Discrimination. Perceived Discrimination scores ranged from 0 to 45. The average score for perceived discrimination was 13.48 (SD) (288). Those who resided outside of Hawai’i recorded a greater range of scores and an average approximately 1.5 points higher than Hawai’i residents,  $t(50.8)=-.77$ ,  $p=.04$ . Table 11 presents the average responses based on gender, location, and ethnic group.

**Table 11.** Mean Response on the Everyday Discrimination Scale by Gender, Location, and Ethnic Group

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>Range</b>
Everyday Discrimination Scale	146	13.5(8.7)	0-45
<b>Gender</b>			
Male	34	12.8(8.79)	0-37
Female	112	13.7(8.65)	0-45
<b>Location**</b>			
Hawai'i	109	13.1(7.96)	0-37
Other	37	14.6(10.5)	0-45
<b>Other Ethnicity</b>			
Chinese	65	13.2(8.1)	0-45
Filipino	33	14.5(3.6)	3-28
Japanese	31	14.3(9.1)	0-35
Portuguese	56	12.8(7.7)	0-28
White	48	11.5(8.8)	0-37

*Note.* N= Sample size; SD = Standard Deviation; \*\* represents statistical difference

Many participants noted they have never experienced acts of discrimination. This was especially true for experiences of being threatened/harassed, others thinking the respondent was dishonest, being called names/insulted, and others acting as if they were afraid of the respondent (56.8%, 46.6%, 45.9%, and 35%, respectively). The highest reported frequencies of experienced discrimination were “a few times a year” and less than once a year.” The most frequently endorsed experiences, in descending order, were the following: “People act as if they’re better than you are,” “You are treated with less courtesy than other people are,” and “People act as if they think you are not smart,” with 88, 84, and 83 percent of individuals endorsing these forms of discrimination, respectively. The 136 participants who endorsed experiencing some form of discrimination were asked this follow-up question: “What do you think is the Main

reason for these experiences?” Participants were welcome to select more than one option when answering; and the frequencies related to these responses are depicted in Table 12. Participants most frequently attributed discrimination to ancestry/natural origin, race, shade of skin color, gender, some other aspect of physical appearance, and age.

**Table 12.** Perceived Reasons for Experience of Discrimination

<b>Reason</b>	<b>N</b>	<b>Percentage</b>
Age	37	27.2%
Ancestry/natural origin	62	45.6%
Education/Income Level	24	17.65%
Gender	43	31.62%
Height	7	5.15%
Other Physical Appearance	39	28.68%
Physical Disability	4	2.94%
Race	49	36.03%
Religion	7	5.15%
Sexual Orientation	5	3.68%
Shade of skin color	47	34.56%
Weight	31	22.8%

*Note.* N=Sample size

## STATISTICAL ANALYSES AND RESULTS FOR THE SPECIFIC AIMS

### Specific Aim 1

Aim 1 proposed that historical trauma/discrimination would be significantly associated with Native Hawai’ians’ socioeconomic status (hypothesis 1a), obesity (Hypothesis 1b), self-efficacy (Hypothesis 1c), and cultural affiliation (Hypothesis 1d). Simple and multiple linear regressions were utilized to analyze these relationships.

***Hypothesis 1a***

The results of the simple linear regression indicated that historical trauma was significantly associated with socioeconomic status,  $R^2=.034$ ,  $F(1,144)=5.062$ ,  $p=.026$ . The adjusted  $R^2$  for this model was .027, a small effect size according to Cohen’s conventions (63). When age, gender, and discrimination were added as covariates in the regression, the relationship between historical trauma no longer a significant,  $\beta = -.14$ ,  $p=.097$ ; and no other variables were significantly associated with SES Hollingshead. The model is presented in Table 11.

**Table 11.** Linear Regression for the Effect of Historical Trauma on SES (Hollingshead)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Historical Trauma	-.16	.07	-.18	.03	-.13	.08	-.14	.10
Age					.07	.07	.08	.32
Gender					-2.1	2.0	-.09	.29
Discrimination					-.13	.10	-.11	.22

**Note.** Model 1= No covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

Regarding subjective measures of SES, regression analyses were also completed to examine the relationships among historical trauma and the two subject SES ladder scales adapted from the MacArthur Scale of Subjective Social Status, the SES Ohana and SES Hawai’i ladders. Linear regression analyses demonstrated historical trauma was not significantly associated with subjective SES, when comparing oneself to others in the community or ohana,  $R^2=.011$ ,  $F(1,144)=1.56$ ,  $p=.21$ . When age, gender, and

discrimination were added as covariates, the model reached significance,  $R^2=.158$ ,  $F(4,141)=6.61$ ,  $p<.01$ . Adjusted  $R^2=.134$ , a small to medium effect size according to Cohen's conventions(63). However, historical trauma remained an insignificant variable,  $\beta =.01$   $p=.94$ . In this latter model, age,  $\beta =.23$ ,  $p=.03$  and perceived discrimination,  $\beta =-.31$ ,  $p<.01$ , reached statistical significance. As age increased, so did SES Ohana. However, as perceived discrimination increased, SES Ohana declined. Detailed results are listed in Table 13.

**Table 13.** Linear Regression for the Effect of Historical Trauma on SES (SES Ohana)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Historical Trauma	-.02	.01	-.10	.21	.00	.01	.01	.94
Age					.04	.01	.23	.03
Gender					-.44	.36	-.09	.26
Discrimination					-.07	.02	-.31	<.01

*Note.* Model 1= No covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

Linear regression analysis demonstrated historical trauma was not significantly associated with SES Hawai'i,  $R^2=.024$ ,  $F(1,144)=3.57$ ,  $p<.06$ . When age, gender, and discrimination were added, the model reached statistical significance,  $R^2=.09$ ,  $F(4,141)=3.5$ ,  $p=.01$ . Adjusted  $R^2$  for this model was .065, a small effect size according to Cohen's conventions (63). However, historical trauma was not a statistically significant factor in this model,  $\beta =-.09$   $p=.32$ . Age,  $\beta =.16$   $p=.046$ , and perceived discrimination,  $\beta =-.20$   $p=.02$ , were significant variables in this model. Detailed results are listed in Table

13. There was an inverse relationship between perceived discrimination and SES Hawai'i. As perceived discrimination increased, SES Hawai'i decreased. In contrast, as age increased, so did SES Hawai'i. Results of this model are listed in Table 14.

**Table 14.** Linear Regression for the Effect of Historical Trauma on SES (SES Hawai'i)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Historical Trauma	-.03	.01	-.06	.06	-.01	.01	-.09	.32
Age					.03	.01	.16	.046
Gender					-.37	.38	-.08	.33
Discrimination					-.05	.02	-.20	.02

*Note.* Model 1= No covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

***Hypothesis 1b***

The results of the linear regression indicated that historical trauma was not significantly associated with BMI among this sample,  $F(1,144)=1.95$ ,  $p=.17$ . However, when age, gender, and discrimination were added as covariates in the regression, the overall model reached statistical significance,  $R^2=.077$ ,  $F(4,141)=2.94$ ,  $p=.02$ . The adjusted  $R^2$  for this model was .051, a small effect size according to Cohen's measures of effect size (63). However, historical trauma did not reach significance,  $\beta=.04$ ,  $p=.66$ . Of note, perceived discrimination was a statistically significant variable in this model,  $\beta=.22$ ,  $p=.01$ . As perceived discrimination increased, so did BMI. Detailed results are listed in Table 15.

**Table 15.** Linear Regression for the Effect of Historical Trauma on BMI

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Historical Trauma	.08	.05	.12	.17	.02	.06	.04	.66
Age					-.03	.05	-.04	.65
Gender					2.3	1.5	.13	.12
Discrimination					2.0	.08	.22	.01

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

### ***Hypothesis 1c***

The results of the linear regression model indicated that historical trauma was not significantly associated with self-efficacy,  $R^2=.001$ ,  $F(1,144)=.177$ ,  $p=.68$ . When age, gender, and discrimination were added as covariates in the regression, the overall model reached statistical significance,  $R^2=.136$ ,  $F(4,141)=5.57$ ,  $p < .01$ . The adjusted  $R^2$  for this model was .112, a medium effect size according to Cohen’s measures of effect size (63). Of note, perceived discrimination was the statistically significant variable in this model,  $p < .01$ ; and historical trauma remained an insignificant variable in this model,  $\beta=.08$ ,  $p=.32$ . As perceived discrimination increased, self-efficacy decreased. Detailed results are listed in Table 16.

**Table 16.** Linear Regression for the Effect of Historical Trauma on Self-Efficacy

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Historical Trauma	-.01	.03	-.04	.68	.03	.03	.08	.32
Age					.05	.03	.11	.17
Gender					-1.4	.89	-.13	.11





regression on the Process macro. For hypothesis 2b, simple linear regressions were utilized to examine the relationship between self-efficacy and the outcome variables, socioeconomic status and obesity.

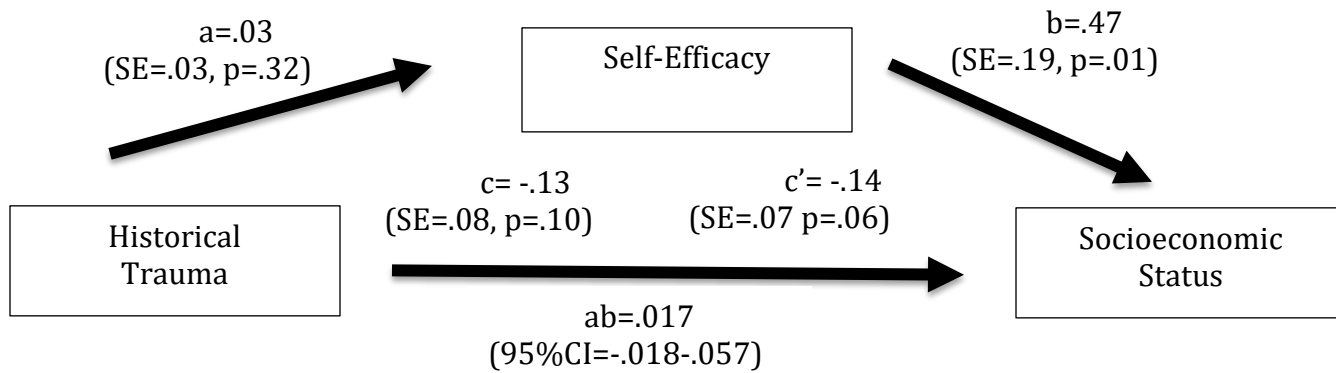
***Hypothesis 2a***

Self-efficacy was expected to explain the relationship between historical trauma and socioeconomic status. First, mediation analyses were conducted utilizing data from the Hollingshead SES scale. Mediation analysis, utilizing the Process macro, with 5,000 bootstrap samples was conducted. In this analysis, the indirect effect of X on Y was -.007, with confidence intervals ranging from -.292 to .016, which is a very small effect size and not significantly greater than zero. Therefore, self-efficacy was not a significant mediator in this model. When age, gender, and discrimination were added as covariates in this model, there was little change. Self-efficacy remained an insufficient mediator between historical trauma and socioeconomic status, with an indirect effect of .016 and confidence intervals ranging from -.018 to .057, which is a very small effect size and not significantly greater than zero. See Table 18 and Figure 5 for further analysis details.

**Table 18.** Mediation Analysis for the Effect of Historical Trauma on SES (Hollingshead)

	<b>Model 1</b>				<b>Model 2</b>			
	Coeff.	SE	P	95% CI	Coeff.	SE	P	95% CI
Total Effect (c)	-.1612	.0717	.0260	-.3029; -.0196	-.1257	.0754	.0975	-.2748; .0233
Direct Effect (c')	-.1538	.0697	.0290	-.2916; -.0160	-.1416	.0742	.0584	-.2884; -.0051
Indirect effect (via mediator)	-.0074	.0290		-.2916; .0160	.0174	.0159		-.0176; .0573

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates



**Figure 5.** Mediation Model for relationship between Historical Trauma, Self-Efficacy, and SES, adjusted for age, gender, and discrimination.

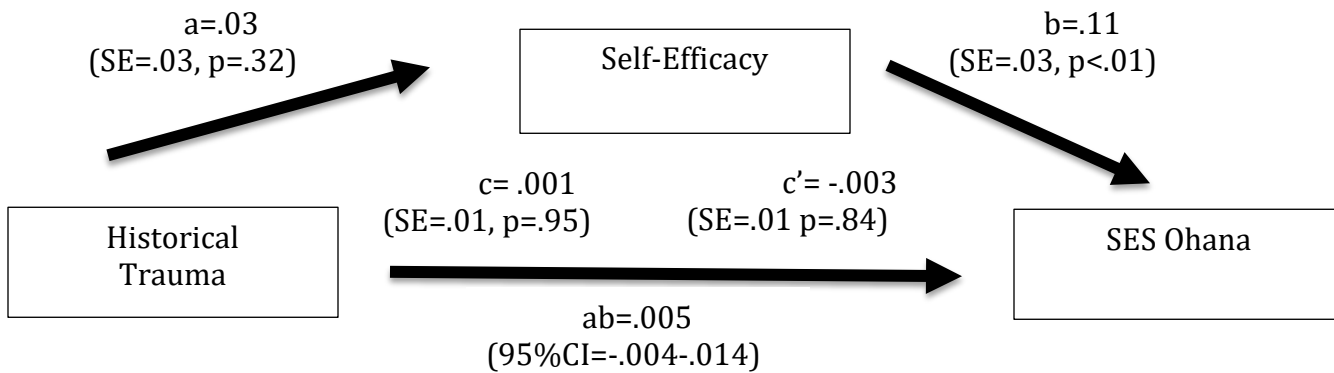
Next, separate mediation analyses were conducted to ascertain the mediating effect of self-efficacy on subjective measures of SES, the MacArthur Scale of Subjective Social Status. On the Ohana Ladder, on which participants compared themselves to others in their community or ohana, self-efficacy was not a significant mediator in this model. The indirect effect was  $-.002$ , with a 95% confidence interval of  $-.040$  to  $.010$ . When age, gender, and discrimination were added as covariates in this model, self-efficacy remained an insufficient mediator between historical trauma and SES Ohana. The indirect effect was  $.004$ , with a 95% confidence interval ranging from  $-.004$  to  $.014$ , which is not significantly greater than zero. See Table 19 and Figure 6 for further analysis details.

**Table 19.** Mediation Analysis for the Effect of Historical Trauma on SES (Ohana Ladder)

	Model 1				Model 2			
	Coeff.	SE	P	95% CI	Coeff.	SE	P	95% CI
Total Effect (c)	-.0171	.0137	.2134	-.0442; .0100	.0011	.0135	.9468	-.0256; .0277

Direct Effect (c')	-.0150	.0128	.2427	-.0403; .0103	-.0027	.0130	.8378	-.0285; .0231
Indirect effect (via mediator)	-.0021			-.0122; .0086	.0037	.0045		-.0042; .0140

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates



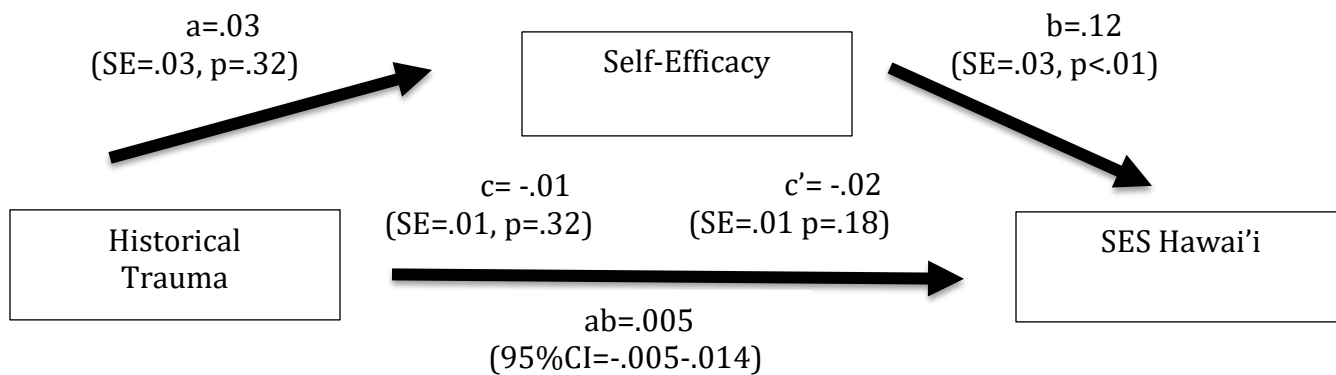
**Figure 6.** Mediation Model for relationship between Historical Trauma, Self-Efficacy, and SES Ohana, adjusted for age, gender, and discrimination.

The following details mediation analyses conducted to ascertain the relationships among historical trauma, self-efficacy and subjective SES compared to others in Hawai'i (SES Hawai'i). Self-efficacy did not mediate the relationship between historical trauma and SES Hawai'i. The indirect effect was -.002, with a 95% confidence interval ranging from -.012 to .007, which is not significantly greater than zero. When age, gender, and discrimination were added to the model, self-efficacy remained an insufficient mediator between historical trauma and SES Hawai'i. The indirect effect was .004 with 95% confidence intervals ranging from -.005 to .014. See model details listed in Table 20 and Figure 7.

**Table 20.** Mediation Analysis for the Effect of Historical Trauma on SES (Hawai'i Ladder)

	Model 1				Model 2			
	Coeff.	SE	P	95% CI	Coeff.	SE	P	95% CI
Total Effect (c)	-.0263	.0139	.0608	-.0538; .0012	-.0143	.0143	.3194	-.0426; .0140
Direct Effect (c')	-.0243	.0131	.0660	-.0502; .0016	-.0185	.0138	.1831	-.0458; .0088
Indirect effect (via mediator)	-.0020	.0049		-.0118; .0074	.0042	.0046		-.0047; .0142

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates



**Figure 7.** Mediation Model for relationship between Historical Trauma, Self-Efficacy, and SES Hawai'i, adjusted for age, gender, and discrimination.

