MECHANISMS THAT PERPETUATE HEALTH CARE DISPARITIES:

PHYSICIAN STEREOTYPES & BIAS

by

ALICIA YEE IBARAKI

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Student: Alicia Yee Ibaraki

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This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Psychology by:

Gordon C. Nagayama Hall, Ph.D.	Chairperson
Janice Sabin, Ph.D.	Core Member
Maureen Zalewski, Ph.D.	Core Member
Charles Martinez, Ph.D.	Institutional Representative

and

Scott L. Pratt	Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

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DISSERTATION ABSTRACT

Alicia Yee Ibaraki

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Title: Mechanisms that Perpetuate Health Care Disparities: Physician Stereotypes & Bias

Purpose: Although Asian Americans are the only racial group for whom cancer is the leading cause of death, colorectal cancer screening is consistently lower than that of White Americans. Physicians also recommend colorectal cancer screening to Asian Americans at nearly half the rate as White Americans. This study tests a mechanism that may underlie low recommendation rates. I based my hypothesis on a conceptual model that integrates the literature on information processing and decision making with Asian American stereotypes.

Methods: I conducted an online study of primary care physicians and measured their cancer screening referral behavior in response to clinical vignettes. I used the existing Asian Attitude Implicit Association Test (IAT) and developed a new Health Attitude IAT to measure implicit attitudes about Asian American foreignness and health advantages, respectively. Explicit attitudes about these constructs were also assessed through self-report. I used binary logistic regression models to evaluate the association of attitudes about Asian Americans foreignness and health advantage with screening recommendation.

Results: My sample included 167 physicians (23% response rate). I found strong implicit bias that Asians are foreign (Cohen's d = 1.09) and strong implicit bias favoring

a white health advantage (Cohen's d = -0.86). There were weaker explicit biases that Asians are foreign (Cohen's d = 0.62). Explicit beliefs about health advantage favored Asians (Cohen's d = 0.73). Physician race, age and gender were significant moderators of bias score. .I found no evidence of a race based screening disparity and no association between implicit or explicit bias scores and making a cancer screening recommendation.

Conclusions: Foreign and health advantage biases exist among a sample of physicians, but may not influence cancer screening recommendation behavior. Physicians demonstrated both implicitly and explicitly held attitudes that Asian Americans are perpetual foreigners. Physicians also reported explicit beliefs that Asian Americans have health advantages relative to other races. Implicitly, their attitudes indicated that White Americans are a healthier group. Further research should address whether race-based cancer screening disparities persist in real world settings, both in terms of screening completion, and physician recommendation. If disparities still exist, alternate explanatory mechanisms should be identified.

CURRICULUM VITAE

NAME OF AUTHOR: Alicia Yee Ibaraki

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
Pomona College, Claremont

DEGREES AWARDED:

Doctor of Philosophy in Clinical Psychology, 2017, University of Oregon
Master of Science, 2012, University of Oregon
Bachelor of Arts, 2008, Pomona College

AREAS OF SPECIAL INTEREST:

Clinical Psychology
Physical and mental health disparities in ethnic minority populations

PROFESSIONAL EXPERIENCE:

Graduate Teaching Fellow, University of Oregon, September 2010-June 2016

Neuropsychology Intern, Dr. David Northway, June 2013- June 2016

Group Therapist, Oregon Research Institute, September 2012- June 2014

GRANTS, AWARDS, AND HONORS:

Norman D. Sundberg Fellowship, 2016

Dissertation Research Award, American Psychological Association, 2015

Dissertation Award, Asian American Psychological Association, 2015

Behavioral Research Grant, Qualtrics, 2015

Travel Award, Asian American Psychological Association, 2011, 2015

Henry V. Howe Scholarship, University of Oregon, 2015

Mental Health and Substance Abuse Services Fellowship, American Psychological Association, 2014, 2015

Graduate Education Committee Training Award, University of Oregon, 2014

Best Poster, Asian American Psychological Association Annual Conference, 2013

Clarence and Lucille Dunbar Scholarship, University of Oregon, 2013, 2014

Graduate School Research Award, University of Oregon, 2011

Promising Scholar Award, University of Oregon, 2010

Summer Undergraduate Research Grant, Pomona College, 2007

PUBLICATIONS:

Hall, G. C. N. & Yee, A. (2015). Multicultural Issues. In C. Nezu & A. Nezu (Eds.), *The Oxford Handbook of Cognitive and Behavioral Therapies* (pp. 465-480). New York: Oxford University Press.

Ibaraki, A. Y., Hall, G. C. N., & Sabin, J. A. (2014). Asian American cancer disparities: The potential effects of model minority health stereotypes. *Asian American Journal of Psychology, 5*, 75–81.

Ibaraki, A. Y., & Hall, G. C. N. (2014). The components of cultural match in psychotherapy. *Journal of Social and Clinical Psychology, 33*, 938-955.

Hall, G. C. N. & Yee, A. H. (2014). Evidence-Based Practice. In F. T. L. Leong, L. Comas-Diaz, G.C.N. Hall, V. McLoyd, & J. Trimble (Eds.), *Handbook of multicultural psychology, Vol. 2: Applications and training* (pp. 59-79). Washington DC: American Psychological Association.

Goto, S. G., Yee, A., Lowenberg, K., & Lewis, R. S. (2013). Cultural differences in sensitivity to social context: Detecting affective incongruity using the N400. *Social Neuroscience, 8*, 63-74. doi:10.1080/17470919.2012.739202

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CHAPTER I

INTRODUCTION

Racial and ethnic disparities exist in health care that are not fully explained by differences in access to care, clinical appropriateness, or patient preferences (Smedley, Stith, & Nelson, 2002). *Unequal Treatment,* a seminal 2002 publication by the Institute of Medicine (IOM), identified existing racial/ethnic disparities in the treatment of cancer, cerebrovascular disease, renal transplantation, HIV/AIDS, asthma, diabetes, pain, cardiovascular procedure, and maternal and infant health (Smedley et al., 2002). Although these disparities have been clearly documented for over a decade, they continue to persist. The IOM report speculated that racial bias and stereotyping might contribute to these entrenched disparities experienced by minority populations.

Health care disparities are primarily documented within African American and Latino/a patient populations. Fewer studies have documented health care disparities within Asian American populations. For example, as of March 2016, a search of the terms "African American" and "health disparity" in PubMed yields 1,253 results. A search for "Asian American" and "health disparity" returns only 174. This speaks to two issues. The first is that in some cases, after controlling for socioeconomic status, Asian Americans have fewer health disparities than other ethnic minority populations. The second is the fact that very few studies include Asian American populations in their samples, and that race in the United States is primarily conceptualized as a Black/White dichotomy. Because of this, existing disparities in non-Black ethnic minority groups can be under-documented (Williams & Mohammed, 2009).