Direct Association between Self-efficacy and SES. Simple and multiple linear regressions were conducted to assess the extent to which self-efficacy was associated with socioeconomic status. There was a statistically significant relationship between self-efficacy and socioeconomic status (Hollingshead),  $R^2=.06$ ,  $F(1,144)=9.5$ ,  $p < .01$ . The adjusted  $R^2$  was .06, a small effect size according to Cohen's effect size measures(63). When age, gender, and discrimination were added as covariates in this model, self-efficacy remained a statistically significant explanatory variable when examining

socioeconomic status as a dependent variable,  $\beta=.02$ ,  $p=.02$ . As self-efficacy increased, socioeconomic status improved. Table 21 presents results from these analyses.

**Table 21.** Linear Regression for the Effect of Self-Efficacy on SES (Hollingshead)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Self-Efficacy	.54	.17	.25	.00	.44	.19	.21	.02
Age					.06	.07	.07	.42
Gender					-1.6	2.0	-.07	.42
Discrimination					-.10	.10	-.09	.32

*Note.* Model 1= no covariates; Model 2 =Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

Similar results were noted when analyzing the relationship between self-efficacy and the subjective measures of SES, SES Ohana and SES Hawai'i. Self-efficacy alone was significantly associated with SES Ohana,  $R^2=.14$ ,  $F(1,144)=23.2$ ,  $p < .01$ . The adjusted  $R^2$  was .13, a small to medium effect size(63). When age, gender, and discrimination were added to the model, self-efficacy maintained a statistically significant association with SES Ohana,  $\beta=.20$ ,  $p=.01$ . As self-efficacy increased, so did SES Ohana. In this model, age,  $\beta=.02$ ,  $p=.02$ , and perceived discrimination,  $\beta=-.22$ ,  $p=.01$ , were also statistically significant variables. Detailed results are listed in Table 22.

**Table 22.** Linear Regression for the Effect of Self-Efficacy on SES Ohana

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Self-Efficacy	.15	.03	.37	<.01	.11	.03	.27	<.01

Age	.03	.01	.20	.01
Gender	-.28	.35	-.06	.42
Discrimination	-.05	.02	-.22	.01

*Note.* Model 1= no covariates; Model 2 =Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

Self-efficacy was also significantly associated with SES Hawai'i,  $R^2=.12$ ,  $F(1,144)=20.1$ ,  $p < .01$ . The adjusted  $R^2$  was .12, a small to medium effect size(63). When age, gender, and discrimination were added to the model, self-efficacy remained a significant explanatory variable in its relationship to SES Hawai'i,  $\beta=.29$ ,  $p<.01$ . As self-efficacy increased, so did SES Hawai'i. Results from these analyses are presented in Table 23.

**Table 23.** Linear Regression for the Effect of Self-Efficacy on SES Hawai'i

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Self-Efficacy	.15	.03	.35	<.01	.12	.04	.29	<.01
Age					.02	.01	.14	.09
Gender					-.22	.34	-.05	.55
Discrimination					-.03	.02	-.13	.11

*Note.* Model 1= no covariates; Model 2 =Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

### ***Hypothesis 2b***

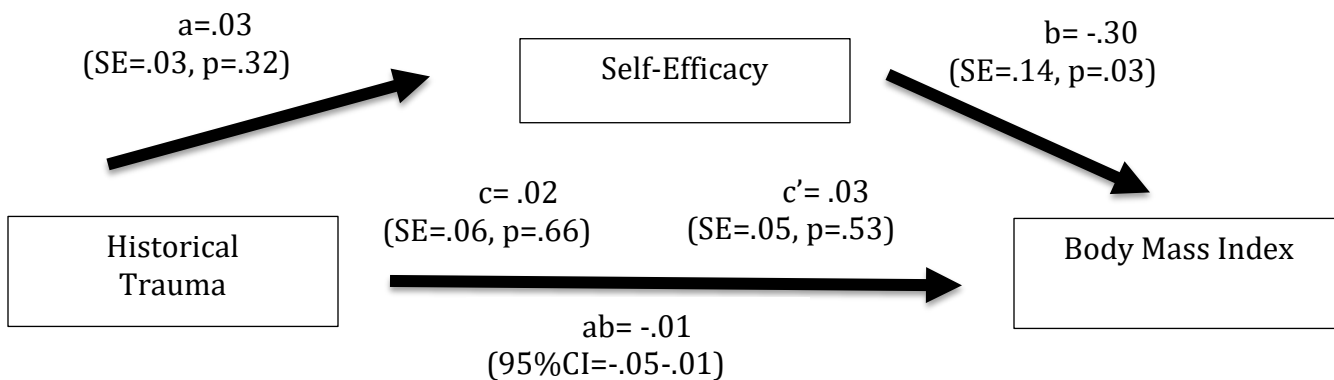
Self-Efficacy and Obesity. Self-efficacy was also expected to explain the relationship between historical trauma and obesity. Mediation analysis, utilizing the

Process macro, with 5,000 bootstrap samples was conducted. When examining the indirect effect of X on Y, the effect size was very small, .006, with confidence intervals ranging from -.024 to .036. Therefore, self-efficacy did not prove to be a statistically significant mediator in this model. When accounting for age, gender, and discrimination, the direct effect of historical trauma on BMI declined and self-efficacy remained an insufficient mediating variable between historical trauma and BMI. The indirect effect was -.01, with a confidence interval ranging from -.049 to .009, which is not significantly different from zero. Further details are listed in Table 24 and Figure 8 below.

**Table 24.** Mediation Analysis for the Effect of Historical Trauma on BMI

	Model 1				Model 2			
	Coeff.	SE	P	95% CI	Coeff.	SE	P	95% CI
Total Effect (c)	.0747	.0535	.1651	-.0311; .1805	.0243	.0552	.6603	-.0848; .1334
Direct Effect (c')	.0690	.0520	.1867	-.0338; .1717	.0344	.0546	.5303	-.0736; .1424
Indirect effect (via mediator)	.0057			-.0238; .0363	-.0101	.0147		-.0492; .0089

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates



**Figure 8.** Mediation Model for relationship between Historical Trauma, Self-Efficacy, and BMI, adjusted for age, gender, and discrimination.



Direct Association between Self-efficacy and SES. Simple and multiple linear regressions were conducted to assess the extent to of the relationship between self-efficacy and BMI. Individuals with higher self-efficacy were expected to have a lower body mass index than those with lower self-efficacy. The results of this regression model, listed in Table 25, indicated that self-efficacy was significantly associated with BMI,  $R^2=.07$ ,  $F(1,144)=10.2$ ,  $p <.01$ . The adjusted  $R^2$  was .06, a small to medium effect size according to Cohen’s conventions(63). Additionally, the direction of this relationship was as hypothesized such that as self-efficacy increased, BMI decreased. When age, gender, and discrimination were added as covariates in this model, self-efficacy remained a statistically significant association with BMI,  $\beta=-.18$ ,  $p=.03$ . Of note, perceived discrimination reached statistical significance within this model,  $p =.04$ .

**Table 25.** Linear Regression for the Effect of Self-Efficacy on BMI

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Self-Efficacy	-.41	.13	-.26	.00	-.30	.14	-.18	.03
Age					-.01	.05	-.02	.81
Gender					1.9	1.5	.10	.20
Discrimination					.16	.07	.18	.04

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

### Specific Aim 3

The third aim of the study was to examine whether cultural affiliation moderated the relationship between historical trauma and the outcome variables, socioeconomic status

and obesity. Moderation analyses were completed using multiple linear regression within the Process macro to analyze the moderating role of cultural affiliation on study outcome variables, SES and obesity. Simple and multiple linear regressions were utilized to examine the direct relationship between cultural affiliation and the outcome variables individually.

***Hypothesis 3a***

Does cultural affiliation moderate the relationship between historical trauma and SES? Cultural affiliation was expected to moderate the relationship between historical trauma and socioeconomic status. Moderation analysis, utilizing the Process macro, with 5,000 bootstrap samples was conducted. Cultural affiliation was not found to significantly moderate historical trauma and socioeconomic status,  $R^2$  change = .00,  $p=.73$ . The overall model was also insignificant,  $R^2=.19$ ,  $F(3,142)=1.7$ ,  $p=.17$ . When age, gender, and discrimination were added to the model, none of the proposed variables were significantly associated with socioeconomic status,  $R^2=.24$ ,  $F(6,139)=1.4$ ,  $p=.21$ ; and cultural affiliation remained an insufficient moderator between the independent and dependent variables,  $R^2$  change = .00,  $p=.90$ . The coefficients, standard errors of the mean, and statistical significance are noted in Table 26 for this model.

**Table 26.** Moderation Analysis for the Effect of Historical Trauma on Socioeconomic Status (Hollingshead)

Variable	Model 1			Model 2		
	Coefficient	Standard Error	Sig(p)	Coefficient	Standard Error	Sig(p)
Historical Trauma	-.16	.08	.03	-.13	.08	.11
Cultural Affiliation	.03	.25	.91	.03	.25	.90
Interaction Term	.01	.02	.74	-.00	.02	.90

(Historical Trauma x Cultural Affiliation)			
Age	.07	.07	.33
Gender	-2.1	2.0	.31
Discrimination	-.13	.10	.23

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates

Regression analyses were also conducted to examine the moderating effect of cultural association on subjective measures of SES. Cultural affiliation proved to be an insignificant moderator of historical trauma and SES Ohana,  $R^2$  change=.00,  $p=.80$ . The overall model reached statistical significance, however,  $R^2=.10$ ,  $F(3, 142)=5.05$ ,  $p<.01$ . Cultural affiliation remained an insignificant moderator of historical trauma and SES Ohana when age, gender, and discrimination were included in the model. While the model reached significance,  $R^2=.24$ ,  $F(6,139)=7.4$ ,  $p<.01$ , the interaction term was not statistically significant,  $R^2$ change=.00,  $p=.80$ . Table 27 presents the results of these analyses.

**Table 27.** Moderation Analysis for the Effect of Historical Trauma on Socioeconomic Status (SES Ohana)

Variable	Model 1			Model 2		
	Coefficient	Standard Error	Sig(p)	Coefficient	Standard Error	Sig(p)
Historical Trauma	-.03	.01	.02	-.01	.01	.31
Cultural Affiliation	.17	.05	<.01	.17	.04	<.01
Interaction Term (Historical Trauma x Cultural Affiliation)	.00	.00	.87	-.00	.00	.80
Age				.04	.01	<.01
Gender				-.57	.35	.10

Discrimination	-0.07	.02	<.01
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*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates

Cultural affiliation was not a significant moderator in the relationship between historical trauma and SES Hawai'i,  $R^2$  change=.00,  $p=.56$ . The overall model was also insignificant,  $R^2=.03$ ,  $F(6,139)=1.3$ ,  $p=.26$ . When age, gender, and perceived discrimination were added to the model, cultural affiliation remained an insignificant moderator between historical trauma and SES HI,  $R^2$  change=.01,  $p=.38$ . The overall model was significant, however,  $R^2=.10$ ,  $F(6,139)=2.5$ ,  $p=.03$ . Results of these analyses are presented in Table 28.

**Table 28.** Moderation Analysis for the Effect of Historical Trauma on Socioeconomic Status (SES Hawai'i)

Variable	Model 1			Model 2		
	Coefficient	Standard Error	Sig(p)	Coefficient	Standard Error	Sig(p)
Historical Trauma	-.03	.01	.06	-.02	.02	.30
Cultural Affiliation	.02	.05	.72	.02	.05	.74
Interaction Term (Historical Trauma x Cultural Affiliation)	-.00	.00	.56	-.00	.00	.38
Age				.03	.01	.04
Gender				.43	.39	.27
Discrimination				-.05	.02	.02

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates

Direct Associations Between Cultural Affiliation and SES. Linear regressions were conducted to examine the relationship between cultural affiliation and socioeconomic status. Cultural affiliation was not significantly associated with

socioeconomic status (Hollingshead),  $R^2=.00$ ,  $F(1,144)=.33$ ,  $p=.57$ . The adjusted  $R^2$  was  $.01$ , a very small effect size(63). When age, gender, and discrimination were added as covariates in this model, cultural affiliation was non-significant,  $\beta=-.03$ ,  $p=.73$ . Results are listed in Table 29.

**Table 29.** Linear Regression for the Effect of Cultural Affiliation on SES (Hollingshead)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Cultural Affiliation	-.14	.24	-.05	.57	-.08	.24	-.03	.73
Age					.08	.07	.09	.28
Gender					-2.2	2.0	-.09	.28
Discrimination					-.18	.10	-.15	.08

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

The relationship between cultural affiliation and perceived SES measures were also examined. Cultural affiliation was significantly associated with SES Ohana,  $R^2=.06$ ,  $F(1,144)=9.6$ ,  $p<.01$ . The adjusted  $R^2$  was  $.056$ , a small to medium effect size (63).When age, gender and perceived discrimination were added to the model, cultural affiliation maintained a significant association with SES Ohana,  $R^2=.24$ ,  $F(3,141)=10.9$ ,  $p<.01$ . The adjusted  $R^2$  for this model was  $.215$ , a medium to large effect size according to Cohen’s conventions (63). In this second model, age and perceived discrimination were significant contributing variables. Overall, as cultural affiliation increased, so did SES Ohana. Detailed results are listed in Table 30.

**Table 30.** Linear Regression for the Effect of Cultural Affiliation on SES (SES Ohana)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p

Cultural Affiliation	.14	.04	.25	<.01	.16	.04	.28	<.01
Age					.04	.01	.22	<.01
Gender					-.57	.34	-.12	.10
Discrimination					-.08	.02	-.33	<.01

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

Regarding SES Hawai'i, cultural affiliation was not a statistically significant independent variable,  $R^2=.00$   $F(1,144)=.03$ ,  $p<.87$ . Adding age, gender, and perceived discrimination, the overall model reached significance,  $R^2=.08$ ,  $F(4,141)=3.2$ ,  $p=.01$ , adjusted  $R^2=.058$ . However, cultural affiliation was not significantly associated with SES Hawai'i,  $\beta=.01$ ,  $p=.92$ . Details of these analyses are listed in Table 31. Age,  $\beta=.17$ ,  $p=.04$ , and gender,  $\beta=-.08$ ,  $p=.01$ , significantly contributed to the variance in this model.

**Table 31.** Linear Regression for the Effect of Cultural Affiliation on SES (SES Hawai'i)

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Cultural Affiliation	-.01	.05	-.01	.87	.01	.05	.01	.92
Age					.03	.01	.17	.04
Gender					-.40	.38	-.08	.31
Discrimination					-.05	.02	-.22	.01

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

### **Hypothesis 3b**

Does cultural affiliation moderate historical trauma and BMI? Cultural affiliation was predicted to moderate the relationship between historical trauma and BMI.

Moderation analysis, utilizing the Process macro, with 5,000 bootstrap samples was conducted. These results indicated cultural affiliation did not moderate the relationship between historical trauma and BMI,  $R^2$  change =.00 and  $p=.95$  for the interaction term. The overall model was also insignificant,  $R^2=.01$ ,  $F(3,142)=.64$ ,  $p=.59$ . . Adding age, gender, and discrimination as covariates did not result in statistical significance,  $R^2=.08$ ,  $F(6,139)=2.0$ ,  $p=.08$ . Cultural affiliation remained an insufficient moderating variable between historical trauma and BMI,  $R^2$  change =.00 and  $p=.74$ . The coefficients, standard errors of the mean, and statistical significance are noted in Table 32 for this model.

**Table 32.** Moderation Analysis for the Effect of Historical Trauma on BMI

Variable	Model 1			Model 2		
	Coefficient	Standard Error	Sig(p)	Coefficient	Standard Error	Sig(p)
Historical Trauma	.08	.06	.18	.03	.06	.64
Cultural Affiliation	-.01	.19	.94	-.03	.18	.86
Interaction Term (Historical Trauma x Cultural Affiliation)	.00	.01	.95	.01	.01	.74
Age				-.03	.05	.65
Gender				2.4	1.5	.11
Discrimination				.20	.08	.01

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates

Direct Associations Between Cultural Affiliation and Obesity. Finally, regression analyses were conducted to examine the relationship between cultural affiliation and BMI. Higher cultural affiliation was expected to be associated with lower body mass index. The results of this regression

model, listed in Table 33, indicated that cultural affiliation was not significantly associated with BMI,  $R^2=.00$ ,  $F(1,144)=.11$ ,  $p=.74$ . When age, gender, and perceived discrimination were added as covariates, the model reached statistical significance,  $R^2=.08$ ,  $F(4,141)=2.9$ ,  $p=.03$ , adjusted  $R^2=.05$ . However, cultural affiliation remained a statistically insignificant variable in the model,  $\beta=-.01$ ,  $p=.94$ . Of note, perceived discrimination significantly contributed to the variance in this model,  $\beta=.24$ ,  $p<.01$ .

**Table 33.** Linear Regression for the Effect of Cultural Affiliation on BMI

Variable	Model 1				Model 2			
	B	SE	$\beta$	p	B	SE	$\beta$	p
Cultural Affiliation	.06	.18	.03	.74	-.01	.18	-.01	.94
Age					-.03	.05	.04	.64
Gender					2.3	1.5	.13	.12
Discrimination					.21	.07	.24	.00

*Note.* Model 1= no covariates; Model 2 = Age, Gender & Discrimination as covariates; B=Unstandardized Coefficient; SE: Standard Error;  $\beta$  = Standardized Coefficient; p=Significance

## CHAPTER 4: DISCUSSION

The current study assessed the relationships among historical trauma, discrimination, self-efficacy, cultural affiliation, socioeconomic status and obesity among individuals who identified as Native Hawai’ian. The long-term goal of this work is to identify psychosocial factors associated with the health of Native Hawai’ians, who as a group disproportionately suffer from poverty and health disparities. Ultimately, through better understanding it is hoped that culturally tailored prevention and intervention programs and policies can be implemented to improve the life of all Native Hawai’ians. The present study did not find historical trauma to be associated with self-efficacy, SES or BMI. However, historical trauma was positively associated with cultural affiliation



suggesting the need to reconsider the measurement of historical trauma in conjunction with other sociocultural variables that address ethnic identity for this multi-ethnic population. Sociocultural factors related to present day functioning, including cultural affiliation and discrimination, were associated with SES and BMI. And, self-efficacy, appeared to be a pivotal construct in understanding the relationship among present day sociocultural factors and health outcome.

Self-efficacy is a construct in several theories that is used to design and guide behavior change and appears promising as a key factor in understanding and promoting the health of Native Hawai'ians. Self-efficacy research tends to demonstrate its association with greater effort in the face of difficulty (16; 17; 218). In the present study, self-efficacy was positively associated with all measures of SES and negatively associated with BMI. These results were similar to previous data highlighting the role of self-efficacy in future aspirations, academic performance, career choice, effort persistence, and obesity-related health outcomes (19; 33);(17; 18; 52; 88).

Recently, Koholokula and colleagues call for application of the Socioecological Model across disciplines to examine how health and disease are impacted by environmental and psychosocial factors that increase risk for cardiovascular and metabolic diseases among Native Hawai'ian and Pacific Island populations. The goal of this work is to develop more effective prevention and health promotion programs as well as impact public health policies. Given many Hawaiian organizations are motivated by the Hawaiian cultural revitalization movement, studies following the association of self-efficacy, culture, and health over time are warranted. Both the Waianae Diet and Pili Ohana (131; 132; 231; 232) studies demonstrated the efficacy of health interventions with

a focus on Native Hawai'ian culture and population-specific challenges to reduce weight and control diabetes. The Waianae Diet included traditional Hawai'ian foods, Native Hawai'ian healing practices, and ancient cooking methods. Participants experienced an average weight loss of 17 pounds, significant decrease in cholesterol and blood pressure, as well as maintained weight loss after seven years (231; 232). Revival of and engagement in Native Hawai'ian culture was reportedly an important factor motivating participant involvement (231). The Pili Ohana Project adapted the Diabetes Prevention Program to Native Hawaiian and Pacific Islanders and integrated a family- and community-focused intervention(131). This project's cultural adaptations included integrating participant perspectives about weight management into intervention strategies, integrating community leader input into the curriculum development, utilizing popular terminology and local examples when creating materials, and having a group of Native Hawaiian/Pacific Islanders review the final curriculum for cultural relevance (132). Results of this study included weight loss of three percent or more body fat, improved blood pressure, and improved physical fitness (131; 132).

#### **MEASURING HISTORICAL TRAUMA IN CONTEXT OF PRESENT-DAY FUNCTIONING**

The importance of understanding the impact of historical trauma on current behavior for Native Hawai'ians is compelling and viewed as important for many Indigenous cultures that suffer from health inequities (243; 280). Mohatt and colleagues suggest historical trauma is a public narrative for groups that connects the present and the past and can therefore impact health and functioning. At the same time, there is recognition that it is difficult to measure the impact of past experiences of historical loss and mistreatment on present-day health

In the present study, historical trauma was assessed with the Historical Loss scale, which asks respondents to indicate how often they think about loss associated with life, cultural practices, land, socio-cultural norms, and trust in government. Community participants from this study scored higher on the measure of historical trauma than a sample of younger Native Hawai'ian college students (198). While there are no pre-determined norms for this measure (198; 285), higher scores indicate greater experiences of historical trauma and may be related to the older age of this sample.

In this study, historical trauma was not associated with SES and BMI. However, historical trauma was associated with cultural affiliation. Additionally, both cultural affiliation and perceived discrimination were associated with SES and BMI. Given these linkages, it may be important to develop a more sophisticated conceptualization of ethnic identity that incorporates aspects of historical trauma, cultural affiliation, and discrimination that can be examined in relationship to present day health.

To identify more proximal factors that influence health, Whitbeck et al. (2004) developed the Historical Losses Associated Symptoms Scale (285). This measure asks participants about feelings/behaviors related to thoughts of historical traumas. These feelings include sadness, shame, feelings of isolation, loss of sleep, fear, rage, and feeling that the trauma is re-occurring (264). Research within Native American communities found that symptoms from the Historical Loss Associated Scale were significantly associated with alcohol and illicit substance use (287). An added focus on these feelings and behaviors related to historical trauma may improve the identification of historical trauma's impact on present-day health. Overall, examining the associated behaviors and

emotions, as well as the thoughts listed in the historical trauma measure, may be a more comprehensive measure of historical trauma.

### **UNDERSTANDING THE RELATIONSHIP BETWEEN CULTURAL AFFILIATION AND HISTORICAL TRAUMA**

The positive association between historical trauma and cultural affiliation was unexpected, but understandable in that historical knowledge of one's culture may be an aspect of cultural affiliation or vice versa. The term historical trauma captures the cumulative experiences of colonization, contemporary discrimination, intentional cultural exploitation and suppression, and negative health outcomes that perpetuate throughout generations (241); 39; 40; 96). Following this definition, the historical trauma scale asked participants how often they thought about "losses" that directly or indirectly came about due to historical trauma, such as loss of community members, land, language, equity in treatment, and cultural expression. These are all items that would be within the awareness of someone engaged in or knowledgeable about Hawai'ian culture and history.

Cultural affiliation, however, refers to an individual's identification, feelings of affiliation, and engagement with a specified cultural background (231; 130; 210). The cultural affiliation measure asked respondents about engagement in traditional cultural practices, the meaning of Hawai'ian words, beliefs about historical experiences, and to identify historical individuals. Therefore, individuals who have invested time to learn this cultural knowledge may likely maintain awareness of and more frequent thoughts of historical trauma events. Therefore, both historical trauma and cultural affiliation may reflect a shared experience of a cultural group. Similarly, experiences of discrimination may be shared by a cultural group and related to cultural affiliation.

## **PERCEIVED DISCRIMINATION AND HEALTH OUTCOMES**

Within the present study, perceived discrimination was measured because ongoing prejudice and marginalization are important aspects of historical trauma theory, but are not directly measured in the Historical Loss scale (273, (241), 39, 40, 96). Perceived discrimination was associated with key study variables including subjective SES, BMI and self-efficacy. Perceived discrimination was associated with lower estimates of SES Ohana and SES Hawai'i. As individuals perceive more discrimination, they also perceive their subjective socioeconomic status to be lower than those in their communities and greater state of Hawai'i. Further understanding of this relationship may be important to improving the health of Native Hawai'ians other research with Native Hawai'ians has highlighted the relationships between discrimination and both depression and feelings of interpersonal inferiority (9).

The relationship of perceived discrimination with BMI and self-efficacy replicates previous research demonstrating an inverse relationship between discrimination and individual health, performance, and self-concept (77; 82; 95; 128; 133; 160; 249; 284) and, specific to Native Hawai'ians, an association between discrimination and BMI (160). Discrimination has been linked to depression and inflammation among Native Hawai'ians, which may provide potential factors to understand the relationship between discrimination and BMI (10; 23; 214).

Of note, perceived discrimination was not associated with objective SES (Hollingshead). There are several possible explanations for this finding. First, most participants were educated professionals, limiting the range of objective SES statuses within the present study. Second, anti-discrimination laws under Title VII may have led to an increase in education and employment opportunities for Native Hawai'ians, serving

as a buffer against discrimination. Since 2007, when the Equal Employment Opportunity Commission began to track Hawai'i state data, Native Hawai'ians experienced an 84 percent increase in professional occupation employment (84; 85). Third, within the present study, self-efficacy was positively associated with objective SES, and this variable may better account for attained objective SES. The association between these variables in this multi-ethnic population require further study. Specifically, future research should be sure to include both subjective and objective measures of SES along with measures of perceived discrimination, cultural affiliation, and historical trauma to predict health behaviors and health outcomes.

Additionally, though not examined in the current study, the potential impact of the multi-ethnic composition of the Native Hawai'ian population is worthy of further study. Census data show that Asian individuals in Hawai'i achieve greater economic and educational outcomes(273). There is reason to hypothesize that the experiences and or values of the different multi-ethnic groups within the Native Hawai'ian community may be associated with different parameters of “success” and impact health outcomes.

### **ETHNIC IDENTITY**

While the racial/ethnic composition of this sample was assessed, ethnic identity was not measured. The mixed-race identities of this study's participants may have had an impact on the sociocultural variables examined. Over 96 percent of Native Hawai'ians are mixed race and over 70 percent of Native Hawai'ians self-identify as multiracial (135; 161);(184). Additionally, approximately 93 percent of the present study's sample identified with another racial and/or ethnic group.

Research on mixed-race individuals suggests that racial identity is determined by family and community background and cultural heritage (122). In addition, many Americans may strategically self-identify with a specific race/ethnicity depending on the situation (193; 209; 210; 221). Therefore, while an individual may identify as Native Hawaiian, they may have an upbringing that was more entrenched in some other culture, based on parental and community factors. Moreover, as individuals move through different life contexts, to include work, friendships, or recreation, the strength of their identity with any of their racial/ethnic backgrounds also shifts (193; 209; 210; 221). This fluidity of racial identity may limit the salience of historical trauma within an increasingly multi-racial Native Hawai'ian population. Therefore, future studies may find utility in asking participants which racial/ethnic identity they most often identify with and understanding the relationships among other sociocultural variables such as those examined in the present study.

While a frequently-used construct, no established definition of ethnic identity exists (196; 197). Instead, components of ethnic identity are offered to best understand this multi-dimensional construct. These components include self-categorization as a group member, commitment and attachment to the group, exploration focused on seeking group-relevant information and experiences, behavioral involvement (speaking the language, eating the food, and associating with members of one's group), ingroup attitudes (attitudes about one's group and oneself as a group member), ethnic values and beliefs, importance or salience of group membership, and ethnic identity in relation to national identity (13; 27; 93; 197; 251; 295). These dimensions provide a framework for

best understanding the concept of ethnic identity and may allow for increased appreciation of the personal identities of Native Hawai'ians.

A substantial amount of research has demonstrated the positive effects of a strong sense of identity on overall well-being. Taylor and Usborne highlighted the importance of a strong cultural identity to engender both individual and community well-being following a collective trauma (252). Other studies demonstrated that individuals who can freely and accurately identify as multiracial and represent their multiple identities report higher self-esteem and self-efficacy (34; 228; 229). Furthermore, Kaholohula et al. (130) found that Native Hawai'ians who identified with both Hawai'ian and mainstream US cultures were significantly less likely to have type 2 diabetes. These findings suggest that a poor self-identity related to multicultural and/or multiracial conflict may negatively impact well-being.

The resurgence of Native Hawai'ian culture through the Native Hawai'ian Renaissance may also serve as a source of conflict for some. Since the 1970s, Native Hawai'ians have worked toward and generated an increase in Hawai'ian language speakers, Hawai'ian immersion and cultural institutions, hula schools, traditional wayfinding, and traditional healing methods (6; 127; 154). With an increasingly multiracial population, this focus on Native Hawai'ian history and culture may lead to some internal conflict regarding identity. Additionally, a significant aspect of the Native Hawai'ian renaissance has been a call for self-determination and sovereignty as an independent Hawai'ian nation (127; 255; 297). This movement toward self-determination conflicts with dominant American culture and may produce related internal conflict for those who identify with both indigenous and American/Western cultures. Thus, overall



findings regarding cultural affiliation indicate there may be more utility in assessing whether Native Hawai'ian participants struggle to maintain a clear identity both due to their multiracial status as well as perceived expectations of dominant Western culture

To summarize, ethnic, racial, and cultural identities are important constructs to assess, especially within the diverse Native Hawai'ian population. While these constructs are relatively similar, they have rarely been studied together. Literature on racial identity has focused on responses to racism and measures of internalized racism whereas ethnic identity has been examined primarily as a sense of belonging to an ethnic group (114; 197). However, the Society for Research on Child Development concluded that individuals' lived experiences are a combination of racial, ethnic, and cultural components; and these components are not experienced separately (260). Therefore, the term racial-ethnic-cultural identity was offered to more accurately account for the interconnected constructs and life experiences of minorities (260).

Future studies may utilize the Cross Ethnic-Racial Identity-Adult Scale (292) to assess attitudes related to dominant culture and assimilation, multi-culturalism, and ethnic/racial salience. The original Cross Ethnic-Racial Identity scale was created over a multi-year and multi-study process to operationalize Cross' negriscence model, beginning in 1995 with five unique studies (66; 200; 279). These studies demonstrated the scale had good internal consistency as well as convergent and discriminant validity (66; 279) and the measure was cited as a " model of best practice for racial identity scale development" (64; 200). The expanded Cross Ethnic-Racial Identity-Adult Scale was designed to assess attitudes toward assimilation, miseducation (endorsement of group stereotypes), self-hatred (extent of dislike for ethnic-racial group), anti-dominant culture, multiculturalist

inclusive (value perspectives of others), ethnocentricity (degree of belief that group values should inform personal life), and ethnic-racial salience (significance of ethnicity/race/culture in daily life) (292). Research with Black, Asian, White, and Latino/a individuals demonstrated the Cross Ethnic-Racial Identity-Adult Scale may be utilized to examine the multi-dimensional constructs of race, ethnicity, and culture across various groups within the United States (292).

### **STUDY LIMITATIONS**

There are several limitations for this study that include generalizability, measurement of historical trauma, and the need for a more detailed analysis of ethnic-racial-cultural identity in this multi-ethnic population. First, this study is a small cross-sectional self-report survey. The data are correlational in nature and causation cannot be assumed. Second, while the current study's demographics matched that of individuals who tend to volunteer for research, regarding gender and SES, it did not always match that of Native Hawai'ians. This sample was majority female, college educated, employed in skilled occupations, and had a higher SES than the general Hawai'ian population. Though these demographics are consistent with research volunteers, (213; 217) it would be worthwhile to explore strategies to reach lower SES individuals and more men. This may include strategies incorporating face to face recruitment in local communities by trusted community workers. The present study did reach out to community organizations to connect with community residents, however, the majority of responses were completed on an online platform. Therefore, participants were limited to those with access to a computer and Internet services.

Another limitation of the present study is the Historical Loss scale used to measure historical trauma. Although historical trauma, in its theoretical context, also accounts for more subtle forms of discrimination (161) and has been demonstrated to correlate with perceived discrimination (248; 250), the historical loss scale does not directly measure these subtleties. While the scale asks about events that initiated in the past and may continue today, this scale does not explicitly measure current and continued discrimination, as theorized within historical trauma. Additionally, individuals may not readily identify that their heightened emotions and/or reactions to contemporary discrimination are linked to historical traumas.

Further criticism of the Historical Loss scale includes its original creation to measure historical trauma within Native Americans. However, it is the only measure of historical trauma identified to capture the experiences of Native/Indigenous peoples in America. Utilizing an expert panel, this scale was adapted to reflect Native Hawai'ian experiences. The amended scale included nine of the original 12 items and two adjusted items, for a total of 11 items. It is possible this measure was not an accurate representation of Native Hawai'ian historical trauma.

The difficulty of assessing the impact of historical trauma on present day psychological and physical health is a problem that extends beyond this study. In part, this study was limited by the lack of a measure for historical trauma among Native Hawaiians. At the same time, measuring historical trauma and understanding its relationship with other sociocultural variables believed to impact health and health behavior is complicated. For Native Hawai'ians, the situation is further complicated by the multi-ethnic identity of those who share in identifying as Native Hawai'ian. There is

work to be done to sort out the ethnic identity of Native Hawai'ians and determine whether considering their other ethnic groups has a significant impact on understanding specific resilience and vulnerability with regard to their psychological and physical health. For example, are those who identify as Native Hawai'ian and other Pacific Islander at greater risk for obesity compared to those who identify as Native Hawai'ian and Asian? Additionally, a better understanding of ethnic identity in this multi-ethnic group may prove important in developing preventative programming that is very specifically tailored to the community and its risk factors.

### **FUTURE DIRECTIONS**

Present study results suggest that the relationships among historical trauma, cultural affiliation, perceived discrimination, and ethnic identity as they relate to health outcomes and SES need to be better understood. This includes the need for updated measures and a focus on causal modeling to explain variables associated with and impacting health and well-being in a Native Hawai'ian population. Future researchers may consider further developing and applying the sociocultural variables used in this study into a causal model designed to study the relationships among these variables and health. Using a longitudinal study design would allow for causation to be attributed.

In summary, this study was designed to serve as a starting point for a line of research to aid in the examination of the complex interplay of historical trauma, discrimination, self-efficacy, and cultural affiliation on important health outcome variables, socioeconomic status and obesity. Future research needs to consider the multi-ethnic composition of Native Hawai'ians as well. The ultimate goal of this work is to better the health of Native Hawai'ians who are known to disproportionately experience

overweight and obesity-related health as well as socioeconomic disparities. Culturally salient means of increasing self-efficacy, building resilience, and decreasing the impact of historical trauma and every day discrimination may allow for a healthier and more equitable life for Native Hawai'ians.