Known instances of health disparities within the Asian American population are diabetes and certain cancers. Asian Americans are about 30% more likely to have type 2 diabetes than White American counterparts despite a lower Body Mass Index (BMI), lower levels of alcohol consumption, and lower rates of smoking (Lee, Brancati & Yeh, 2011). Although the prevalence rate of diabetes has increased in both ethnic groups over the last decade, the gap between Asian Americans and Whites has remained stable (Lee et al., 2011). Compared to other racial and ethnic groups, Asian Americans are also disproportionately infected with the chronic hepatitis B virus, the leading cause of primary liver cancer (Misra et al., 2013).

Heart disease is the leading cause of death of all adults in the United States today except among Asian Americans where the leading cause of death is cancer (Murphy, Xu, & Kochanek, 2012). In the most recent dataset released by the Center for Disease Control and Prevention (CDC, 2014), cancer accounted for 26% of all deaths among Asian Americans. Cancer mortality rates among Asian Americans relative to other ethnic groups are elevated due to Asian Americans not being diagnosed until they have more advanced stages of cancer, when survival rates are poorer (Smigal et al., 2006). Timely cancer screenings are crucial to early detection, yet screening rates for cervical and breast cancer in Asian American women, and colorectal cancer in Asian American women and men are well below those of any other ethnic group (Ho, Lai, & Cheung, 2011; Jun & Oh, 2013; Lee, Ju, Vang, Lundquist, 2010; U.S. Cancer Statistics Working Group, 2015; Wu, Bancroft, & Guthrie, 2005). This health care disparity persists even after adjusting for access to care (CDC, 2012), education level, or income (Carcaise-Edinboro & Bradley, 2008).

Colorectal Cancer Screening

Across ethnic groups, rates of colorectal cancer screening are lower than other types of preventative screenings. Approximately 65% of adults aged 50-75 years old are up to date with testing. The U.S. Preventative Services Task Force (USPTF) recommends a home fecal occult blood test repeated annually; flexible sigmoidoscopy done every five years with fecal occult blood testing done every three years; or colonoscopy done every ten years (USPSTF, 2016). Fecal occult blood testing detects blood in stool, which may be an indication of cancer. Flexible sigmoidoscopy and colonoscopy identify pre-cancerous polyps or cancerous cells in the colon or rectum. Screenings are recommended for all asymptomatic individuals with an average level of risk, regardless of race, starting at age 50. There is high certainty that screenings substantially reduce colorectal cancer mortality (USPSTF, 2016). The American Cancer Society estimates that with early detection and the removal of precancerous polyps, five-year survival rates are as high as 90%.

While acknowledging that there are important ethnic-specific differences in cancer site incidence and mortality rates (for a review see Miller, Chu, Hankey, & Ries, 2008), I highlight colorectal cancer because among Asian Americans as a whole, colorectal cancer is the second most commonly diagnosed cancer and the third highest cause of cancer-related mortality (Wong, Gildengorin, Nguyen & Mock, 2005). Colorectal cancer is also one of the most common cancers in Asia for both males and females, and incidence rates are similar to Western countries (Sung et al., 2015), making this a relevant issue both US- and foreign-born individuals of Asian descent. Risk for colorectal cancer doubles in individuals with type 2 diabetes, a medical condition that

disproportionately affects Asian Americans (Cavicchia et al., 2013). Additionally, unlike breast and cervical cancer screening guidelines, which have undergone recent changes that make it less clear when to begin and how frequently to screen, the clinical guidelines for colorectal cancer have been consistent and are straightforward.

Despite these guidelines, data from the 2001, 2003 and 2005 California Health Interview Survey (CHIS) and the 2004 nationally representative Medical Expenditure Panel Survey (MEPS) indicate that as an aggregated group, Asian Americans' colorectal cancer screening was consistently lower than that of non-Hispanic White Americans. Most recent estimates suggest that 54.4% of Asian Americans are up to date on colorectal cancer screenings compared to 64.8% of African Americans and 66.4% of White Americans (CDC, 2013). In addition to lower screening rates, CHIS (2005) data also demonstrated that rates of physician *recommended* cancer screening among Asian Americans is disproportionately lower than justified by the ethnic group differences in rates of cancer and mortality (U.S. Cancer Statistics Working Group, 2015). Colon testing of any type was recommended by physicians during the preceding five years for 48% of non-Hispanic White American patients but for only 27% of Asian American patients, controlling for age (CHIS, 2005).

Low rates of physicians-recommended colorectal screening to Asian American patients were not unique to the CHIS dataset. In a national sample of Japanese Americans, only 23% of had undergone screening at the recommendation of a physician. 63% of individuals with elevated risk based on older age and personal medical history reported never receiving a cancer screening recommendation from their physician (Honda, 2004). In a more recent sample of older Korean Americans, only 29% had ever

received a screening recommendation from their physician (Jo, Maxwell, Wong, & Bastani, 2008). Data from the 2000 National Health Interview Survey suggests that of a subset of adults from multiple ethnic backgrounds who were asked about barriers to screening and who had seen a physician in the past year, only 10% had received a physician recommendation for screening (Klabunde, Vernon, Nadel, Breen, Seeff, & Brown, 2005). Although physicians are not able to control whether their patients follow through with their medical advice, physicians should make the initial recommendation. There is no clinical rationale for racial or ethnic differences in the rate that physicians are making the recommendation for colorectal cancer screening.

Disparities in rates of physician recommendation and rates of completed colorectal cancer screens are two separate, but related problems. For many patients, a physician recommendation is a crucial component in undergoing screening. Patients who are current with screening regularly cite physician recommendation as the single most important factor in them getting the test (Honda, 2004; Jo, et al., 2008; Ma et al., 2012). Additionally, although patients will follow through on their physician's recommendation, many are unwilling to initiate the conversation about screening themselves (Maxwell, Bastani, Crespi, Danao & Cayetano, 2011). The MEPS found that likelihood of completing screening doubled when physicians took the time to explain the screening process and rationale (Carcaise-Edinboro & Bradley, 2008). Honda's 2004 study with Japanese Americans found that when a physician did recommend screening, 66% (fecal occult blood testing) and 71% (sigmoidoscopy/colonoscopy) of patients followed through with the screening versus 28% and 12%, respectively, when no recommendation was made. Results from the 2000 National Health Interview Survey found that among

individuals 50-64 years old who had never undergone or were behind on screening, the top two reasons cited were never having thought about getting it done (52%) and not having their physician recommend it to them (21%) (Seeff et al., 2004). Both of these factors could be directly addressed with physician recommendation. A survey of physicians also found that the majority (78%) believe that their patients generally accept their advice about cancer screening (Bodle, Islam, Kwon, Zojwalla, Ahsan & Senie, 2008), indicating that both patients and physicians consider physician recommendation an important component of the cancer screening process. Because regular cancer screenings have been shown to effectively reduce cancer mortality rates (Nelson, Tyne, Naik, Bougatsos, Chan, & Humphery, 2009; Pignone, Rich, Teutsch, Berg & Lohr, 2002), increasing the rate of physician recommendations can help to reduce the number of deaths attributed to colorectal cancer.