## REFERENCES

1. 103rd Congress. 1993. U.S. Code 103-150: A joint resolution to acknowledge the 100th anniversary of the January 17, 1893 overthrow of the Kingdom of Hawaii, and to offer an apology to Native Hawaiians on behalf of the United States for the overthrow of the Kingdom of Hawaii.
2. Aboriginal Healing Foundation. 2004. *Historic Trauma and Aboriginal Healing*. Ottawa, Ontario: Anishinabe Printing
3. Adler N, Stewart J. 2007. *The MacArthur Scale of Subjective Social Status*. <http://www.macses.ucsf.edu/research/psychosocial/subjective.php>
4. Adler N, Stewart J, Cohen S, Cullen M, Diez Roux A, et al. 2007. *Reaching for a healthier life: Facts on socioeconomic status and health in the US*. [https://macses.ucsf.edu/downloads/Reaching\\_for\\_a\\_Healthier\\_Life.pdf](https://macses.ucsf.edu/downloads/Reaching_for_a_Healthier_Life.pdf)
5. Adler NS, J. 2010. Health disparities across the lifespan: meaning, methods, and mechanisms. *Annals of the New York Academy of Sciences* 1186(1):5-23
6. Aha Punana Leo. n.d. *A timeline of revitalization*. [http://www.ahapunanaleo.org/index.php?/about/a\\_timeline\\_of\\_revitalization/](http://www.ahapunanaleo.org/index.php?/about/a_timeline_of_revitalization/)
7. Al-Khawaldeh OA, Al-Hassan MA, Froelicher ES. 2012. Self-efficacy, self-management, and glycemic control in adults with type 2 diabetes mellitus. *Journal of Diabetes and its Complications* 26(1):10-6
8. American Psychological Association. n.d. *Socioeconomic Status*. <http://www.apa.org/topics/socioeconomic-status/>
9. Antonio M, Jun Ahn, H., Townsend Ing, C., Dillar, A., Cassel, K., Kekauoha, BP., Keawaaimoku Kaholokla, J. 2016. Self-Reported Experiences of Discrimination and Depression in Native Hawaiians. *Hawaii Journal of Medicine and Public Health* 75(9):266-72
10. Antonio MC, Ahn, H. J., Ing, C. T., Dillard, A., Cassel, K., Kekauoha, B. P., & Kaholokula, J. K. . 2016. Self-Reported Experiences of Discrimination and Depression in Native Hawaiians. *Hawai'i journal of medicine & public health : a journal of Asia Pacific Medicine & Public Health* 75(9):266-72
11. Armenta BE, Whitbeck, L.B., & Habecker, P.N. 2016. The Historical Loss Scale: Longitudinal measurement equivalence and prospective links to anxiety among North American indigenous adolescents. *Cultural Diversity and Ethnic Minority Psychology* 22(1):1-10
12. Arsenault DJ. 2005. Rhetorical Vision of the Independent and Sovereign Nation of Hawai'i: A Fantasy Theme Analysis. *Tamara: Journal of Critical Organization Inquiry* 3(2):57-73
13. Ashmore RD, Deaux K, McLaughlin-Volpe T. 2004. An Organizing Framework for Collective Identity: Articulation and Significance of Multidimensionality. *Psychological Bulletin* 130(1):80-114
14. Atkinson J. 2002. *Trauma trails, recreating song lines: The transgenerational effects of trauma in indigenous Australia*. North Melbourne, Australia: Spinifex Press

15. Bailey JM. 2014. *Supplemental nutrition assistance program and rural households*.  
[https://www.ruralhealthweb.org/NRHA/media/Emerge\\_NRHA/PDFs/snap-and-rural-households.pdf](https://www.ruralhealthweb.org/NRHA/media/Emerge_NRHA/PDFs/snap-and-rural-households.pdf)
16. Bandura A. 1977. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* 84(2):191-215
17. Bandura A. 1982. Self-efficacy mechanism in human agency. *American Psychologist* 37(2):122-47
18. Bandura A. 1997. *Self-efficacy: The exercise of control*. New York, NY: WH Freeman & Company
19. Bandura A, Barbaranelli, C., Caprara, G.V., & Pastorelli, C. 2001. Self - efficacy beliefs as shapers of children's aspirations and career trajectories. *Child development* 72(1):187-206
20. Banks J, Marmot, M., Oldfield, Z. & Smith, J.P. 2006. Disease and disadvantage in the United States and in England. *Journal of the American Medical Association* 295(17):2037-45
21. Barbee KG, Timmerman GM. 2015. Emotional eating, nonpurge binge eating, and self-efficacy in healthy perimenopausal women. *Journal of Holistic Nursing* 33(4):298-307
22. Barnett E, Casper, M.L., Halverson, J.A., Elmes, G.A., Braham, V.E., Majeed, Z.A., Bloom, A.S., & Stanley, S. 2001. Atlas of geographic and racial/ethnic disparities in heart disease death rates for US men. *Public Health Reports, US National Library of Medicine, NIH* 116(3):270
23. Beatty DL, Matthews KA, Bromberger JT, Brown C. 2014. Everyday discrimination prospectively predicts inflammation across 7-years in racially diverse midlife women: Study of women's health across the nation. *J Soc Issues* 70(2):298-314
24. Beckles GL, Truman BI. 2013. Education and income—United States, 2009 and 2011. *Morbidity and Mortality Weekly Report* 62(3):9-19
25. Beckles GLT, B.I. 2011. Education and income—United States, 2005 and 2009. *Morbidity and Mortality Weekly Report* 60(1):13-7
26. Berry JW. 2003. Conceptual approaches to acculturation. In *Acculturation: Advances in theory, measurement, and applied research*, ed. KM Chun, P Balls-Organista, G Marín:17-37. Washington, D.C.: American Psychological Association.
27. Berry JW. 2005. Acculturation. In *Culture and human development: The importance of cross-cultural research for the social sciences*, ed. W Friedlmeier, Chakkarath, P., & Schwarz, B.:291-302. Hove, England: Psychology Press.
28. Betz NE, Hackett G. 1981. The relationship of career-related self-efficacy expectations to perceived career options in college women and men. *Journal of counseling psychology* 28(5):399-410
29. Bielakowski AM. 2013. *Ethnic and Racial Minorities in the US Military: An Encyclopedia* Santa Barbara, California: ABC-CLIO
30. BigFoot DB, J. 2007. Adapting evidence-based treatments for use with American Indian and Native Alaskan children and youth. *Focal Point: Research, Policy, & Practice in Children's Mental Health* 21(1):19-22

31. Blankenfeld B. 2017. Role of the Hokule'a Voyages. ed. S Soares
32. Bond JT, Galinsky E. 2011. *Workplace flexibility and low-wage employees*. <http://familiesandwork.org/downloads/WorkFlexandLowWageEmployees.pdf>
33. Boyraz G, Granda R, Baker CN, Tidwell LL, Waits JB. 2016. Posttraumatic stress, effort regulation, and academic outcomes among college students: A longitudinal study. *Journal of Counseling Psychology* 63(4):475-86
34. Bracey JR, Bamaca MY, Umana-Taylor AJ. 2004. Examining ethnic identity and self-esteem among biracial and monoracial adolescents. *Journal of Youth and Adolescence* 33(2):123-32
35. Braun KL, Kim BJ, Ka'opua LS, Mokuau N, Browne CV. 2015. Native Hawaiian and Pacific Islander elders: What gerontologists should know. *The Gerontologist* 55(6):912-9
36. Brave Heart MY. 1999. Gender differences in the historical trauma response among the Lakota. *Journal of Health & Social Policy* 10(4):1-21
37. Brave Heart M. 2003. The historical trauma response among Natives and its relationship with substance abuse: A Lakota illustration. *Journal of Psychoactive Drugs* 35(1):7-13
38. Brave Heart MY, DeBruyn LM. 1998. The American Indian Holocaust: Healing historical unresolved grief. *American Indian Alaska Native Mental Health Research* 8(2):56-78
39. Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. 2010. Socioeconomic disparities in health in the United States: What the patterns tell us. *American Journal of Public Health* 100(S1):S186-S96
40. Brenner I. 2004. *Psychic trauma: Dynamics, symptoms and treatment*. Lanham, MD: Rowman & Littlefield Publishers, Inc.
41. Brown-Rice K. 2013. Examining the theory of historical trauma among Native Americans. *The Professional Counselor* 3(3):117-30
42. Brown I, Inouye DK. 1978. Learned helplessness through modeling: The role of perceived similarity in competence. *Journal of Personality and Social Psychology* 36(8):900-8
43. Brunello N, Davidson JR, Deahl M, Kessler RC, Mendlewicz J, et al. 2001. Posttraumatic stress disorder: Diagnosis and epidemiology, comorbidity and social consequences, biology and treatment. *Neuropsychobiology* 43(3):150-62
44. Bureau of Indian Affairs. n.d. *Certificate of degree of Indian or Alaska Native blood instructions*. [https://www.bia.gov/sites/bia.gov/files/assets/public/raca/online\\_forms/pdf/CDIB\\_1076-0153\\_Exp3-31-21.pdf](https://www.bia.gov/sites/bia.gov/files/assets/public/raca/online_forms/pdf/CDIB_1076-0153_Exp3-31-21.pdf)
45. Bureau of Labor and Statistics. 2016. *Household data annual averages: Employed persons by detailed occupation and age*. <https://www.bls.gov/cps/cpsaat11b.pdf>
46. Bureau of Labor Statistics. 2014. *Education Still Pays*. <https://www.bls.gov/careeroutlook/2014/data-on-display/education-still-pays.htm>
47. Bureau of Labor Statistics. 2014. *Native Hawaiians and Other Pacific Islanders had a higher labor force participation rate than Asians*. [https://www.bls.gov/opub/ted/2014/ted\\_20140523.htm](https://www.bls.gov/opub/ted/2014/ted_20140523.htm)



48. Bureau of Labor Statistics. 2015. *Labor force characteristics by race and ethnicity*. <https://www.bls.gov/opub/reports/race-and-ethnicity/archive/labor-force-characteristics-by-race-and-ethnicity-2014.pdf>
49. Bureau of Labor Statistics. 2015. *Labor force characteristics by race and ethnicity, 2014*. <https://www.bls.gov/opub/reports/race-and-ethnicity/archive/labor-force-characteristics-by-race-and-ethnicity-2014.pdf>
50. Bureau of Labor Statistics. 2015. *Occupational injuries/illnesses and fatal injuries profiles*. <https://data.bls.gov/gqt/ProfileCharacteristics>
51. Bureau of Labor Statistics. 2016. *May 2016 national occupational employment and wage estimates, United States*. [https://www.bls.gov/oes/current/oes\\_nat.htm](https://www.bls.gov/oes/current/oes_nat.htm)
52. Burke LE, Ewing, L.J., Ye, L., Styn, M., Zheng, Y., Music, Ed., Mancino, J., Imes, C.C., Hu, L., & Goode, R., . 2015. The SELF trial: A self - efficacy - based behavioral intervention trial for weight loss maintenance. *Obesity* 23(11):2175-82
53. Carter RT. 2007. Racism and psychological and emotional injury. *The Counseling Psychologist* 35(1):13-105
54. Cataldi EF, Green C, Henke R, Lew T, Woo J, et al. 2011. 2008-09 Baccalaureate and beyond longitudinal study U.S. Department of Education
55. Center on Disability Studies. n.d. *Food in Old Hawaii*. <http://www.cds.hawaii.edu/kahana/downloads/curriculum/SectionII/Unit3/3.D.MeaaiaaOlaHealth/3.D.1.FoodinOldHawaii.pdf>
56. Centers for Disease Control and Prevention. 2015. *Health effects of overweight and obesity*. <https://www.cdc.gov/healthyweight/effects/index.html>
57. Centers for Disease Control and Prevention. 2016. *Defining adult overweight and obesity*. <https://www.cdc.gov/obesity/adult/defining.html>
58. Chambliss C, Murray EJ. 1979. Cognitive procedures for smoking reduction: Symptom attribution versus efficacy attribution. *Cognitive Therapy and Research* 3(1):91-5
59. Chambliss CA, Murray EJ. 1979. Efficacy attribution, locus of control, and weight loss. *Cognitive Therapy and Research* 3(4):349-53
60. Cirino PT, Chin CE, Sevcik RA, Wolf M, Lovett M, Morris RD. 2002. Measuring socioeconomic status: reliability and preliminary validity for different approaches. *Assessment* 9(2):145-55
61. Clark R, Coleman AP, Novak JD. 2004. Brief report: Initial psychometric properties of the everyday discrimination scale in black adolescents. *Journal of adolescence* 27(3):363-8
62. Coccorello R, D'Amato FR, Moles A. 2009. Chronic social stress, hedonism and vulnerability to obesity: Lessons from rodents. *Neuroscience & Biobehavioral Reviews* 33(4):537-50
63. Cohen J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Erlbaum
64. Cokley K. 2007. Critical issues in the measurement of ethnic and racial identity: A referendum on the state of the field. *Journal of Counseling Psychology* 54(3):224-34
65. Cook WK, Chung C, Tseng W. Demographic and socioeconomic profiles of Asian Americans, Native Hawaiians, and Pacific Islanders. *Proc. Asian & Pacific Islander American Health Forum, San Francisco, CA & Washington, DC, 2011:*

66. Cross Jr WE, Vandiver BJ. 2001. Nigrescence theory and measurement: Introducing the Cross Racial Identity Scale (CRIS). In *Handbook of multicultural counseling, 2nd ed.*:371-93. Thousand Oaks, CA, US: Sage Publications, Inc.
67. Dallman MF, Pecoraro N, Akana SF, La Fleur SE, Gomez F, et al. 2003. Chronic stress and obesity: a new view of “comfort food”. *Proceedings of the National Academy of Sciences* 100(20):11696-701
68. Danese A, Tan M. 2014. Childhood maltreatment and obesity: systematic review and meta-analysis. *Molecular Psychiatry* 19(5):544-54
69. Danieli Y. 1998. *International handbook of multigenerational legacies of trauma*. New York, NY: Plenum Press
70. Daws G. 1968. *Shoal of time: A history of the Hawaiian Islands*. Honolulu: University of Hawaii Press
71. DeBruyn L, Chino M, Serna P, Fullerton-Gleason L. 2001. Child maltreatment in American Indian and Alaska Native communities: Integrating culture, history, and public health for intervention and prevention. *Child Maltreatment* 6(2):89-102
72. Dedovic K, Duchesne A. 2012. Cortisol: Physiology, regulation and health implications. In *Cortisol: Physiology, regulation and health implications*, ed. A Esposito, V Bianchi:27-48. New York: Nova Science Publishers, Inc. .
73. DeNavas-Walt C, Proctor BD. 2015. *Income and poverty in the United States: 2014*.  
<https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf>
74. Department of Hawaiian Home Lands. 2017. *Lease Information: Designating successors Q&A*. <http://dhhl.hawaii.gov/lessee-information/designating-successors-qa/>
75. Department of Hawaiian Homelands. n.d. *Applying for Hawaiian Home Lands*. <http://dhhl.hawaii.gov/applications/applying-for-hawaiian-home-lands/>
76. Dockery AM. 2010. Culture and wellbeing: The case of Indigenous Australians. *Social Indicators Research* 99(2):315-32
77. Duncan GJ, Daly MC, McDonough P, Williams DR. 2002. Optimal indicators of socioeconomic status for health research. *American Journal of Public Health* 92(7):1151-7
78. Duran E, Duran B. 1995. *Native American postcolonial psychology*. Albany, NY: SUNY Press
79. Ehlers CL, Gizer IR, Gilder DA, Ellingson JM, Yehuda R. 2013. Measuring historical trauma in an American Indian community sample: Contributions of substance dependence, affective disorder, conduct disorder and PTSD. *Drug and Alcohol Dependence* 133(1):180-7
80. Ehrensaft MK, Cohen P, Brown J, Smailes E, Chen H, Johnson JG. 2003. Intergenerational transmission of partner violence: a 20-year prospective study. *Journal of Consulting and Clinical Psychology* 71(4):741
81. Eisenberg L. 2001. From molecules to mind. *Eastern Mediterranean Health Journal* 7(3):363-6
82. Eisenberger NI, Lieberman MD, Williams KD. 2003. Does rejection hurt? An fMRI study of social exclusion. *Science* 302(5643):290-2

83. Elfeddali I, Bolman C, Candel MJ, Wiers RW, De Vries H. 2012. The role of self - efficacy, recovery self - efficacy, and preparatory planning in predicting short - term smoking relapse. *British Journal of Health Psychology* 17(1):185-201
84. Equal Employment Opportunity Commission. 2007. *Employer Information Reports: EEO-1 Single and Establishment Reports*  
<https://www.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2007/state/Hawaii/index.html>
85. Equal Employment Opportunity Commission. 2017. *Employer Information Reports: EEO-1 Single and Establishment Reports*.  
<https://www1.eeoc.gov/eeoc/statistics/employment/jobpat-eeo1/2017/index.cfm#centercol>
86. Evans-Campbell T. 2008. Historical trauma in American Indian/Native Alaska communities. *Journal of Interpersonal Violence* 23(3):316-38
87. Eyerman R. 2013. Social theory and trauma. *Acta Sociologica* 56(1):41-53
88. Faghri P, Buden J. 2015. Health Behavior Knowledge and Self-efficacy as predictors of body weight. *Journal of Nutritional Disorders & Therapy* 5(3):1-11
89. Faimon M. 2004. Ties that Bind. *American Indian Quarterly* 28(1/2):238-50
90. Farmer P. 2003. *Pathologies of power: Health, human rights, and the new war on the poor*. Berkeley: University of California Press
91. Faul F, Erdfelder E, Buchner A, Lang A-G. 2009. Statistical power analyses using G\* Power 3.1: Tests for correlation and regression analyses. *Behavior research methods* 41(4):1149-60
92. Faul F, Erdfelder E, Buchner A, Lang A. 2009. Statistical power analyses using G\* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods* 41(4):1149-60
93. Felix-Ortiz M, Newcomb MD, Myers H. 1994. A multidimensional measure of cultural identity for Latino and Latina adolescents. *Hispanic Journal of Behavioral Sciences* 16(2):99-115
94. Field A. 2013. *Discovering statistics using IBM SPSS statistics*. London, UK: Sage
95. Fischer CS, Hout M, Jankowski MS, Lucas SR, Swidler A, Voss K. 1996. *Race, ethnicity and intelligence*. Princeton, NJ: Princeton University Press
96. Franklin AJ, Boyd-Franklin N. 2000. Invisibility syndrome: a clinical model of the effects of racism on African-American males. *American Journal of Orthopsychiatry* 70(1):33-41
97. Fritz MS, MacKinnon DP. 2007. Required sample size to detect the mediated effect. *Psychological Science* 18(3):233-9
98. Gallimore R, Boggs JW, Jordan C. 1974. *Culture, behavior, and education: A study of Hawaiian-Americans* Beverly Hills, CA: Sage
99. Giatti L, do Valle Camelo L, de Castro Rodrigues JF, Barreto SM. 2012. Reliability of the MacArthur scale of subjective social status-Brazilian Longitudinal Study of Adult Health (ELSA-Brasil). *BMC Public Health* 12(1):1096