The majority of colorectal cancer screening research has focused on factors that are associated with completed screenings, and not with factors that go into whether a recommendation is made. I incorporate both into my conceptual model presented at the end of this section. I first briefly review the literature of patient and physician factors that influence recommendations and screening.

Patient factors that influence screening. Patient-related factors associated with differential rates of screening encompass multiple domains. Known demographic correlates of not being up to date with screening are female gender, ethnic minority race, younger age relative to screening guidelines, having less than a high school education, and living at or below the poverty level (Carcaise-Edinboro & Bradley, 2008; Seeff et al., 2004; Sentell, Tsoh, Davis, Davis, & Braun, 2014). Structural factors include lack of

health insurance and no usual source of care (Carcaise-Edinboro & Bradley, 2008; Seeff et al., 2004). Cultural factors, such as being a non-English speaker, immigrant status, and low levels of health literacy are also associated with lower rates of screening (Carcaise-Edinboro & Bradley, 2008; Koo, et al., 2011; Sentell, Tsoh, Davis, Davis, & Braun, 2014). Having seen a physician in the last year facilitates being up to date with screening, with a single visit more than doubling the odds (Seeff et al., 2004).

Health beliefs. The Health Belief model is a widely accepted framework in which to understand patient compliance or non-compliance with screening guidelines. The model states that four beliefs ultimately influence a person's decision to engage in preventative actions against different diseases. The four beliefs are (1) perceived susceptibility to the disease; (2) that the severity of the disease would affect their quality of life; (3) that taking action would reduce the severity of the disease; and (4) that there would be no major barriers to taking action (Rosenstock, 1974).

Susceptibility. An increased belief in susceptibility to cancer is associated with increased compliance. For example, in a group of Thai women living in Australia, those who believed that they were highly susceptible to breast cancer were almost three times more likely to conduct self breast exams than those who perceived themselves at low susceptibility (Jirojwong & MacLennan, 2003). Higher levels of perceived susceptibility to colorectal cancer were also associated with increased usage of fecal occult blood testing or a sigmoidoscopy among Asian American populations (Honda, 2004; Sun, Basch, Wolf, & Li, 2004). Comparatively, English-speaking Asian Americans report significantly lower perceived susceptibility to colorectal cancer than White Americans or African Americans whereas low-English proficiency Asian American reported similar

susceptibility as Whites Americans (Brenner, Ko, Janz, Gupta, & Inadomi, 2015). Study authors did not speculate about reasons for this difference. However, one possibility is that in contemporary American culture, publicity and attention around cancer is largely associated with White Americans. For example, the Susan G. Komen and pink ribbon campaign is synonymous with breast cancer, and largely represented by and associated with White American women. Celebrities whose struggles with cancer are widely publicized also tend to be White Americans (e.g. Farrah Fawcett, Michael Douglas, and Angelina Jolie). These depictions could lead Asian Americans to believe that cancer is primarily an issue of concern for White Americans and would explain why more acculturated Asian Americans, who are more connected to American cultural norms report less susceptibility than low-English proficiency Asian Americans.

Severity. Asian Americans appear to perceive the severity of cancer similarly to other ethnic groups, regardless of their primary language (Brenner et al., 2015). The literature is sparse regarding health beliefs about the severity of cancer, particularly with Asian American populations. This is likely because cancer is widely accepted as a severe condition. Severity appears to be a more important factor in predicting preventative behaviors for disease with symptoms that do not necessarily cause a person to feel ill such as diabetes, or hypertension (Thalacker, 2011).

Efficacy of Preventative Measures. A belief that cancer screening tests are effective in early cancer detection, and that early cancer detection is important in the curability of cancer, plays an important role in screening behavior. For example, mammography was three times higher among Asian American women who believed screening was important for preventing breast cancer compared to women who only

endorse it as somewhat important (Ma, Gao, Lee, Wang, Tan, & Shive, 2012b). Asian American women who believed Pap tests could detect cancer early were twice as likely to have received the test compared to women who did not hold these beliefs (Ma et al., 2012a). Given the association between low health literacy and not getting timely screenings, health education could be an important tool in changing beliefs about efficacy, especially among recent immigrants. For example, in a study of over 700 Vietnamese women, the majority of whom were immigrants, 66% held the belief that you should only see a physician when you are sick (Ma et al., 2012a). Such beliefs make it unlikely that preventative measures will be utilized.

Barriers. Literature on the barriers to Asian Americans seeking cancer screening has been mixed. Some studies have indicated that Asian values, such as modesty and embarrassment, may interfere with screening procedures for cancers such as breast cancer or colon cancer (Honda, 2004; Wu et al., 2005). Other studies have reported that embarrassment is not a major concern among Asian Americans seeking mammograms (Sadler, Wang, Wang, & Ko, 2000) or colorectal cancer screening (Brenner et al., 2015; Maxwell et al., 2011). Logistical factors, such as lack of regular transportation, lack of time, language barriers, and lack of knowledge of where to seek services are also commonly cited barriers among Asian Americans (Ma et al., 2012b; Sadler et al., 2000). English-speaking Asian Americans cited cost as a barrier significantly more than White Americans or African Americans. Low-English proficiency Asian Americans reported fewer barriers than the rest of the sample and were less likely to view the need for additional testing, fear of test results, anxiety, complications, or sedation as treatment interfering barriers (Brenner et al., 2015). This finding is somewhat counterintuitive and

study authors were unsure why the non-English speaking Asian Americans report fewer perceived barriers than all other groups.

Physician factors that influence recommendation and screening. Little research has identified physician factors that are associated with making colorectal cancer screening recommendations. The existing literature identifies and documents associations, however no unifying theoretical framework explains how these characteristics are connected to behavior. There is evidence that physician race influences the type of screening test that is recommended. White American and Asian American physicians are more likely to recommend FOBT plus colonoscopy compared to physicians of other races, who are more like to recommend other tests or test combinations (Zapka, Klabunde, Arora, Yuan, Smith & Kobrin, 2011). Female gender is associated with higher rates of recommendation (Shokar, Nguyen-Oghalai, & Wu, 2009). Koo and colleagues (2012) found that physician beliefs about patients also had an impact, as physicians in their sample were less likely to recommend screening to immigrants because of beliefs about poor follow-through.

Implicit/explicit bias. Implicit beliefs and biases are attitudes or stereotypes that can affect behavior, but are outside of an individual's conscious awareness. For example, in Condry and Condry's (1976) classic study, participants watching a baby react to a jack-in-the-box toy were more likely to describe the infant's expressed emotion as anger if they believed the baby was a boy, but as fear if they believed the baby was a girl. When asked how they used the baby's gender in making their decision, participants indicated they did not consider gender. Clearly, beliefs about the baby's gender had in impact in decision making, but that process happened automatically, on a subconscious level

outside of awareness. Because by nature, implicit attitudes cannot be reported, popular measurements of implicit bias, such as the Implicit Association Task, use differences in reaction time to different pairs of associations (e.g. Black/White paired with Good/Bad) to represent the strength of implicit attitudes.

Conversely, explicit biases are attitudes or stereotypes that a person is aware of and able (although not necessarily willing) to report (Greenwald & Banaji, 1995). The word 'bias' tends to carry a negative connotation and many individuals can feel pressured to be 'bias-free'. However, biases are a common and natural part of the human experience, and can exist in many neutral contexts such as the preference for certain brands, or genres of music, or presidential candidate. The literature on the association between implicit and explicit biases is mixed. In some studies, measures of the two types of bias are highly correlated (e.g., Banse, Seise, & Zerbes, 2001), however in other studies they are not related (e.g. Sabin, Moore, Noonan, Lallemand, & Buchwald, 2015). Surprisingly, the level of social desirability associated with the construct does not seem to influence the strength of the correlation (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). A meta-analysis of 126 IAT studies conducted between 1998 and 2004 found that the average correlation between implicit and explicit measures was $r = .24$, $SD = .14$, suggesting that the association is present but small (Hofmann et al., 2005). Based on their moderator analyses Hoffmann and colleagues (2005) concluded that methodological considerations, like the spontaneity in which the explicit self-report is given, is one of the best predictors of larger correlations.

The finding that measures of implicit and explicit bias are only modestly correlated was replicated in a study of over 2,500 physicians ($r = .30$). The small, but

significant association between implicit and explicit bias reinforces the idea that they are related, but distinct processes (Sabin, Nosek, Greenwald, & Rivara, 2009). It also suggests that implicit biases can be present in individuals who espouse egalitarian beliefs and show no evidence of explicit biases, such as physicians (Dovidio & Gaertner, 2000). Sabin and colleagues (2009) found evidence of implicit and explicit biases related to racial preferences in a large sample of physicians. Physicians from multiple ethnic backgrounds preferred White Americans to African Americans. The effect was strongest among White American physicians. Conversely, African American physicians did not show an implicit preference for either White Americans or African Americans. Both implicit and explicit biases also varied by gender. Compared to females, male physicians showed stronger implicit and explicit preferences for White Americans (Sabin et al., 2009).

Physician-held biases based on race can influence decision making processes and contribute to health disparities (Dovidio & Fiske, 2012; van Ryn & Fu, 2003). In a vignette study, Green, Carney, Pallin, Raymond, Iezzoni, and Banaji (2007) demonstrated that implicit stereotypes about a patient's level of cooperativeness made as a function of their race changed the likelihood of physicians offering treatment to a patient complaining of chest pain. The more that the physician believed in the stereotype that African American patients are uncooperative, the less likely they were to offer treatment to African American patients relative to White American patients. Higher levels of implicit bias have also been associated with less frequent referral to specialists in response to reports of ambiguous chest pain (Stepanikova, 2012), lower likelihoods of prescribing narcotic pain medication following surgery (Sabin & Greenwald, 2012), and

less patient centeredness and poorer ratings of interpersonal care during medical appointments (Cooper et al., 2012).

Despite these findings, there is also conflicting evidence suggesting that IATs are not good predictors of discriminatory behavior. In their 2013 meta-analysis, Oswald, Mitchell, Blanton, Jaccard and Tetlock reported smaller mean correlations between race IATs and behavior (ρ (rho) = .14) than what was found in Greenwald, Poehlman, Uhlmann, and Banaji's 2009 study (ρ (rho) = .36), in part due to the inclusion of additional studies They concluded that although race-related IAT measures correlated strongly with brain activity in studies that used neuroimaging, they were poor predictors of actual behavior, judgment, and decision making (Oswald et al., 2013). Studies using IATs to predict physician behavior, have also reported mixed results. No association between implicit attitudes and treatment behaviors was noted in studies of childhood obesity (Sabin et al., 2015), pediatric urinary tract infection, or pediatric asthma (Sabin & Greenwald, 2012).

Heuristics and stereotyping

Human information processing involves two modes, commonly referred to as "System 1" and "System 2". System 1 is an intuitive mode in which decisions are made automatically and rapidly. System 2 is a controlled mode, which is deliberate and slower (Kahneman, 2003). The facilitation of System 1 processing relies on heuristics- cognitive shortcuts, such as 'rules of thumb,' or stereotypes that are easily accessed and employed to quickly form judgments and make decisions (Kahneman, Slovic, & Tversky, 1982). Heuristics are more likely to be relied to make decisions when people have a limited or depleted supply of cognitive resources such as when they are under time pressure or in

other types of stressful situations (Stepanikova, 2012). Physicians, who often find themselves faced with a complex array of patient information and limited time in which to process this information, often employ System 1 in decision making (Croskerry, 2009; Ely, Graber, & Croskerry, 2011).