100. Gibson C, Jung K. 2005. Historical census statistics on population totals by race, 1790 to 1990, and by Hispanic origin, 1970 to 1990, for large cities and other urban places in the United States ed. US Census Bureau. Washington, D.C.
101. Gillespie CF, Phifer J, Bradley B, Ressler KJ. 2009. Risk and resilience: Genetic and environmental influences on development of the stress response. *Depression and Anxiety* 26(11):984-92
102. Gone JP. 2013. Redressing First Nations historical trauma: Theorizing mechanisms for Indigenous culture as mental health treatment. *Transcultural Psychiatry* 50(5):683–706
103. Goodman RD, Miller MD, West-Olatunji CA. 2012. Traumatic stress, socioeconomic status, and academic achievement among primary school students. *Psychological Trauma: Theory, Research, Practice, and Policy* 4(3):252-9
104. Graves MW, Addison DL. 1995. The Polynesian settlement of the Hawaiian archipelago: Integrating models and methods in archaeological interpretation. *World Archaeology* 26:257–82
105. Grieco EM. 2001. *The Native Hawaiian and other Pacific Islander population: 2000*. <https://www.census.gov/prod/2001pubs/c2kbr01-14.pdf>
106. Groesz LM, McCoy S, Carl J, Saslow L, Stewart J, et al. 2012. What is eating you? Stress and the drive to eat. *Appetite* 58(2):717-21
107. Hall GA. 1904. *Adolescence: its psychology and its relations to physiology, anthropology, sociology, sex, crime, religion, and education*. New York, NY: Appleton and Company
108. Handy ES, Pukui MK. 1972. *The Polynesian family system in Ka'u, Hawaii*. Boston: Tuttle
109. Hansel J. 2017. Blood quantum debate renewed: Legislature passes bill that would lower requirement for Hawaiian homestead successors. *Hawaii Tribune-Herald*
110. Harper S, Lynch J. 2007. Trends in socioeconomic inequalities in adult health behaviors among US states, 1990–2004. *Public Health Reports* 122(2):177-89
111. Hawaii Department of Agriculture. 2008. *Food Self Sufficiency in Hawaii*. <http://hawaii.gov/hdoa/add/White%20Paper%20D14.pdf>
112. Hawaii State Data Center. 2013. *Urban and rural areas in the state of Hawaii by county: 2010*. [http://files.hawaii.gov/dbedt/census/Census\\_2010/Other/2010urban\\_rural\\_report.pdf](http://files.hawaii.gov/dbedt/census/Census_2010/Other/2010urban_rural_report.pdf)
113. Hayes AF. 2013. *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: Guilford
114. Helms JE. 2007. Some better practices for measuring racial and ethnic identity constructs. *Journal of Counseling Psychology* 54(3):235-46
115. Herman DB, Susser ES, Struening EL, Link BL. 1997. Adverse childhood experiences: Are they risk factors for adult homelessness? *American Journal of Public Health* 87(2):249-55
116. Herskovits MJ. 1938. *Acculturation: The study of culture contact*. New York: JJ Augustin

117. Hishinuma ES, Andrade NN, Johnson RC, McArdle JJ, Miyamoto RH, et al. 2000. Psychometric properties of the Hawaiian culture scale - Adolescent version. *Psychological Assessment* 12(2):140-57
118. Hixson L, Helper BB, Kim MO. 2012. *The Native Hawaiian and other Pacific Islander Population: 2010 Census*.  
<http://www.census.gov/prod/cen2010/briefs/c2010br-12.pdf>
119. Hoerger M. 2010. Participant dropout as a function of survey length in Internet-mediated university studies: Implications for study design and voluntary participation in psychological research. *Cyberpsychology, Behavior, and Social Networking* 13(6):697-700
120. Hollingshead AB. 1975. *Four factor index of social status*. New Haven, CT: Yale University
121. Hope Services Hawaii. n.d. *The reality of homelessness in Hawai'i*.  
<http://hopeserviceshawaii.org/message-from-the-ceo/facts/>
122. Howard J. 2000. Social psychology of identities. *Annual Review of Sociology* 26(1):367-93
123. Hunt CW, Grant JS, Pritchard DA. 2012. An empirical study of self-efficacy and social support in diabetes self-management: implications for home healthcare nurses. *Home Healthcare Nurse* 30(4):255-62
124. Jang Y, Chiriboga DA, Kim G, Rhew S. 2010. Perceived discrimination, sense of control, and depressive symptoms among Korean American older adults. *Asian American Journal of Psychology* 1(2):129-35
125. Judd NLKM. 1998. Laau Lapaau: Herbal healing among contemporary Hawai'ian healers. *Pacific Health Dialogue: Journal of Community Health and Clinical Medicine for the Pacific* 5(1):239-45
126. Kaho'olawe Island Reserve Commission. n.d. *Kukulu ke ea a kanaloa: Kaho'olawe*. <http://www.kahoolawe.hawaii.gov/faq.shtml>
127. Kaholokula J. 2017. Maui Ola: Pathways to optimal Kanaka 'Oiwi health. In *Maui Ola: Hawai'inuiākea Monograph*, ed. W. Mesion-Lee, M Look. Honolulu, HI: University of Hawaii Press
128. Kaholokula JK, Grandinetti A, Keller S, Nacapoy AH, Kingi TK, Mau MK. 2012. Association between perceived racism and physiological stress indices in Native Hawaiians. *Journal of Behavioral Medicine* 35(1):27-37
129. Kaholokula JK, Iwane MK, Nacapoy AH. 2010. Effects of perceived racism and acculturation on hypertension in Native Hawaiians. *Hawai'i Medical Journal* 69(5 Suppl 2):11-5
130. Kaholokula JK, Nacapoy AH, Grandinetti A, Chang HK. 2008. Association between acculturation modes and type 2 diabetes among Native Hawaiians. *Diabetes Care* 31(4):698-700
131. Kaholokula JK, Wilson RE, Townsend CKM, Zhang GX, Chen J, et al. 2014. Translating the diabetes prevention program in Native Hawaiian and Pacific Islander communities: the PILI 'ohana project. *Translational Behavioral Medicine* 4(2):149-59
132. Kaholokula JKa, Kekauoha P, Dillard A, Yoshimura S, Palakiko D-M, et al. 2014. The PILI 'ohana project: A community-academic partnership to achieve

- metabolic health equity in Hawai'i. *Hawaii J Med Public Health* 73(12 Suppl 3):29-33
133. Kaholokula KJ, Iwane MK, Nacapoy AH. 2010. Effects of perceived racism and acculturation on hypertension in Native Hawaiians. *Hawai'i Medical Journal* 69(5 Suppl 2):11-5
  134. Kame'eleihiwa L. 1992. *Native land and foreign desires*. Honolulu: Bishop Museum
  135. Kana'iaupuni SM, Malone N. 2006. This land is my land: The role of place in Native Hawai'ian identity. In *Race, ethnicity, and place in changing America*, ed. J. Frazier, E Tetty-Fio. New York: SUNY Press.
  136. Kana'iaupuni S, Ledward B, Jensen U. 2010. *Culture-based education and its relationship to student outcomes*.  
[http://www.ksbe.edu/assets/spi/pdfs/CBE\\_relationship\\_to\\_student\\_outcomes.pdf](http://www.ksbe.edu/assets/spi/pdfs/CBE_relationship_to_student_outcomes.pdf)
  137. Kanahale G. 1986. *Kū kanaka—Stand tall: A search for Hawaiian values*. Honolulu: University of Hawai'i Press
  138. Kehaulani GS. 2015. *After 200 years, Native Hawaiians make a comeback*.  
<http://www.pewresearch.org/fact-tank/2015/04/06/native-hawaiian-population/>
  139. Kendall-Tackett K. 2009. Psychological trauma and physical health: a psychoneuroimmunology approach to etiology of negative health effects and possible interventions. *Psychological Trauma: Theory, Research, Practice, and Policy* 1(1):35
  140. Kirmayer L, Gone J, Moses J. 2014. Rethinking historical trauma. *Journal of Transcultural Psychiatry* 51(3):299-319
  141. Kirmayer LJ, Brass GM, Tait CL. 2000. The mental health of Aboriginal peoples: Transformations of identity and community. *Canadian Journal of Psychiatry* 45(7):607-16
  142. Kirmayer LJ, Lemelson R, Barad M. 2007. Introduction: Inscribing trauma in culture, brain, and body. In *Understanding trauma: Integrating biological, clinical, and cultural perspectives*, ed. L. J. Kirmayer, R. Lemelson, M Barad: 1-20. Cambridge: Cambridge University Press.
  143. Klengel T, Mehta D, Anacker C, Rex-Haffner M, Pruessner JC, et al. 2013. Allele-specific FKBP5 DNA demethylation mediates gene-childhood trauma interactions. *Nature Neuroscience* 16(1):33-41
  144. Koss MP, Yuan NP, Dightman D, Prince RJ, Polacca M, et al. 2003. Adverse childhood exposures and alcohol dependence among seven Native American tribes. *American Journal of Preventive Medicine* 25(3):238-44
  145. Kroeber AL, Kluckhohn C. 1952. Culture: A critical review of concepts and definitions. *Papers. Peabody Museum of Archaeology & Ethnology, Harvard University* 47(1):223
  146. Laryea G, Arnett MG, Muglia LJ. 2012. Behavioral studies and genetic alterations in corticotropin-releasing hormone (CRH) neurocircuitry: insights into human psychiatric disorders. *Behavioral Sciences* 2(2):135-71
  147. Lee RS, Tamashiro KL, Yang X, Purcell RH, Harvey A, et al. 2010. Chronic corticosterone exposure increases expression and decreases deoxyribonucleic acid methylation of Fkbp5 in mice. *Endocrinology* 151(9):4332-43

148. Lee RS, Tamashiro KL, Yang X, Purcell RH, Huo Y, et al. 2011. A measure of glucocorticoid load provided by DNA methylation of Fkbp5 in mice. *Psychopharmacology* 218(1):303-12
149. Levi J, Segal LM, St Laurent R, Lang A, Rayburn J. 2013. *F as in fat: How obesity threatens America's future 2013*.  
<http://healthyamericans.org/assets/files/TFAH2013FasInFatReportFinal%209.9.pdf>
150. Liu DM, Alameda CK. 2011. Social determinants of health for Native Hawaiian children and adolescents. *Hawai'i Medical Journal* 70(11):9-14
151. Liu Y, Croft JB, Chapman DP, Perry GS, Greenlund KJ, Zhao GE, V.J. 2013. Relationship between adverse childhood experiences and unemployment among adults from five US states. *Social Psychiatry and Psychiatric Epidemiology* 48(3):357-69
152. Livesay TM. 1942. Racial comparisons in test-intelligence. *American Journal of Psychology* 55(1):90-5
153. Loutit CM. 1931. Racial comparisons of ability in immediate recall of logical and nonsense material. *Journal of Social Psychology* 2(2):205-15
154. Low S. 2018. *Hawaiki Rising: Hōkūle'a, Nainoa Thompson, and the Hawaiian Renaissance*. Honolulu, HI: University of Hawaii Press
155. Lupien SJ, King S, Meaney MJ, McEwen BS. 2000. Child's stress hormone levels correlate with mother's socioeconomic status and depressive state. *Biological Psychiatry* 48(10):976-80
156. Macartney S, Bishaw A, Fontenot K. 2013. *Poverty rates for selected detailed race and Hispanic groups by state and place: 2007–2011*.  
<https://www.census.gov/library/publications/2013/acs/acsbr11-17.html>
157. MacCaughey V. 1917. The physique of the ancient Hawaiians. *The Scientific Monthly* 5(2):166-74
158. Manson SM, Beals J, Klein SA, Croy CD. 2005. Social epidemiology of trauma among 2 American Indian reservation populations. *American Journal of Public Health* 95(5):851-9
159. Mayeda DT, Okamoto SK, Mark GY. 2005. Adapting culture in a colonial and capitalized world: Role strain and acculturation in Hawaiian and Samoan families. *Journal of Poverty* 9(1):105-20
160. McCubbin LD, Antonio M. 2012. Discrimination and obesity among Native Hawaiians. *Hawai'i Journal of Medicine & Public Health* 71(12):346-52
161. McCubbin LDM, A. 2009. Native Hawaiians and psychology: The cultural and historical context of Indigenous ways of knowing. *Cultural Diversity and Ethnic Minority Psychology* 15(4):374–87
162. McMullin J. 2005. The call to life: revitalizing a healthy Hawai'ian identity. *Social Science & Medicine* 61(4):809-20
163. McMullin J. 2010. *The healthy ancestor*. NY, NY: Routledge
164. Michaels C. 2010. Historical trauma and microaggressions: A framework for culturally-based practice. St. Paul, Minnesota: University of Minnesota Extension Service, Children, Youth and Family Consortium

165. Mohatt NV, Thompson AB, Thai ND, Tebes JK. 2014. Historical trauma as public narrative: A conceptual review of how history impacts present-day health. *Social Science & Medicine* 106:128-36
166. Mokuau N, DeLeon PH, Keawe'aimoku Kaholokula J, Soares S, Tsark JU, Haia C. 2016. Challenges and promise of health equity for Native Hawaiians. *National Academy of Medicine Perspectives*
167. Morland K, Wing S, Roux AD, Poole C. 2002. Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine* 22(1):23-9
168. Mowbray M. 2007. *Social determinants and Indigenous health: The international experience and its policy implications*.  
[http://www.who.int/social\\_determinants/resources/indigenous\\_health\\_adelaide\\_report\\_07.pdf](http://www.who.int/social_determinants/resources/indigenous_health_adelaide_report_07.pdf)
169. Myhra LL. 2011. "It runs in the family": intergenerational transmission of historical trauma among urban American Indians and Alaska Natives in culturally specific sobriety maintenance programs. *American Indian and Alaska Native Mental Health Research (Online)* 18(2):17-40
170. National Center for Education Statistics. 2015. *Total fall enrollment in degree-granting postsecondary institutions, by attendance status, sex, and age: Selected years, 1970 through 2025*.  
[https://nces.ed.gov/programs/digest/d15/tables/dt15\\_303.40.asp?current=yes](https://nces.ed.gov/programs/digest/d15/tables/dt15_303.40.asp?current=yes)
171. National Center for Health Statistics. 2012. *Health, United States, 2011: With special feature on socioeconomic status and health*.  
<https://www.cdc.gov/nchs/data/hus/hus11.pdf>
172. National Park Service. n.d. *Determining cultural affiliation within NAGPRA*.  
[http://pages.ucsd.edu/~rfrank/class\\_web/UnivHouse/Cultural\\_Affiliation.pdf](http://pages.ucsd.edu/~rfrank/class_web/UnivHouse/Cultural_Affiliation.pdf)
173. National Partnership for Action to End Health Disparities. 2016. *Glossary of terms*. <http://minorityhealth.hhs.gov/npa/templates/browse.aspx?lvl=1&lvlid=34>
174. Neigh GN, Gillespie CF, Nemeroff CB. 2009. The neurobiological toll of child abuse and neglect. *Trauma, Violence, & Abuse* 10(4):389-410
175. Nguyen D, Slavail FR. 2015. *Hawaii behavioral risk factor surveillance system*.  
[https://health.hawaii.gov/brfss/files/2016/07/brfss15\\_results.pdf](https://health.hawaii.gov/brfss/files/2016/07/brfss15_results.pdf)
176. Nguyen DH, Slavail FR. 2015. *Hawaii behavioral risk factor surveillance system: 2015 results*. [https://health.hawaii.gov/brfss/files/2016/07/brfss15\\_results.pdf](https://health.hawaii.gov/brfss/files/2016/07/brfss15_results.pdf)
177. No'Eau Warner SL. 2001. The movement to revitalize Hawaiian language and culture. In *The green book of language revitalization in practice*, ed. Leanne Hinton, K Hale:133-46. San Diego, CA: Academic Press.
178. Norris F, Friedman M, Watson P. 2002. 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. *Psychiatry* 65(3):240-60
179. Norris F, Friedman, M., Watson, P., Byrne, C., Diaz, E., & Kaniasty, K. . 2002. 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981-2001. *Psychiatry* 65:207-39
180. Nouwen A, Ford T, Balan AT, Twisk J, Ruggiero L, White D. 2011. Longitudinal motivational predictors of dietary self-care and diabetes control in adults with newly diagnosed type 2 diabetes mellitus. *Health Psychology* 30(6):771-9



181. Noyes MH. 2003. *Then there were none*. Honolulu, HI: Bess Press
182. Nugent NR, Goldberg A, Uddin M. 2016. Topical review: The emerging field of epigenetics: Informing models of pediatric trauma and physical health. *Journal of Pediatric Psychology* 41(1):55-64
183. O'Connor TG, Ben-Shlomo Y, Heron J, Golding J, Adams D, Glover V. 2005. Prenatal anxiety predicts individual differences in cortisol in pre-adolescent children. *Biological Psychiatry* 58(3):211-7
184. Office of Hawaiian Affairs. 1986. *Distribution of the Native Hawai'ian population in Hawai'i by blood quantum*.  
<http://www.ohadatabook.com/Quantum-01.pdf>
185. Office of Hawaiian Affairs. 2006. *Native Hawaiian Databook 2006*.  
<http://www.ohadatabook.com/>
186. Office of Hawaiian Affairs. 2014. *Income inequality and Native Hawaiian communities in the wake of the great recession: 2005 to 2013*.  
<https://www.oha.org/economic-self-sufficiency/income-inequality-and-native-hawaiian-communities-in-the-wake-of-the-great-recession-2005-2013/>
187. Office of Hawaiian Affairs. n.d. *Legal Basis*.  
<http://www.oha.org/about/history/constitution/>
188. Ogden CL, Carroll MD, Fryar CD, Flegal KM. 2015. Prevalence of obesity among adults and youth: United States, 2011–2014. *National Center for Health Statistics Data Brief* 219:1-8
189. Olshansky SJ, Antonucci T, Berkman L, Binstock RH, Boersch-Supan A, et al. 2012. Differences in life expectancy due to race and educational differences are widening, and many may not catch up. *Health Affairs* 31(8):1803-13
190. Operario D, Adler NE, Williams DR. 2004. Subjective social status: Reliability and predictive utility for global health. *Psychology & Health* 19(2):237-46
191. Osorio JK. 2001. What kind Hawaiian are you? A mo'olelo about nationhood, race, history and the contemporary sovereignty movement in Hawaii. *Contemporary Pacific Journal of Island Affairs* 13(2):359–79
192. Pecoraro N, Reyes F, Gomez F, Bhargava A, Dallman MF. 2004. Chronic stress promotes palatable feeding, which reduces signs of stress: feedforward and feedback effects of chronic stress. *Endocrinology* 145(8):3754-62
193. Perez AD, Hirschman C. 2009. Estimating net interracial mobility in the U.S. A residual methods approach. *Sociol Methodology* 39(1):31-71
194. Perkins Mj. 2005. 'O ka yäina ke ea: The Waitangi tribunal and the Native Hawaiians study commission. *Hülili: Multidisciplinary Research on Hawaiian Well-Being* 2:193–214
195. Pew Research Center. 2017. *Separate questions about race and Hispanic ethnicity may be combined for the 2020 census*. [http://www.pewresearch.org/fact-tank/2017/04/20/seeking-better-data-on-hispanics-census-bureau-may-change-how-it-asks-about-race/ft\\_17-04-17\\_census\\_questionnaire/](http://www.pewresearch.org/fact-tank/2017/04/20/seeking-better-data-on-hispanics-census-bureau-may-change-how-it-asks-about-race/ft_17-04-17_census_questionnaire/)
196. Phinney JS. 1990. Ethnic identity in adolescents and adults: Review of research. *Psychological Bulletin* 108(3):499-514