A common heuristic that may facilitate the diagnostic process is *representativeness*. Representativeness in a diagnostic context is used to judge how similar the patient is to the typical person with the disorder. Representativeness may function in different ways with respect to Asian American patients. Although the leading cause of death for Asian Americans is cancer, African Americans have the highest overall rate of cancer mortality. Compared to other ethnic groups, Asian Americans have the lowest cancer death rate (CDC, 2013). If physicians were using a representativeness heuristic considering just the Asian American population, cancer may be salient and represented because it is an important health concern within this population. However, if a physician were considering representativeness across races, an Asian American patient would not be highly representative of a person with a high risk of cancer. Heuristics are a useful cognitive tool that allows individuals to make decisions quickly. The cost to using them is that not all the available information can be processed and incorporated into decision-making. If the information that is processed is biased, or is overly simplified into a stereotype, it can result in decision-making errors (Kahneman & Klein, 2009). Because physicians are frequently put into situations that favor using System 1 processing, and because there is evidence that physician-held implicit attitudes are associated with differential clinical recommendations and practices, I suggest that understanding the content of implicit bias associated with Asian American and cancer

screening will help to explain lower screening recommendation rates. A reasonable starting point for investigating the content of implicit bias is Asian American-specific stereotypes.

Asian American Stereotypes

Model Minority. The most well known stereotypes about Asian Americans are those perpetuated by the model minority myth. This term was coined in the 1960s in the midst of the Civil Rights Movement and used as evidence that all races could be successful if they just worked hard enough. This justification also served as an excuse to deny the barriers to upward mobility imposed by institutional and systemic racism (Gupta, Szymanski & Leong, 2011). Over 50 years later, Asian Americans as a model minority it is still a commonly held belief in the United States (Chao, Chiu, Chan, Mendoza-Denton, & Kwok, 2012). Asian Americans are stereotyped as quiet, hardworking, intelligent, disciplined, and more successful than *any* other ethnic minority group. Because of the relative socioeconomic success in East-Asian ethnic groups, all Asian Americans are portrayed as a group that does not face societal barriers, and does not need or deserve help (Yoo, Burrola, & Steger, 2010).

The paradox in considering Asian American stereotypes and disparities is that many stereotypes about Asian Americans sound positive and one would generally expect disparities rooted in bias or discrimination to stem from negative stereotypes. Indeed, in the stereotype literature, negative stereotypes that result in hostility or other negative outcomes have historically received the most attention. Yet seemingly innocuous, or even complimentary, positive stereotypes can also have deleterious effects. In a recent study, Asian American participants who heard positive stereotypes about their group

(e.g., Asians are good at math) experienced greater negative emotions than participants who did not hear a stereotype (Siy & Cheryan, 2013). Positive stereotypes are damaging because they base the admired quality solely on group membership instead of individual characteristics. They are restricting and can generalize identities and traits of groups to individuals where they do not apply (Czopp, 2008). Stereotyped groups are categorized by two dimensions, one of which is competence (Dovidio & Fiske, 2012). Competence refers to the perception of a group's power, status, and their ability to help or harm others. The model minority stereotype characterizes Asian Americans as a high competence group, made powerful by their economic success and business connections. Similarly, to the Model Minority myth, high competence groups can be perceived as not needing or deserving help. I contend that the overall stereotypes of Asian American self-sufficiency and being a low-need/low risk population may also generalize to Asian American health.

In order to further investigate the idea that the overall health of Asian Americans may be held as a model for other ethnic groups I asked 351 undergraduates which ethnic group (African Americans, Asian Americans, Hispanics, or Whites) is least likely to suffer from a number of health conditions, including stroke, diabetes, alcoholism, obesity, heart disease, and cancer. The sample was 66% female and had a mean age of 19.6 years. Participants were primarily White (74%), followed by Asian (14%), more than one race (4%), and Latino (3%). Native populations and African Americans each comprised less than 2% of the sample. Respondents were significantly more likely to choose Asian Americans as the least likely to suffer from each disease, even when that was not accurate (e.g., diabetes).

That is not to say that Asian Americans do not have lower prevalence rates of a number of health conditions. Asian Americans have relatively low rates of obesity (Shariff-Marco, Klassen, & Bowie, 2010), drinking (Chartier & Caetano, 2010) and, among Asian American women, smoking (Chae, Gavin, & Takeuchi, 2006), which are risk factors for disease. As stated earlier, the prevalence of cancer is lower among Asian Americans than among other groups (National Center for Health Statistics, 2011). Anecdotally, there is also the idea within American culture, of the "well preserved" Asian American who looks much younger than they actually are. Although I am not aware of any research that empirically validates this idea, the appearance of youthfulness contributes to an overall picture of good health. This is especially relevant for cancer screenings because guidelines are based on age. Lower rates of health behaviors that elevate risk contribute to the idea that Asian Americans are not representative of a patient at high risk for developing a disease like cancer. I am not arguing that participant endorsement of relatively lower rates of health conditions of Asian Americans is driven purely by stereotyping- this finding is largely supported by epidemiological data. However, it is also a fact that failure to screen for cancer is associated with disproportionately high rates of cancer-related deaths among Asian Americans (National Center for Health Statistics, 2011). Perceptions of relatively better health should not be used justify lower rates of cancer screening recommendations.

Perpetual Foreigner. A second common stereotype about Asian Americans is that of the perpetual foreigner (Lee, Wong, & Alvarez, 2009). The perpetual foreigner stereotype suggests that regardless of how many years or how many generations an Asian American and their ancestors have lived in the United States, they are never truly

"American." A corollary of this stereotype is that Asian Americans are unable to speak English or have poor English skills (Huynh, Devos, & Smarlarz, 2011), and do not understand American culture. Unlike the model minority, this stereotype has negative connotations of being an outsider and incorrectly or awkwardly trying to participate in a culture, which they will never fully belong. This relates to the second dimension of Dovidio and Fiske's stereotype model: warmth. Warmth refers to judgment about whether the group will be cooperative (warm) or resistant (cold), and relates to how likely you will be to work with or against that group. The perpetual foreigner stereotypes characterize Asian Americans as cold (Dovidio & Fiske, 2012).

On measures of both implicit and explicit beliefs, Asian Americans are rated as less American than African Americans and White Americans (Devos & Banaji, 2005). The implicit association between Asian Americans and foreign is so strong that it is easier to pair White European celebrities (e.g., Hugh Grant) with American symbols than it is to pair Asian American celebrities such as Kristy Yamaguchi, who was an actual representative of the United States on an international stage, with American symbols (Devos & Banaji, 2005).

The likelihood to characterize an American-born person of Asian descent as American or foreign varies depending on implicit or explicit measurement. When participants are instructed to deliberately reflect on their decision, thus utilizing System 2 processing, they will rate Lucy Liu (an American-born actress) as more American than Kate Winslet (a British-born actress). Under the time pressure created by an Implicit Association Test (which activates System 1 processing), the same participants rated Kate Winslet as more American than Lucy Liu (Devos & Ma, 2008).

Based on data assessing cancer screening practices of Asian American physicians (Bodle et al., 2008), I suggest that aspects of the perpetual foreigner stereotype may influence clinical encounters as well. Bodle and colleagues (2008) surveyed 117 physicians practicing in the New York City area. All physicians were Asian American and many worked in settings with a larger number of Asian American clients. The majority of the physicians (90%) communicated with their Asian patients in at least one language other than English. Physicians were less likely to recommend screening to non- or poor-English speakers (Bodle et al., 2008). When physicians did not recommend cancer screening, common reasons cited were that they did not believe that their patients understood the purpose of preventative medicine, such as cancer screenings, concerns about the financial cost to the patient, and concerns about causing patient embarrassment over invasive exams.

The patient profile presented in the prior study consisting of a large number of Asian American patients, is one of a patient who does not have good language abilities, is not likely to understand the value of preventative medicine, is difficult to communicate the value of preventive testing to because of poor language skills, will be embarrassed by the invasiveness of standard cancer screening tools, and for whom the cost of testing is a significant concern. These characteristics may not be stereotypes and truly reflect the make-up of the population served by these physicians. However, it may also be the case that this profile of an Asian American patient- an immigrant, a perpetual foreigner who has poor English skills, monetary restrictions, and does not understand the Western culture of medicine - is one that is overly-applied to Asian Americans where the profile is not appropriate or accurate. This may be especially true for physicians who have little

experience or opportunity to work with Asian American patients and do not have a high enough volume of patients to see counter-examples to this profile.

Stereotyping and the Connection to Clinical Decision Making

The model minority and the perpetual foreigner are the two most common stereotypes associated with Asian Americans but represent different pictures of Asian American patients. The Model Minority stereotype is seemingly positive but it can be pernicious if it causes a population with true need to be overlooked due to perceptions of competency or lack of problems. In the health sector, a comparatively youthful appearance, low rates of drinking and smoking, and lower rates of obesity may suggest that Asian Americans are the model racial group for health. An implicit endorsement of this positive stereotype could lead physicians not to recommend preventative screening measures, such as colonoscopies, because they simply do not see a clinical need (Ibaraki, Hall, & Sabin, 2014). The perpetual foreigner stereotype paints Asian Americans as outsiders who will never truly belong. In the health sector, implicit physician beliefs about a patient's inability to speak English, embarrassment over invasive medical procedures, or lack of understanding of Western medicine due to their perceived foreign status, may also lead physicians not to recommend cancer screenings because they view it as a wasted effort (Ibaraki et al., 2014). Epidemiologic data has demonstrated that physicians are recommending cancer screenings at lower rates for Asian Americans compared to other ethnic groups, but it is unknown why this occurring. The explicit or implicit endorsement of either the model health stereotype or the perpetual foreigner health stereotype is a plausible mechanism in explaining this behavior (Ibaraki et al., 2014).

A Conceptual Model of Physician Cancer-Screening

Figure 1 represents my hypothesized conceptual model. When an adult turns 50 years of age, clinical guidelines state that physicians should recommend screening for colorectal cancer regardless of gender or ethnicity (USPSTF, 2016). My conceptual model suggests that although patient age should directly predict receiving a screening recommendation, implicitly and explicitly physician-held attitudes about Asian Americans mediate this association. Additionally, physician characteristics such as race and gender moderate the effect of bias. Once screening recommendations are made, patient factors, such as health beliefs and demographic characteristics moderate the association between receiving a recommendation and following through. This dissertation focuses on the first half of this model, as I am interested in explaining the contribution of physician-level factors to cancer screening disparities. Although I do not look at how organization-level factors interact with this process, it is also important to acknowledge that physicians and patients operate within a healthcare system that can perpetuate disparities in the way that healthcare organizations are organized, financed, and to the extent that they are or are not equally accessible (Smedley et al., 2002).

Specific Aims

The purpose of my dissertation is to test a mechanism that may underlie low recommendation rates of cancer screening to Asian American patients by their physicians. The specific aims of the current study are:

Aim 1: *Examine the extent to which physicians implicitly and explicitly ascribe to lay stereotypes.* Three specific hypotheses will be tested within this aim.

Hypothesis 1.1 Measurable levels of bias will reflect two common lay stereotypes about Asian Americans. I expect that I will be able to document physician endorsement of Asian Americans as perpetual foreigners, and as a model health group through responses in the both the implicit and explicit portions of the IAT.

Hypothesis 1.2 Implicit stereotype endorsement will be more prominent than explicit stereotype endorsement. I expect that although both implicit and explicit biases will be exhibited, implicit bias will larger.

Hypothesis 1.3 Stereotype endorsement will be moderated by physician-level variables such as race/ethnicity and gender. Based on prior research which found race-related implicit bias among White but not Black physicians (Sabin et al., 2009), I expect gender and race/ethnicity to moderate the amount of stereotypes endorsed with women showing less implicit bias than men, and White American physicians showing a preference for White patients.

Aim 2: *Determine the extent to which implicitly and explicitly physician-held stereotypes influence the decision to recommend preventative screening.*

Hypothesis 2.1 Differential rates of screening. Based on published data (CHIS, 2005), I expect that given identical vignettes, physicians will recommend colorectal cancer screening for Asian American patients at a lower rate than for White American patients.

Hypothesis 2.2 Level of bias moderating recommendation rate. I hypothesize that levels of implicit and explicit bias will mediate the association between patient race and whether a screening recommendation is made, such that levels of bias, not patient race,

will account for screening disparities. Additionally, the physician characteristics of race and gender will moderate this mediation.

CHAPTER II

METHODS

Participants and Recruitment

Physicians were recruited through Qualtrics Panels, an online survey company that specializes in reaching targeted populations. In order to be eligible to participate, physicians had to identify as a primary care provider, and spend at least 50% of their time providing direct patient care, as opposed to teaching or research. There were no exclusion criteria for any demographic factor such as age, gender, or race. Online survey invitations were sent via email to a panel of physicians obtained from the American Medical Association. A generic subject line, Physician Study, was used as not to prime the participants. The survey was open from November 23, 2015 to December 6, 2015. During that time, the survey link was accessed 1,106 times. 374 (34%) individuals were not eligible due to (a) non-consent (30%), (b) less than 50% patient contact (2%), or (c) non PCP-status (2%). The remaining 732 individuals were randomized into the Asian patient condition (n = 483) or White patient condition (n = 249). Of these individuals, 167 individuals completed all parts of the Asian patient condition and 87 participants completed all parts of the White patient condition for an overall response rate of 23% based on initial traffic to the survey or 35% based on eligible participants (see Figure 2). No demographic data were available for physicians who did not complete the study.