197. Phinney JS, Ong AD. 2007. Conceptualization and measurement of ethnic identity: Current status and future directions. *Journal of Counseling Psychology* 54(3):271-81
198. Pokhrel P, Herzog TA. 2014. Historical trauma and substance use among Native Hawaiian college students. *American Journal of Health Behavior* 38(3):420-9
199. Polynesian Voyaging Society. n.d. *The Story of Hōkūle‘a*.  
<https://www.hokulea.com/voyages/our-story/>
200. Ponterotto JG, Park-Taylor J. 2007. Racial and ethnic identity theory, measurement, and research in counseling psychology: Present status and future directions. *Journal of Counseling Psychology* 54(3):282-94
201. Pratt HG. 1929. Some conclusions from a comparison of school achievement of certain racial groups. *Journal of Educational Psychology* 20(9):661-8
202. Preacher KJ, Hayes AF. 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods* 36(4):717-31
203. Pudrovská T. 2014. Early-life socioeconomic status and mortality at three life course stages. *Journal of Health and Social Behavior* 55(2):181-95
204. Pukui MK, Elbert SH. 1986. *Hawaiian Dictionary: Hawaiian-English, English-Hawaiian*. Honolulu, Hawaii: University of Hawaii Press
205. Reynolds RM, Labad J, Buss C, Ghaemmaghami P, Räikkönen K. 2013. Transmitting biological effects of stress in utero: Implications for mother and offspring. *Psychoneuroendocrinology* 38(9):1843-9
206. Rezentes III WC. 1993. Nāmea Hawai'i: A Hawai'ian acculturation scale. *Psychological Reports* 73(2):383-93
207. Roberts JM. 1995. Pidgin Hawaiian: A sociohistorical study. *Journal of Pidgin and Creole Languages* 10(1):1-56
208. Robin RW, Chester B, Goldman D. 1996. Cumulative trauma and PTSD in American Indian communities. In *Ethnocultural aspects of post-traumatic stress disorders: Issues, research, and clinical applications*, ed. A. J. Marsella, M. J. Friedman, E. T. Gerrity, R M.Scurfield:239–54. Washington,DC: American Psychological Association.
209. Rockquemore KA, Arend P. 2002. Opting for White: Choice, fluidity and racial identity construction in post civil-rights America. *Race and Society* 5(1):49-64
210. Rockquemore KA, Brunsma DL. 2002. Socially embedded identities: Theories, typologies, and processes of racial identity among Black/White biracials. *The Sociological Quarterly* 43(3):335-56
211. Romaine S. 2005. Pidgin grammar. An introduction to the Creole language of Hawai 'i. *Journal of Pidgin and Creole Languages* 20(2):387-92
212. Roohi GH, Asayesh H, Bathai SA, Shouri Bidgoli AR, Badeleh MT, Rahmani H. 2013. The relationship between self-efficacy and academic motivation among students of medical sciences. *The Journal of Medical Education and Development* 8(1):45-51
213. Rosenthal RR, R. 1975. *The volunteer subject*. New York: John Wiley
214. Russell DW, Clavé FD, Cutrona CE, Abraham WT, Burzette RG. 2018. Neighborhood racial discrimination and the development of major depression. *J Abnorm Psychol* 127(2):150-9

215. Ryan CL, Bauman K. 2016. *Educational attainment in the United States: 2015*. <https://www.census.gov/content/dam/Census/library/publications/2016/demo/p20-578.pdf>
216. Sai DK. 2008. A slippery path towards Hawaiian indigeneity: An analysis and comparison between Hawaiian state sovereignty and Hawaii and indigeneity and its use and practice in Hawai'i today. *Journal of Law and Social Change* 10:68–133
217. Salkind NJ. 2010. *Encyclopedia of research design*. Thousand Oaks, California: Sage Publications
218. Salomon G. 1984. Television is "easy" and print is "tough": The differential investment of mental effort in learning as a function of perceptions and attributions. *Journal of Educational Psychology* 76(4):647-58
219. Sampson EE. 1988. The debate on individualism: Indigenous psychologies of the individual and their role in personal and societal functioning. *American Psychologist* 43(1):15-22
220. Sampson EE. 1989. The challenge of social change for psychology: Globalization and psychology's theory of the person. *American Psychologist* 44(6):914-21
221. Saperstein A, Penner AM. 2014. Beyond the looking glass: Exploring fluidity in racial self-identification and interviewer classification. *Sociological Perspectives* 57(2):186-207
222. Scanlan KRL. 2013. *The relationship of cultural affiliation and cultural congruency to depression, anxiety, and psychological well-being among native Hawaiian college students*. Columbia University
223. Schmitt RC. 1968. *Demographic statistics of Hawaii: 1776-1965*. Honolulu, HI: University of Hawaii
224. Schnurr PP, Green BL. 2004. *Trauma and health: Physical health consequences of exposure to extreme stress*. Washington, DC: American Psychological Association
225. Schwarzer R, Jerusalem M. 1995. Generalized self-efficacy scale. In *Measures in health psychology: A user's portfolio. Causal and control Beliefs*, ed. J. Weinman, S. Wright, M Johnston:35-7. Windsor, UK: NFER-NELSON.
226. Segman RH, Shefi N, Goltser-Dubner T, Friedman N, Kaminski N, Shalev AY. 2005. Peripheral blood mononuclear cell gene expression profiles identify emergent post-traumatic stress disorder among trauma survivors. *Molecular Psychiatry* 10(5):500-13
227. Sharoni SKA, Wu SV. 2012. Self-efficacy and self-care behavior of Malaysian patients with type 2 diabetes: a cross sectional survey. *Nursing & Health Sciences* 14(1):38-45
228. Shih M, Bonam C, Sanchez DT, Peck C. 2007. The social construction of race: Biracial identity and vulnerability to stereotypes. *Cultural Diversity and Ethnic Minority Psychology* 13(2):125–33
229. Shih M, Sanchez DT. 2005. Perspectives and research on the positive and negative implications of having multiple racial identities. *Psychological Bulletin* 131(4):569-91

230. Shin H, Shin J, Liu P, Dutton GR, Abood DA, Ilich JZ. 2011. Self-efficacy improves weight loss in overweight/obese postmenopausal women during a 6-month weight loss intervention. *Nutrition Research* 31(11):822-8
231. Shintani T, Beckham S, O'Connor HK, Hughes C, Sato A. 1994. The Waianae Diet Program: a culturally sensitive, community-based obesity and clinical intervention program for the Native Hawaiian population. *Hawaii Medical Journal* 53(5):136-41
232. Shintani T, Beckham S, Tang J, O'Connor HK, Hughes C. 1999. Waianae Diet Program: Long-term follow-up. *Hawaii Medical Journal* 58(5):117-22
233. Shonkoff JP, Boyce WT, McEwen BS. 2009. Neuroscience, molecular biology, and the childhood roots of health disparities: Building a new framework for health promotion and disease prevention. *Journal of the American Medical Association* 301(21):2252-9
234. Shweder RA, LeVine RA. 1984. *Culture theory: Essays on mind, self and emotion*. Cambridge: Cambridge University Press
235. Siegel J. 2008. *The emergence of pidgin and creole languages*. Oxford: Oxford University Press
236. Singh GK, Hiatt RA. 2006. Trends and disparities in socioeconomic and behavioural characteristics, life expectancy, and cause-specific mortality of native-born and foreign-born populations in the United States, 1979–2003. *International Journal of Epidemiology* 35(4):903-19
237. Smart JF, Smart DW. 1997. The racial/ethnic demography of disability. *Journal of Rehabilitation* 63(4):9
238. Smelser N. 2004. Psychological trauma and cultural trauma. In *Cultural trauma and collective identity*, ed. JC Alexander, R Eyerman, B Giesen, NJ Smelser, P Sctompka:31-59. Berkeley, CA: University of California Press.
239. Smith JP. 1999. Healthy bodies and thick wallets: the dual relation between health and economic status. *The Journal of Economic Perspectives* 13(2):144
240. Solomon EP, Heide KM. 2005. The biology of trauma: Implications for treatment. *Journal of Interpersonal Violence* 20(1):51-60
241. Sotero MM. 2006. A conceptual model of historical trauma: Implications for public health practice and research. *Journal of Health Disparities Research and Practice* 1(1):93-108
242. Spruhan P. 2018. CDIB: The role of the certificate of degree of Indian blood in defining Native American legal identity. *American Indian Law Journal* 6(2):169-96
243. Stanley LR, Swaim RC, Kaholokula JK, Kelly KJ, Belcourt A, Allen J. 2017. The imperative for research to promote health equity in Indigenous communities. *Prevention Science : The Official Journal of the Society for Prevention Research*
244. Stannard DE. 1989. *Before the horror: The population of Hawaii on the eve of western contact*. Honolulu, HI: University of Hawaii Press
245. State of Hawaii. 2012. *Native Hawaiian Population by county, island and census tract in the state of Hawaii: 2010*. [http://files.hawaii.gov/dbedt/census/Census\\_2010/SF1/HSDC2010-4\\_Native\\_Hawaiian.pdf](http://files.hawaii.gov/dbedt/census/Census_2010/SF1/HSDC2010-4_Native_Hawaiian.pdf)

246. State of Hawaii. 2015. *Hawaii Behavioral Risk Factor Surveillance System*. <http://health.hawaii.gov/brfss/>
247. State of Hawaii. 2016. *Homeless Point-in-Time Count*. <https://humanservices.hawaii.gov/wp-content/uploads/2016/06/Statewide-2016-PIT-Report-Final.pdf>
248. State of Hawaii Office of Planning Department of Business Economic Development & Tourism. 2012. *Increased food security and food self-sufficiency strategy: A state strategic/ functional plan*. [http://files.hawaii.gov/dbedt/op/spb/INCREASED\\_FOOD\\_SECURITY\\_AND\\_FOOD\\_SELF\\_SUFFICIENCY\\_STRATEGY.pdf](http://files.hawaii.gov/dbedt/op/spb/INCREASED_FOOD_SECURITY_AND_FOOD_SELF_SUFFICIENCY_STRATEGY.pdf)
249. Steele CM. 1997. A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist* 52(6):613
250. Strychar I, Elisha B, Schmitz N. 2012. Type 2 diabetes self-management: role of diet self-efficacy. *Canadian Journal of Diabetes* 36(6):337-44
251. Tajfel H, Turner JC. 2004. The social identity theory of intergroup behavior. In *Political psychology: Key readings.*, ed. J. T. Jost, J Sidanius:276-93. New York, NY: Psychology Press.
252. Taylor DM, Usborne E. 2010. When I know who “we” are, I can be “me”: The primary role of cultural identity clarity for psychological well-being. *Transcultural Psychiatry* 47(1):93-111
253. Tomiyama AJ, Dallman MF, Epel ES. 2011. Comfort food is comforting to those most stressed: evidence of the chronic stress response network in high stress women. *Psychoneuroendocrinology* 36(10):1513-9
254. Townsend C, Takishima-Lacasa JY, Latner JD, Grandinetti A, Keawe‘aimoku Kaholokula J. 2014. Ethnic and gender differences in ideal body size and related attitudes among Asians, Native Hawaiians, and Whites. *Hawai‘i Journal of Medicine & Public Health* 73(8):236–43
255. Trask M, Wong-Wilson NN. 2005. A Conversation with Mililani Trask. *The Contemporary Pacific* 17(1):142-56
256. Tulchinsky TH, Varavikova EA. 2014. *The new public health*. San Diego: Academic Press
257. U.S. Census Bureau. 2015. *Percent of people below the poverty line in the past 12 months: Urban/Rural and Inside/Outside Metropolitan and Micropolitan Area* <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
258. U.S. Census Bureau. 2016. *2015 American community survey 1-year data and the Hawaii State Department of Business, Economic Development & Tourism, Research and Economic Analysis Division*. <http://census.hawaii.gov/acs/acs-2015/>
259. U.S. Census Bureau. n.d. *Rural America: A story map*. <https://gis-portal.data.census.gov/arcgis/apps/MapSeries/index.html?appid=7a41374f6b03456e9d138cb014711e01>
260. Umaña-Taylor AJ, Yazedjian A, Bámaca-Gómez M. 2004. Developing the ethnic identity scale using Eriksonian and social identity perspectives. *Identity: An International Journal of Theory and Research* 4(1):9-38

261. US Census Bureau. 2008. *Selected population profile in the United States: 2006-2008 American Community Survey 3-year estimates*.  
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
262. US Census Bureau. 2010. *Selected population profile in the United States: 2008-2010 American Community Survey 3-year estimates*.  
[http://files.hawaii.gov/dbedt/census/acs/ACS2010/ACS2010\\_3\\_Year/ACS\\_HI\\_Select\\_Pop\\_Profiles\\_10\\_3yr\\_files/ACS\\_10\\_3YR\\_S0201\\_ancestry.pdf](http://files.hawaii.gov/dbedt/census/acs/ACS2010/ACS2010_3_Year/ACS_HI_Select_Pop_Profiles_10_3yr_files/ACS_10_3YR_S0201_ancestry.pdf)
263. US Census Bureau. 2011. *Household and families: 2007-2011 American Community Survey 5-year estimates*.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_S1101&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_S1101&prodType=table)
264. US Census Bureau. 2013. *Selected population profile in the United States: 2011-2013 American Community Survey 3-year estimates*.  
[http://files.hawaii.gov/dbedt/census/acs/ACS2013/ACS2013\\_3\\_Year/ACS\\_HI\\_Select\\_Pop\\_Profiles\\_13\\_3yr\\_files/ACS\\_13\\_3YR\\_S0201\\_alone\\_combo.pdf](http://files.hawaii.gov/dbedt/census/acs/ACS2013/ACS2013_3_Year/ACS_HI_Select_Pop_Profiles_13_3yr_files/ACS_13_3YR_S0201_alone_combo.pdf)
265. US Census Bureau. 2014. *Selected Population Profile in the United States: 2014 American Community Survey 1-Year Estimates*.  
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
266. US Census Bureau. 2014. *Selected Population Profile in United States, Hawaii*.  
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
267. US Census Bureau. 2015. *2011-2015 American Community Survey 5-Year Estimates*.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_DP05&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP05&prodType=table)
268. US Census Bureau. 2015. *2015 American Community Survey 1-Year Estimates*.  
[http://files.hawaii.gov/dbedt/census/acs/ACS2015/ACS2015\\_1\\_Year/Select\\_Pop\\_Profiles/major\\_race\\_alone.pdf](http://files.hawaii.gov/dbedt/census/acs/ACS2015/ACS2015_1_Year/Select_Pop_Profiles/major_race_alone.pdf)
269. US Census Bureau. 2015. *Household and families: 2011-2015 American Community Survey 5-year estimates*.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_S1101&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_S1101&prodType=table)
270. US Census Bureau. 2015. *Measuring America: An overview on Native Hawaiian and other Pacific Islander population stats*.  
[https://www.census.gov/mso/www/training/pdf/ma\\_nhopi\\_populations.pdf](https://www.census.gov/mso/www/training/pdf/ma_nhopi_populations.pdf)
271. US Census Bureau. 2015. *Selected Population Profile in the United States, Hawaii*.  
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>
272. US Census Bureau. n.d. *Comparative economic characteristics*.  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_CP03&prodType=table](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_CP03&prodType=table)
273. US Census Bureau. n.d. *Quick Facts: Hawaii*.  
<https://www.census.gov/quickfacts/table/PST045215/15>

274. US Census Bureau. n.d. *Selected Economic Characteristics, 2011-2015 American Community Survey 5-Year Estimates*  
[https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_15\\_5YR\\_DP03&src=pt](https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_DP03&src=pt)
275. US Department of Education. 2004. Native Hawaiian Education Act.
276. US Department of Education. 2007. *A Guide to the Individualized Education Program*.  
<https://www2.ed.gov/parents/needs/speced/iepguide/index.html?exp=0#process>
277. US Equal Employment Opportunity Commission. n.d. *Types of Discrimination*.  
[https://www.eeoc.gov/laws/types/race\\_color.cfm](https://www.eeoc.gov/laws/types/race_color.cfm)
278. Van den Bergh BRH, Van Calster B, Smits T, Van Huffel S, Lagae L. 2008. Antenatal maternal anxiety is related to HPA-axis dysregulation and self-reported depressive symptoms in adolescence: a prospective study on the fetal origins of depressed mood. *Neuropsychopharmacology* 33(3):536-45
279. Vandiver BJ, Cross Jr. WE, Worrell FC, Fhagen-Smith PE. 2002. Validating the Cross Racial Identity Scale. *Journal of Counseling Psychology* 49(1):71-85
280. Walls ML, Whitbeck LB. 2011. Distress among Indigenous North Americans: Generalized and culturally relevant stressors. *Society and Mental Health* 1(2):124-36
281. Walters K, Simoni J. 2002. Reconceptualizing Native women's health: An "Indigenist" stress-coping model. *American Journal of Public Health* 93(4):520-4
282. Webb N. 2004. *Mass trauma and violence: Helping families and children cope*. New York: The Guilford Press
283. Weisberg RB, Bruce SE, Machan JT, Kessler RC, Culpepper L, Keller MB. 2002. Nonpsychiatric illness among primary care patients with trauma histories and posttraumatic stress disorder. *Psychiatric Services* 53(7):848-54
284. Whitbeck BL, Chen X, Hoyt DR, Adams GW. 2004. Discrimination, historical loss and enculturation: culturally specific risk and resiliency factors for alcohol abuse among American Indians. *Journal of Studies on Alcohol* 65(4):409-18
285. Whitbeck LB, Adams GW, Hoyt DR, Chen X. 2004. Conceptualizing and measuring historical trauma among American Indian people. *American Journal of Community Psychology* 33(3-4):119-30
286. Whitbeck LB, Walls ML, Johnson KD, Morrisseau AD, McDougall CM. 2009. Depressed affect and historical loss among North American indigenous adolescents. *American Indian and Alaska Native Mental Health Research (Online)* 16(3):16
287. Wiechelt SA, Gryczynski J, Johnson JL, Caldwell D. 2012. Historical trauma among urban American Indians: Impact on substance abuse and family cohesion. *Journal of Loss and Trauma* 17(4):319-36
288. Williams DR. 1997. Measuring discrimination resource. *Psychology* 2(3):335-51
289. Williams DR, Neighbors HW, Jackson JS. 2003. Racial/ethnic discrimination and health: findings from community studies. *American Journal of Public Health* 93(2):200-8
290. Williamson DF, Thompson TJ, Anda RF, Dietz WH, Felitti V. 2002. Body weight and obesity in adults and self-reported abuse in childhood. *International Journal of Obesity* 26(8):1075