The survey was implemented through Qualtrics. Implicit Association Tasks were programmed through Inquisit 4 Web. All data were hosted on Qualtrics' secure server. Approval to conduct the study was granted by the University of Oregon Institutional

Review Board. The study took 25-30 minutes to complete. Participants were paid $25 for their time.

Power Analysis

Sample size for screening recommendation likelihood was estimated with the G*Power (Erdfelder, Lang, & Buchner, 2007) using a power convention of .80 and an alpha level of .05. Actual rates of physician referral for cancer screening to Asian and White patients taken from the California Health Interview Survey were used to calculate an odds ratio of screening recommendation. A sample of 112 is powered .80 to detect an odds ratio of .37, which is considered a medium effect, of recommending screening to Asian compared to White patients, independent of covariates. Based on effect sizes published in the literature for the Implicit Association Task, inclusion of covariates with an R^2 of .06, a medium effect, increases required sample size to 278 in order to be powered at .80.

Measures

Clinical Vignettes. Each participant read three clinical vignettes (see Appendix A). The vignette of interest was always presented third. Although I was only interested in the final vignette, three vignettes were used to increase time pressure and cognitive load, conditions under which System 1 processing is more likely to be utilized. Vignettes included the patient's race, age, gender, family/social history, primary purpose for visit, history of present illness, medical history, medication, and vital signs. All clinical information contained in the vignette was drawn from previously published material- either medical case studies or peer-reviewed studies that also used vignette paradigms. Additionally, each vignette in this study was presented to three physicians for feedback

and verification that the clinical information and presentation was consistent with what physicians would reasonably expect to encounter. Vignettes were accompanied by pictures of each patient that had been rated for apparent age and attractiveness and matched on these two variables. In the target vignette, patients were either White or Asian. Following the vignette, physicians were asked, *"for a patient like this, how often would you offer order each of the following at this visit?"* and presented with a list of medical interventions related to presenting symptoms as well as preventative screening measures associated with different ages. All physicians saw the same medical information across conditions (e.g., the medical information in presented in vignette one, condition one was identical to the medical information presented in vignette one, condition two). The only thing varied between conditions was the patient's race and accompanying picture, which served as the independent variable. The dependent variable was whether physicians recommended any one of three colon cancer screening tests (colonoscopy, flexible sigmoidoscopy, or fecal occult blood test) to the patient in the target vignette, who was 51-years-old and reported not having seen a medical professional within the past three years. Case vignettes are considered a valid method to measure quality of care (Peabody et al., 2000, 2004) and have been shown to compare favorably to the research "gold standard" of using standardized patients to measure quality of care (Peabody et al., 2004). This method compares well with other quality of care measures, outperforms chart review, and is cost effective.

Manipulation Check. Immediately following the presentation of all three vignettes, physicians were asked to select the race and age of each patient from a multiple-choice drop-down list. Age options were presented in 10-year increments (e.g.

30-30 years old; 40-49 year old). These items were used to ensure physicians had attended to patient race and age.

Implicit Association Test (IAT). The IAT is a timed cognitive test measuring the relative association strength between two pairs of concepts, a target concept such as *race* (e.g., White American vs. Asian American) and an *evaluation* (e.g., good vs. bad). Concepts that are strongly associated should be paired more quickly than concepts that have a weaker association. The IAT has good reliability in comparison to other implicit measures, is robust for repeated pre-post evaluation assessments, and has predictive validity (Nosek, Greenwald, & Banaji, 2005). Limitations of the IAT include the ability to be faked (Banse et al., 2001), susceptibility to practice effects with repeated testing (Nosek et al., 2005), and varying relationships to implicit measures depending on domain and the characteristic of the self-report measure. For instance, correlations tend be higher when explicit self-reports are of an affective versus cognitive nature (Hofmann et al., 2005). Despite these limitations, the IAT is one of the most widely used and well-established measures of implicit attitudes in social cognition research.

To assess physicians' implicit attitudes about two stereotypes about Asian Americans, I used one existing IAT (Asian) (Lane, Banaji, Nosek, & Greenwald, 2007) and one new IAT (Health) (see Appendix B & C). In the Asian IAT, participants are asked to pair pictures of Asian or White faces with pictures of famous American or Foreign landmarks. Results assess implicit attitudes about the foreignness of Asians based on the speed of their parings. This IAT was used to measure strength of perpetual foreigner stereotypes. The Health IAT was developed for this study to examine the association of race with a model health stereotype. Different stimuli, both visual and text

representations were considered for the target categories of White/Asian and Healthy/Unhealthy and potentially stimuli were pilot tested in an undergraduate sample of N = 33. From that data, two Health IATs were developed- one that focused on health behaviors (unhealthy, obese, alcoholic, smoker) and one that described poor health in general (unhealthy, ill, sick, diseased) in contrast to descriptors of good health (healthy, well, hearty, fit). To represent Asian and White race, I used common (as identified by the 2000 U.S. Census) Asian surnames of Zhang, Huang, Choi, Nguyen, and the White surnames Wood, Sullivan, Miller, Peterson (Word, Coleman, Nunziata, & Kominski, n.d.) Each version of the IAT was piloted on a sample of 15 physicians and the health behavior version, which had a more normal distribution of scores, was selected for use in the main study to measure the strength of model health stereotypes.

Measures of explicit bias. Explicit bias that corresponded to the two IATs was also measured. In the Asian IAT Physicians were asked to respond to the following questions: "*in your mind, how American are people who belong to the following groups? That is, how strongly are they identified with American and all things American?"* In the Health IAT, they responded to "*how healthy, on average, are people who belong to the following groups?"* Responses were made on a 7-point likert scale that ranged from *Absolutely American* to *Not at all American*/*Completely Healthy* to *Not at all Healthy* with a neutral midpoint. As additional measures of factors that contribute to overall explicit health ratings, physicians were also asked to indicate the prevalence rates of obesity, smoking, and unhealthy levels of alcohol consumption in each racial group. Physicians completed these ratings for Asian Americans and White Americans as well as African Americans and Native Americans. Ratings of African Americans and Native

Americans were used to differentiate the effects of an Asian identity versus having ethnic minority status in comparison to White Americans.

The RACE scale. The RACE scale (Bonham, Sellers, & Woolford, 2014) is a 7-item scale that measures self-reported use of race in medical decision making. Each item is answered with a 5-point Likert scale (4 = all of the time to 0 = none of the time). The RACE scale has good demonstrated psychometric properties and consists of a single factor (Bonham et al, 2014). In this sample, this measure was normally distributed (skew = .01, kurtosis = -.20). The distribution of responses to individual items is included in Table 3. The measure is included in Appendix D.