291. World Health Organization. 2003. *Social determinants of health: The solid facts, second edition*.  
[http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/98438/e81384.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/98438/e81384.pdf)
292. Worrell FC, Mendoza-Denton R, Wang A. 2019. Introducing a new assessment tool for measuring ethnic-racial identity: The Cross ethnic-racial identity scale–adult (CERIS-A). *Assessment* 26(3):404-18
293. Wu Y, Braun K, Onaka AT, Horiuchi BY, Tottori CJ, Wilkens L. 2017. Life expectancies in Hawai ‘i: A multi-ethnic analysis of 2010 life tables. *Hawai‘i Journal of Medicine & Public Health* 76(1):9
294. Yates A, Edman JL, Aruguete MS. 2004. Ethnic differences in BMI and body/self-dissatisfaction among Whites, Asian subgroups, Pacific Islanders, and African-Americans. *Journal of Adolescent Health* 34(4):300-7
295. Yip T, Fuligni AJ. 2002. Daily variation in ethnic identity, ethnic behaviors, and psychological well-being among American adolescents of Chinese descent. *Child Development* 73(5):1557-72
296. Yuen NYC, Nahulu LB, Hishinuma ES, Miyamoto RH. 2000. Cultural identification and attempted suicide in Native Hawaiian adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry* 39(3):360-7
297. Zhang L. 2017. Re-Building a Native Hawaiian Nation: Base rolls, membership, and land in an effective self-determination movement. *Asian Pacific American Law Journal* 22(1):69-93
298. Zhao X, Lynch JG, Chen Q. 2010. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research* 37(2):197-206
299. Zusho A, Clayton K. 2011. Culturalizing achievement goal theory and research. *Educational Psychologist* 46(4):239-60



**APPENDIX**

**Appendix 1.**

Demographic Questionnaire:

Native Hawai'ian: Yes/ No

Many Native Hawai'ians today also identify with one or more different ethnic and/or racial backgrounds. Below is a list of several groups that you may identify with in addition to your Native Hawai'ian background. Please select all backgrounds that you identify with and write in any others that may not be on the list provided. Please note that if you identify as only Hawai'ian, you do not need to select any other background.

- American Indian or Alaska Native \_\_\_\_ Asian Indian \_\_\_\_ Back or African American \_\_\_\_ Cambodian \_\_\_\_ Chinese \_\_\_\_ Chuukese \_\_\_\_ Filipino \_\_\_\_ Fijian \_\_\_\_ Guamanian or Chamorro \_\_\_\_ Indonesian \_\_\_\_ Japanese \_\_\_\_ Korean \_\_\_\_ Kosraean \_\_\_\_ Laotian \_\_\_\_ Marshallese \_\_\_\_ Palauan \_\_\_\_ Pohnpeian \_\_\_\_ Portuguese \_\_\_\_ Samoan \_\_\_\_ Tahitian \_\_\_\_ Thai \_\_\_\_ Tokelauan \_\_\_\_ Tongan \_\_\_\_ Vietnamese \_\_\_\_ White \_\_\_\_ Yapese \_\_\_\_
- Other Please write in any other races or backgrounds that you identify with.

Current Zip code: \_\_\_\_\_

Year of Birth: \_\_\_\_\_ Age: \_\_\_\_\_

Gender: \_\_\_\_\_

Height \_\_\_\_\_ Weight \_\_\_\_\_

**Appendix 2.**

Historical Loss Scale:  
(Amended to include items more relevant to the Native Hawai’ian experience)

How often do you think about the following?

Never	Yearly or at special times	Monthly	Weekly	Daily	Several times a day
1	2	3	4	5	6

Response Choices:

- A. Loss of land
- B. Loss of language
- C. Loss of traditional spiritual ways
- D. Loss of family ties because of boarding schools
- E. Loss of our people due to disease after European contact**
- F. Loss of self-respect from poor treatment by government officials
- G. Loss of trust in **government due to the illegal overthrow of the Hawai’ian kingdom**
- H. Losing our culture
- I. Loss of respect by children and grandchildren for elders
- J. Loss of our people through early death
- K. Loss of respect by our children for traditional ways

**Appendix 3.**

Hollingshead Four Factor Index

A. Marital Status:

Married, living with spouse	Never Married, Single	Never Married, living with partner	Divorced	Permanently separated	Widowed
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B. Participant Employment Status:

Employed full time	Employed part time	Unemployed	Retired
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C. If employed, what is your current job title, including rank/ position? \_\_\_\_\_  
If self-employed or own a business, how much is that business worth? \_\_\_\_\_

D. If retired, what was your previous job title, including rank/ position before retirement? \_\_\_\_\_  
If self-employed or business-owner before retirement, how much was that business worth? \_\_\_\_\_

E. Employment status of spouse/ partner:

Employed full time	Employed part time	Unemployed	Retired
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F. If spouse/ partner (only if living with partner) is employed, what is his/her current job title, including rank/ position? \_\_\_\_\_

If spouse/ partner (only if living with partner) is self-employed or own a business, how much is that business worth? \_\_\_\_\_

G. Your highest level of formal education completed:

Less than 7 <sup>th</sup> grade	Junior high school (9 <sup>th</sup> grade)	Partial high school (10 <sup>th</sup> /11 <sup>th</sup> grade)	High school graduate	Partial college (at least one year)	Standard college/ university graduate	Graduate professional training (graduate degree)
1	2	3	4	5	6	7

H. If married/ living with partner, what is spouse/ partner's highest level of formal education completed:

Less than 7 <sup>th</sup> grade	Junior high school (9 <sup>th</sup> grade)	Partial high school (10 <sup>th</sup> /11 <sup>th</sup> grade)	High school graduate	Partial college (at least one year)	Standard college/ university graduation	Graduate professional training (graduate degree)
1	2	3	4	5	6	7

I. Other sources of income:

If separated, divorced, or widowed AND unemployed, do you receive financial support from former spouse or spouse's estate?

If so, how much do you receive monthly? \_\_\_\_\_

If so, what was your former spouse's highest level of completed education?

Less than 7 <sup>th</sup> grade	Junior high school (9 <sup>th</sup> grade)	Partial high school (10 <sup>th</sup> /11 <sup>th</sup> grade)	High school graduate	Partial college (at least one year)	Standard college/ university graduation	Graduate professional training (graduate degree)
1	2	3	4	5	6	7

J. Other sources of income: \_\_\_\_\_

How much do you receive monthly? \_\_\_\_\_

**Appendix 4.**

Macarthur Scale SES/ Community Ladder

**Think of this ladder as representing where people stand in their local communities or ohana.**

**At the top of the ladder are the people who have the highest standing in their community or ohana.** At the bottom are the people who have the lowest standing in their community or ohana.

**Where would you place yourself on this ladder?**

Place an "X" on the rung where you think you stand at this time in your life, compared to other people in your community or ohana.



**Think of this ladder as representing where people stand compared to others in Hawai'i.**

**At the top of the ladder are the people who have the highest standing in Hawai'i.** At the bottom are the people who have the lowest standing in Hawai'i.

**Where would you place yourself on this ladder?**

Place an "X" on the rung where you think you stand at this time in your life, compared to other people in Hawai'i.

**Appendix 5.**

## General Self-Efficacy Scale

Not true at all	Hardly true	Moderately true	Exactly true
1	2	3	4

1. I can always manage to solve difficult problems if I try hard enough
2. If someone opposes me, I can find the means and ways to get what I want
3. It is easy for me to stick to my aims and accomplish my goals
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

**Appendix 6.**

## Nā Mea Hawai'i Scale: (1 point each)

Please answer the following questions by placing a check next to the "yes" or "no" items or filling in the blank.

1. Do you have at least one relative who speaks Hawai'ian? Y/N
2. Do you or your family catch fish without the use of a fishing pole, e.g., by net laying or spear? Y/N
3. Do you eat Hawai'ian food at least once a week, e.g., poi, poke, opihi, laulau, or kālua pig? Y/N
4. Do you often prepare or catch Hawai'ian foods, e.g., poi, poke, opihi, laulau, or kālua

pig? Y/N

5. In the past year, have you *attended* Hawai'ian events such as an ancient hula dance (e.g., Merrie Monarch), the arrival or departure of the Hokule'a, the Moloka'i Hoe, a Hawai'ian concert, the Kamehameha Song Contest, or other major Hawai'ian events? Y/N

6. Have you ever *participated* in any major Hawai'ian event such as those mentioned in question number 5? Y/N

7. Do you, or anyone in your immediate family, currently engage in traditional Hawai'ian arts and crafts, e.g., sculpture, weaving, lei making, featherwork? Y/N

8. Do you currently go to beer busts? (e.g., fundraiser for a halau-hula school) Y/N

9. Has your family ever made a baby lu'au? Y/N

10. Do you know more than 50 Hawai'ian words, NOT counting street names and place names? Y/N

11. Do you have a Hawai'ian middle name? Y/N

12. Did Kalākaua and Lili'uokalani get married in 1878? Y/N/DK

13. Do you believe that the overthrow of the Hawai'ian monarchy was an unjustified act? Y/N

14. With which of these groups do you identify the most strongly? (Check one)  
local people  
part-Hawai'ians  
Hawai'ians  
other (e.g., Caucasian, Japanese, Filipino, none)

15. What does "Aloha wau iā 'oe" mean? \_\_\_\_\_

16. What do these words mean?

'akua \_\_\_\_\_

kahuna \_\_\_\_\_

maika'i \_\_\_\_\_

kupuna \_\_\_\_\_

ali'i \_\_\_\_\_

17. Are children in your family sometimes "hānai" to relatives or close friends? Y/N/DK

18. Do you call your grandmother "Tutu"? Y/N

19. Does your family have an 'aumakua? Y/N/DK

20. Do you believe in the 'aumakua? Y/N

21. Do you call your minister, priest, or chaplain "Kahu"? Y/N/DK

**Appendix 7.**

The Everyday Discrimination Scale

In your day-to-day life, how often do any of the following things happen to you?

Never	Less than once a year	A few times a year	A few times a month	At least once a week	Almost every day
0	1	2	3	4	5

1. You are treated with less courtesy than other people are.
2. You are treated with less respect than other people are.
3. You receive poorer service than other people at restaurants or stores.
4. People act as if they think you are not smart.
5. People act as if they are afraid of you.
6. People act as if they think you are dishonest.
7. People act as if they're better than you are.
8. You are called names or insulted.
9. You are threatened or harassed.

If response is "A few times a year" or more frequently to at least one question, follow-up questions are presented:

What do you think is the Main reason for these experiences? (You may check more than one option)

Your ancestry or national origin	Your gender
Your race	Your age
Your religion	Your height
Your weight	Some other aspect of your physical appearance
Your sexual orientation	Your education or income level
A physical disability	Your shade of skin color
Your tribe	OTHER- WRITE IN

## Appendix 8.

### Sample Size Estimation

Field states that for a medium effect size, a sample size of 100 should suffice for conducting a regression analysis with six or fewer predictors (94). Fritz and MacKinnon estimated sample sizes for mediation analyses with 80 percent power based on varying statistical tests (97). For a bias-corrected bootstrap test (as the *Process* macro generates) the sample size for a medium effect size (Cohen's  $f^2$  explains 13 percent of the variance) is 71 (97). For a percentile bootstrap test, the minimum sample size needed to provide 80 percent power to detect a medium effect is 78 (97).

A priori power analyses were also conducted for each hypothesis utilizing G\*Power, Version 3.1 (92). For simple linear regressions in Hypothesis 1, given a significance threshold of  $\alpha = 0.05$ , a sample size of 84 would provide 80 percent power to detect a medium effect ( $R=.3$ ). For hypothesis 2, a multiple linear regression analysis with two predictor variables (historical trauma and self-efficacy) was conducted. Using an alpha of .05, a power of .80, and a medium effect size (Cohen's  $f^2 = 0.15$ ), a sample size of 68 was deemed sufficient. For moderation analyses in Hypotheses 3, a multiple regression power analysis was conducted based on six predictor variables (historical trauma, cultural affiliation, interaction of historical trauma and cultural affiliation, as well as perceived discrimination, age, and gender). Analysis indicated that a minimum sample size of 98 would provide 80 percent power to detect a medium effect (Cohen's  $f^2 = 0.15$ ) (91). Based upon these analyses, a minimum sample size of 98 was indicated.

The following information is provided to describe the role of participant drop-out rate in sample size estimation for this dissertation. Since this survey was anonymous, complete participant responses cannot be deleted upon participant request since they



cannot be identified. Any incomplete surveys were discarded and data from these were not analyzed. Previous research suggests that a 10 percent participant drop-out rate, with an additional two percent per each 100 survey items, can be anticipated with web-based surveys (119). However, planning for a dropout rate of 25 percent is recommended. Accounting for a dropout rate of 25 percent, a sample size of 130 is recommended. To account for further drop-out or incomplete data, a sample size of 150 is recommended.

## Appendix 9.

### Summary of planned statistical analyses

Specific Aims/Hypotheses	Statistic	Variables	Equation
<b>Specific Aim 1: To examine the effect of historical trauma on related study variables: socioeconomic status, obesity, self-efficacy, and cultural affiliation</b>			
Hyp 1a: historical trauma → socioeconomic status	Simple & Multiple linear regression	Predictor: historical trauma  Outcome: socioeconomic status  Covariate: discrimination, gender, age	$Y_1 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
Hyp 1b: historical trauma → obesity	Simple & Multiple linear regression	Predictor: historical trauma  Outcome: obesity  Covariate: discrimination, gender, age	$Y_2 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
Hyp 1c: historical trauma → self-efficacy	Simple & Multiple linear regression	Predictor: historical trauma  Outcome: self-efficacy	$Y_3 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$

		Covariate: discrimination, gender, age	
Hyp 1d: historical trauma → cultural affiliation	Simple & Multiple linear regression	Predictor: historical trauma  Outcome: cultural affiliation  Covariate: discrimination, gender, age	$Y_4 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
<b>Specific Aim 2: To examine the effect of self-efficacy on the relationship between historical trauma and outcome variables (socioeconomic status and obesity)</b>			
<b>Hyp 2a: Historical trauma → self-efficacy → socioeconomic status</b>			
Hyp 2ai: Historical trauma → self-efficacy → socioeconomic status	Multiple linear regression completed via Bootstrap ( <i>Process</i> macro- mediation analysis)	Predictor: Historical trauma  Outcome: Socioeconomic status  Mediator: self- efficacy  Covariate: discrimination, gender, age	$Y_1 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{self-efficacy}) + \beta_3(\text{discrimination}) + \beta_4(\text{gender}) + \beta_5(\text{age})$
Hyp 2aii: Self-efficacy → socioeconomic status	Simple & Multiple linear regression	Predictor: self- efficacy  Outcome: socioeconomic status  Covariate: discrimination, gender, age	$Y_1 = \beta_0 + \beta_1(\text{self-efficacy}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
<b>Hyp 2b: Historical trauma → self-efficacy → obesity)</b>			
Hyp 2bi: Historical trauma → self-efficacy → obesity	Multiple linear regression completed via Bootstrap ( <i>Process</i> macro –	Predictor: Historical trauma  Outcome: BMI	$Y_2 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{self-efficacy}) + \beta_3(\text{discrimination}) +$

	mediation analysis)	Mediator: self-efficacy  Covariate: discrimination, gender, age	$\beta_4(\text{gender}) + \beta_5(\text{age})$
Hyp 2bii: Self-efficacy → obesity	Simple & Multiple linear regression	Predictor: self-efficacy  Outcome: BMI  Covariate: discrimination, gender, age	$Y_2 = \beta_0 + \beta_1(\text{self-efficacy}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
<b>Specific Aim 3: To examine the effect of cultural affiliation on the relationship between historical trauma and related variables (discrimination, age, gender, socioeconomic status and obesity)</b>			
<b>Hyp 3a: Historical trauma x cultural affiliation → socioeconomic status</b>			
Hyp 3ai: Historical trauma x cultural affiliation + discrimination, age, gender → socioeconomic status	Multiple linear regression completed via Bootstrap ( <i>Process</i> macro – moderation analysis)	Predictor: Historical trauma & cultural affiliation  Outcome: socioeconomic status  Moderator: historical trauma × cultural affiliation  Covariate: discrimination, age, gender	$Y_1 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{cultural affiliation}) + \beta_3(\text{historical trauma} \times \text{cultural affiliation}) + \beta_4(\text{discrimination}) + \beta_5(\text{gender}) + \beta_6(\text{age})$
Hyp 3aai: cultural affiliation → socioeconomic status	Simple & Multiple linear regression	Predictor: cultural affiliation  Outcome: socioeconomic status  Covariate: discrimination, gender, age	$Y_2 = \beta_0 + \beta_1(\text{cultural affiliation}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$
<b>Hyp 3b: Cultural affiliation → outcome variables (socioeconomic status and obesity)</b>			

Hyp 3bi: Historical trauma x cultural affiliation → obesity	Multiple linear regression completed via Bootstrap ( <i>Process</i> macro – moderation analysis)	Predictor: Historical trauma & cultural affiliation  Outcome: BMI  Moderator: historical trauma × cultural affiliation,  Covariate: discrimination, age, gender	$Y_2 = \beta_0 + \beta_1(\text{historical trauma}) + \beta_2(\text{cultural affiliation}) + \beta_2(\text{historical trauma} \times \text{cultural affiliation}) + \beta_4(\text{discrimination}) + \beta_5(\text{gender}) + \beta_6(\text{age})$
Hyp 3bii: cultural affiliation → obesity	Simple & Multiple linear regression	Predictor: cultural affiliation  Outcome: BMI  Covariate: discrimination, gender, age	$Y_3 = \beta_0 + \beta_1(\text{self-efficacy}) + \beta_2(\text{discrimination}) + \beta_3(\text{gender}) + \beta_4(\text{age})$

*Note.* Hyp = hypothesis; ‘x’ = interaction; BMI = body mass index

### Appendix 10.

#### Frequency of Cultural Practices and Beliefs Responses

Cultural Category	N	%age	Cultural Practice/Belief	Participant Response
Cultural Ceremony	11	11.8%	Awa Ceremony 1; ceremonies (1); greeting of Ha (1); Protocol before entering a sacred space/ rites & rituals(3); bury piko & ‘iew (1); house blessing(1); ask permission of the land/spirits before picking plants/flowers & return to land after	Awa <b>ceremony</b> : incl. drinking kava root drink; <b>Ha greeting</b> : sharing/exchanging breath of life; <b>piko/’iewe</b> : umbilical cord

			using it(2); food sharing to welcome & celebrate(1)	
Cultural Event/Festival	6	6.45%	Aloha Festival(3); Makahiki(2); Hale Mua(1)	<b>Makahiki:</b> Hawai'ian New Year; <b>Hale Mua:</b> Native Hawai'ian men's progression group.
Educational	26	28%	Hawai'ian Immersion Class (2); Hawai'ian philosophy(1); educate the lahui/teach the kids/share my mana'o (12); olelo (7); ongoing education/mentorship (3); perpetuating with keiki the language, history, & culture of Hawai'i/tell stories/pass wisdom; speaking Hawai'ian and passing it on to my children; expertise in your profession(1)	<b>Lahui:</b> common person; <b>Olelo:</b> language; <b>Mana'o:</b> opinions/beliefs
Emotional Way of life	62	66.7%	Compassion(1); Malama(3); Ho'okupu(2); Ho'oponopono(14); love of land(3); love of the people(4); ohana time/importance of familial relationships(8);	<b>Malama:</b> take care <b>Ho'okupu:</b> offerings expressing gratitude, respect, & aloha;

			having/sharing aloha(5); doing things with intentionality(1); honor relationships(1); be humble(3); help others(3); connection to place(1); respect elders(4); kuleana(3); pono(1); respect others(2); kindness(2); hope(1); Aloha kekahi i kekahi, malama kekahi i kekahi, kokua kekahi i kekahi;	<b>Ho‘oponopono:</b> forgiveness; <b>Kuleana:</b> responsibility; <b>Pono:</b> righteousness
Environmental Practice	34	36.6%	Cleaning the lo‘i(4); farming kalo(5); Mahi‘ai(2); farming/subsistence practices(4); holoholo(1); Hukilau/fishing(4); caring for the ocean(2); caring for the land/malama ‘aina(8); restoration of cultural and natural resources, visitation and access to culturally significant areas/fishpond restoration(2); gathering foliage(1); Thanking land/ocean for provided resources(1)	<b>Lo‘i:</b> kalo(taro) pond; <b>Mahi‘ai:</b> farmer; <b>Holoholo:</b> reef gathering; <b>Hukilau:</b> fishing; <b>Malama:</b> take care
Food-Related	15	16.1%	Cooking(12)-poi, haupia; making poi with pounder and board; kui	<b>Kui kalo:</b> pound taro/ make poi

			kalo; making lau; pig cooking; helping with imu; gathering sea salt(1); gathering local fruits/plants(2);	<b>Imu:</b>
Health/ Wellness- Related	19	20.4%	Lomi Lomi(7); lā'au lapa'au/traditional healing(11)	<b>Lomi Lomi</b> (type of massage); <b>Lā'au lapa'au:</b> plant-based medicine
Historical Focus	28	30.1%	Genealogy/ Mo'oku'ahau (9), historical class(3); ancient stories/ Hawai'ian mythology(5); mo'olelo of Wahi pana(1); bury ancestral remains(1); feeling loved ones who passed away are present with us/ancestors are watching us(3); Menehune(1); naming children with past generation name(1); Hawai'ian history(1); we're all related to the ancestors(1); respect for history & traditions(1); traditions guide actions(1)	<b>Mo'oku'ahau:</b> genealogy; <b>Mo'olelo of Wahi pana:</b> legends/history of historical/sacred sites;
Music/Art	25	26.9%	Hawai'ian music(3); Oli(6); ipu heke(1); lei making(3); slack key	<b>Oli:</b> Chanting; ipu heke: (gourd drum);

			guitar/ kiho'alu(2); mele(2); Kanikapila(1); Kapa(1); ukulele(1); sing(2); choosing 'ili'ili(1); picking flowers for lei-making(1); tattoo- making(1)	<b>Mele:</b> chants, songs, poems; <b>Kanikapila:</b> gather together & play music; <b>Kapa:</b> cloth made of bark; <b>Kiho'alu:</b> slack-key guitar; <b>'ili 'ili:</b> small stones used in hula
Physical Activity	27	29%	Hula/dance(13) Canoe/Paddle/wa'a(4); lua(4); surfing(3); pau riding(1); sports(1); pikai(1)	<b>Lua:</b> Hawai'ian martial art; <b>Wa'a:</b> traditional canoe; <b>Pau:</b> horseback; <b>Pikai:</b> swim
Political	4	4.3%	Hawai'ian Politics (2); civic engagement (1); Hawai'ian nationalism(1); <i>I believe in Hawai'ian nationalism and a future of independent self-determination for the lāhu</i>	



Religious	49	52.7%	Church(6); I will usually ask <b>Kāne</b> for beautiful sky's to continue my flight training so I can one day get stationed back home and protect my family and our way of life(1); offerings to gods(1); hokupu to heaiau(1); practicing pule/prayer(16); amakua worship(3); Hawai'ian religion(3); spiritual healing(1); aloha akua(7); one akua(2); moon phases & natural world dictate life(1); belief in Night Marchers(1); all nature has a spirit(2); spiritual connection of earth & heaven above(2); spirit possession(1); value the mana(1) akua can be found in the waoakua and kai.	<b>Kane:</b> one of the highest Hawai'ian deities; <b>Pule:</b> prayer; <b>Aloha akua:</b> love of god; <b>Hokupu to heaiau:</b> offerings to temples; <b>Akua can be found in the waoakua and kai:</b> gods can be found in the mountains and sea
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**Appendix 11.**

Obstacles or Restrictions to Cultural Engagement

Obstacle	N	Percent	Response
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Access to Resources	19	16.4%	<p>Access to fresh flowers/plants; government; Governmental and private ownership laws and discrimination; Sometimes access to sacred sites are off limits with “no trespassing signs.” I almost got arrested on Mauna Kea for practicing protocol; insufficient numbers of trained and willing `olohe in my areas of expertise, knowledgeable elders have passed on;</p> <p><i>The inability of many Hawai’ians to speak Hawai’ian or to value Hawai’ian things the penchant for activists to take ceremony and turn them into photo-ops for resistance. The unavailability of ‘āina, kai and wai for people to enjoy as a community. The loss of community because ‘ohana is dispersed from here to there. Homesteads being divided apart by American racial regimes and high rents force us to live in separate spaces rather than having our communities live and schooled and be together.; We’ve lived in the mainland for close to 11 years due to</i></p>
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			<p><i>cost of living. This has been heartbreaking in many ways, but we've been able to provide for our family which is a blessing.</i></p> <p><i>I was a Hawai'ian studies major and expected to work with Hawai'ian people.</i></p> <p><i>My life moved in a different direction and I now work in medical research. I miss so much about being able to practice my culture and it breaks my heart that my children know so little about where they were born. We wish we could participate in more cultural practices in general.</i></p>
Knowledge of Events/resources	5	4.3%	<p>Availability and lack of advertisement.</p> <p>Merry Monarch, Song Contest and Hikulei'a are large events covered by the media but smaller events and cultural practices or events aren't publicized.</p>
Money/Cost	17	14.7%	<p>Everything requires money; Having to live on the mainland, because I cannot afford to live in Hawai'i; I'm in the mainland because I can't afford to live back home.</p>
Physical Distance/Convenience	13	11.2%	<p>I am currently serving in the United States Navy. There are times where it is hard to</p>

			<p>serve the country that overthrew ours;</p> <p>however, I will serve this country to protect the people I love and the land I hold dear to my heart. I wish to protect our way of life as best as possible.</p>
<p>Self-Imposed/ Limited knowledge of Hawai'ian culture</p>	20	17.2%	<p>An unspoken feeling of competition around how Hawai'ian you are and the feeling of being less than that occurs in a space of uncertainty and unfamiliarity when others are practicing; Embarrassment of being an outsider and not knowing enough of culture; Feeling that I don't necessarily belong to or would be accepted by Native Hawai'ian cultural practitioners, and a lack of knowledge; Can't dance; I don't olelo Hawai'ian; I have been integrated into western civilization due to the necessity of becoming an independent woman and being able to support myself without worrying about how I am going to take care of myself. Thus, I have had to become a primary care provider in order to keep up with this ever-changing economy and</p>

			<p>demands of western society. So, I left my cultural practices for a little, but I think of myself as a role model in order to enlighten other young Hawai'ians that yearn to become self-sufficient.</p> <p>I have Lil Knowledge of my heritage and it breaks my heart almost daily I miss my Ohana they're all in Hawai'i; I wasn't taught cultural practices growing up; Lack of knowledge. Fear of being judged for not knowing what I am doing. I push through it, but this is the biggest issue for me; taking on the kuleana/commitment; Nobody knows how to do anything anymore. The system of handing down knowledge is a broken chain. People are increasingly westernizing our practices and don't connect well with other people in a caring and nurturing way. People are practicing our culture in a western way with Hawai'ian words and clothes thrown on top so that I feel culture shock a lot of time when spending time with other Hawai'ians</p>
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			who say they are practicing our culture; religious beliefs(2); And because I don't speak Hawai'ian or am a graduate of a Hawai'ian school or I don't live a certain way, I often feel ostracized even by my peers. Like, too brown to be non-Hawai'ian, not brown enough to be Hawai'ian. You just can't win.
Time	57	49%	Busy working; Busy trying to make money to live in Hawai'i; Life - working two jobs to survive to live in our home on Oahu. Because the cost of living continues to rise in our place called home; Time Management, finding the time outside of western society (Work, school, etc.); Traveling to different islands to learn from different family lineages requires time away from work and family
7. Other	3	2.6%	Hawai'ians fight too much; my health(2)

**Appendix 12.**

Native Hawai'ian Organizations for Recruitment

Kamehameha Schools Alumni Association	ksalumni@pauahi.org	808-534-3966
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University of Hawai'i at Manoa– School of Hawai'ian knowledge	balutski@Hawai'i.edu	808-956-0641
University of Hawai'i at Hilo - College of Hawai'ian language and Hawai'ian language Center	keiki@Hawai'i.edu	
University of Hawai'i at Manoa– Myron Thompson School of Social Work. NH center in medical school	kreif@Hawai'i.edu sswadmit@Hawai'i.edu	808-956-7182
Center for Native and Pacific Health Disparities Research	native@Hawai'i.edu	
Hawai'ian canoe club	Info@Hawai'iancanoeclub.org	808-893-2124
Polynesian Voyaging Society - The Hokule'a	education@pvsHawai'i.org	
Native Hawai'ian roll commission	kokua@kanaiolowalu.org	808-973-0099
	Native Hawai'ian Health Centers/System	
Oahu	Joelene K. Lono, MSW, Executive Director  jlono@keolamamo.org	808-848- 8000
Kuai	David Peters dpkauai@hoolalahui.org	808- 240-0100
Hawai'i	Louis Hao louis@hmono.org	808- 969-9220
Maui	Joseph Gonsalves JGonsalves@hnpkop.org	808-244-4647
Molokai and Lanai	Kamahanahokulani Farrar kamahanahokulanifarrar@nap uuwai.com	808-560-3653
Papa ola lokahi	Sheri-Ann Daniels sdaniels@papaolalokahi.org	808- 597-6550
	Hawai'i Health Centers	
Hawai'i -Bay Clinic	Harold Wallace	808-961-4071
Hawai'i - Hamakua Health Center	Irene Carpenter	808-775-7204
Hawai'i - West Hawai'i Community Health Center	Richard Taaffe	808-331-6472
Lanai - Lanai Community Health Center	Diana Shaw	808-565-6919
		808-553-5038

Molokai – Molokai Community Health Center		
Maui- Malama I Ke Ola Health Center	Dana Alonzo Howeth	808-872-4000
Maui - Hana Health	Cheryl Vasconcellos	808-248-7515
Oahu - Kalihi-Palama Health Center	Emmanuel Kintu	808-791-6301
Oahu - Kokua Kalihi Valley Comprehensive Family Services	David Derauf	808-791-9400
Oahu - Ko’olauloa Community Health and Wellness Center	Terrence Aratani	808-293-9216
Oahu - Waianae Coast Comp Health Center	Richard Bettini	808-697-3300
Oahu - Waikiki Health	Sheila Beckham	808-922-4787
Oahu - Waimanalo Health Center	Mary Oneha	808-259-7949

**Appendix 13.**

Recruitment Flyer

Are you a Native Hawai’ian adult between the ages of 25 and 64?  
 If so, you are invited to participate in a study about historical trauma and Native Hawai’ian well-being! We are conducting new research to understand how historical trauma affects Native Hawai’ians, with a focus on economic and health issues.

We need your help to learn more about these important topics!

Who is eligible? – Native Hawai’ian adults between the ages of 25 and 64.  
 How to participate: You can complete the anonymous survey online at this link: \_\_\_\_\_  
 This survey may take 15-20 minutes to complete.

Let your opinion be heard and help others to learn more about Native Hawai’ians!

If you have any questions/ concerns, please contact the principal investigator, Sade Soares at [sade.soares@usuhs.edu](mailto:sade.soares@usuhs.edu), PhD candidate, at the Uniformed Services University

**Appendix 14.**

Frequently Asked Question Page  
 (1<sup>st</sup> page of survey link prior to accessing study)

Aloha! Thank you for your interest and willingness to participate in this important research!



Here is a list of Frequently Asked Questions (FAQs) to read before completing the survey.

What is the purpose of this survey? The purpose of this survey is to identify how historical trauma impacts socioeconomic status and obesity among Native Hawai'ians. We will also be examining how other factors, such as culture, may play a role in these topics. Very little information is known about the relationship among these issues, so your responses will help to clarify important aspects of Native Hawai'ian well-being.

How long will this take: This survey may take up to 15-20 minutes.

Who is eligible to participate in this study? Any adult between the ages of 25 and 64 who self-identifies as Native Hawai'ian is eligible to participate in this study.

The flyer says the survey is anonymous. Is it really? Yes! This survey is completely anonymous in that we do not collect any identifying information that can be used to directly identify you. We will not be asking you for your name, address, social security number, telephone number, email address or any other identifying information. We also are not tracking or collecting IP addresses of the computer/ device you use to complete this survey.

What is historical trauma? Historical trauma refers to the long-term effects of past traumatic events, with a focus on colonization of Native and Indigenous groups. It also includes continued injustices and discrimination that contribute to individual and community-wide problems. These problems sometimes become part of the culture, and they are passed on from generation to generation.

What is socioeconomic status? Socioeconomic status refers to the social position of an individual or group; and it is usually measured by combining education, income, and occupation.

How is obesity determined? Obesity occurs when an individual's weight is more than what would be considered healthy based on that person's height(57)(58)(58)(58)(58)(58)(57)(57)(57)(55)(55)(55)(55)(56)(57)(57)(57)(57)(57)(57)(211)(211)(211)(205205)(201)(201)(201)(198)(197)(196)(196)(198)(193)(193)(190)(190)(190). A common measure of obesity is body mass index (BMI). BMI is a measure of a person's weight in kilograms divided by the square of their height in meters. A person is considered obese if he/she has a BMI of 30 kg/m<sup>2</sup> or greater.

Informed consent:

Participation in this survey is completely voluntary and you are welcome to discontinue your participation at any time.

What happens if I begin the survey but no longer wish to participate? In the case that you have already begun the survey and you decide to discontinue, please feel free to do so. You are not obligated to complete this survey simply because you began. Responses from any incomplete surveys will not be utilized in the final data analysis.

What happens if I complete the survey and days/weeks later decide I no longer want my information included in the final data analysis? As a reminder, this study is completely anonymous. Because of this, it will not be possible to identify your responses compared to others. Therefore, the principal investigator will not be able to find and delete your responses after you have submitted your completed survey.

How will my information be used?

Data collected in this survey will be utilized toward the completion of the Principal Investigator's doctoral dissertation. All survey responses will be analyzed to identify the relationship between historical trauma and Native Hawai'ian well-being. Specifically, data collected will help to better understand the relationships among historical trauma, socioeconomic status and obesity. Results will be written up and presented as part of the Principal Investigator's dissertation report. It is possible that versions of the Principal Investigator's dissertation may one day be published in a scientific journal.

What is a principal investigator and who is responsible for this study? Scientific research often includes several people who help to bring a research study together. The principal investigator is the individual who is responsible for the preparation, conduct, and administration of a research study. The principal investigator for this survey is Sadé Soares at [sade.soares@usuhs.edu](mailto:sade.soares@usuhs.edu).

A little bit about Sadé: I am a Caribbean-American Clinical Psychology graduate student who is married to a Native Hawai'ian. My husband's family is from Oahu and he grew up near Waialua. As I learned more about my in-laws, I also began to discover Hawai'i's history. I am humbled by the strength and resilience of Native Hawai'ians and I am honored to be doing this research.

National Lifeline Crisis: Some people may experience negative thoughts while taking this survey. Please write down the following contact information so you can receive help if you begin to experience any distress while taking this survey:  
**<http://www.crisischat.org/chat> or call 1-800-273 TALK (8255).**

**Appendix 15.**

Post Survey Page

Thank you for completing this survey and providing your anonymous responses!

As a reminder, this study is designed to better understand how historical trauma affects Native Hawai'ian well-being.

Some people may experience negative thoughts and/or emotions during and/or after completing this survey. If you experience distress following this survey and/or begin to consider thoughts related to harming yourself or others, please contact the National Lifeline Crisis chat at <http://www.crisischat.org/chat> or call **1-800-273 TALK (8255)**.

If, at any time, you have further questions related to this study, feel free to email the principal investigator, Sade Soares at [sade.soares@usuhs.edu](mailto:sade.soares@usuhs.edu).