Demographics. Physician characteristics such as race and gender have been shown to interact with IAT scores (Sabin et al., 2009). Physicians were asked about their gender and race/ethnicity. Information about their age, number of years practicing, the percentage of clients in their practice that are Asian American, and percentage of the time they use computer-assisted diagnostic software was also collected.

Qualitative Item. Physicians were told that a large scale study found that physicians recommended colorectal cancer screening to 48% of non-Hispanic White patients ages 50 and above, but to only 27% of Asian American patients ages 50 and above. They were provided a large text box and asked for their explanation of this statistic.

Procedure

The entire experiment took place online. A flow chart of study enrollment is depicted in Figure 2. Participants were randomized into one of two conditions where the target patient was either an Asian or White female. Randomization was weighted so that

twice as many participants were in the Asian condition because only that data was used for the mediation analysis. All participants were given 90 seconds to read each case vignette and make clinical recommendations. Each participant was presented with three vignettes that only varied by patient race. The third vignette was always the target vignette for examining cancer screening recommendation. In the target vignette, the patient presents for a wellness visit and endorses the ambiguous symptoms of heartburn and back pain to increase clinical uncertainty. Increased levels of uncertainty produces more errors in medical decision-making and increase reliance on heuristics and stereotypes (Kahneman et al., 1982).

Participants answered manipulation check questions then completed the explicit bias measures and RACE scale. They were then were directed to Inquisit 4 Web where they completed the Health and Asian IAT. Presentation of the two IATs was counterbalanced. After completing the IATs, the participants were routed back to Qualtrics where they responded to the qualitative item, answered demographic questions, and were debriefed.

Statistical Analyses

I report descriptive statistics using mean and standard deviation for continuous variables and percentages for categorical variables. The IAT effect, also known as the IAT *D* score was calculated based on the methodology outlined in Greenwald et al., (2003), which includes a built in error penalty and dropping scores where greater than 10% of responses were below 300ms latency time. I also computed standardized effect sizes (Cohen's *d)* for the IAT *D* score by diving IAT *D* by its standard deviation. IAT *D* scores were calculated such that a positive value in the Health IAT indicates an easier

time pairing Asian individuals with health and White individuals with unhealthy behaviors. A positive value in the Asian IAT indicates an easier time pairing White individuals with American concepts and Asian individuals with foreign concepts. Negative IAT *D* scores indicate an easier time pairing the opposite attributes. A *D* score of zero or close to zero is interpreted as little to no implicit bias in either direction.

Explicit bias scores were also scored using standard methodology (e.g., Sabin et al., 2015) of calculating difference scores from Likert-scale questions. Explicit bias score are interpreted similarly to implicit bias scores in terms of what a positive or negative score means regarding the nature of the bias. Effect size (Cohen's *d*) was also calculated. Repeated measures ANOVAs were used to look at differences in implicit and bias by racial group. Cohen's *d* effects sizes were used to compare the relative strength of reported implicit and explicit bias.

Planned Analyses. Univariate ANOVAs with polynomial contrasts were used to examine the physician factors associated with bias score. The dependent variable for each ANOVA was one of the bias score (e.g. implicit health, explicit foreignness). Physician race, gender, age, years practiced, percentage of their practice that is comprised of Asian clients, and percentage of time they use computer-assisted diagnostic software were simultaneously entered as independent variables. Due to the small sample size of African American, Latino, and mixed-race physicians, these three groups were combined into a single group so that there were three racial groups in the ANOVA: White, Asian, and Other Ethnic Minority. Correlations were used to determine the direction of the relationship for significant continuous predictors.

In order to examine differences in treatment recommendations by patient race, I utilized 2x2 chi-squares with the variables of recommendation status and patient race. Because patient age is a key criterion in making cancer screening recommendations, only the sub-sample of physicians who correctly indicated that the patient in the vignette as at least 50 years old (n = 219) were included to control for the possibility that the physician did not recommend screening because they thought the patient was younger than screening guidelines indicate.

For the main analysis looking at how levels of bias and physician personal and professional characteristics impact cancer screening, I used the subsample of the data who passed the manipulation check and saw the condition with the Asian patient (n = 144). I used only that condition instead of the entire sample because I am interested in how bias effects clinical decision making specific to Asian American patients. I first individually examined the association between all predictor variables and the outcome variable with binary logistic regression (see Table 9). I then used binary logistic regression models to evaluate how attitudes about foreignness and health were associated with colorectal cancer screening recommendations. I first fit a model with bias scores predicting whether a screening recommendation is made. I then fit a model that simultaneously included implicit and explicit bias score along with physician gender and race. Finally, I included the interaction terms for gender and race with each bias score. All continuous variables were centered to reduce multicollinearity in interactions terms. Potential confounding variables that were not significantly associated with the outcome variable and were not part of the original hypotheses (e.g. years practiced) were excluded from the models for parsimony. I report odds ratios (OR) and 95% confidence intervals

(CIs) for all models. Only significant interactions are reported. In linear regression, beta values are interpreted as the change in the dependent variable for a 1-unit change in the independent variable. When the dependent variable is a binary outcome, as in logistic regression, betas are exponentiated (base *e* raised to the value of the beta coefficient) to determine the odds of changing from one outcome to the other- in this case, making a screening recommendation. Attitudes for perpetual foreigner and model health status were considered in separate models (see Tables 10 and 11), except when their product was included in the model to assess the interaction between foreign and health attitudes.

I planned to test a moderated mediation model where levels of implicit and explicit bias mediated the decision to recommend colorectal cancer screening, which was further moderated by physician characteristics. However, because there was not a statistically significant difference in screening recommendations, and implicit and explicit bias score did not predict screening, the conditions for performing a mediation analysis were not met (Baron & Kenny, 1986).

Exploratory Analyses. I calculated Pearson correlation coefficients for all independent variables to examine possible association between the variables (see Table 6). I also calculated correlation coefficients between explicit ratings of behavior-specific measures of health (e.g. obesity, smoking) and overall health ratings as a way to understand specific factors that contribute to ideas of health. Results are presented by race of physician in Table 7. Qualitative data were coded for themes by two independent coders who were both doctoral students. Results are presented as percentages. This data are from the question asking physicians for their interpretation of why a cancer recommendation screening disparity exists. This exploratory question was meant to

guide future research and does not ask physicians to address why they personally did or did not make a recommendation in the vignette portion of the study. This item was presented at the end of the study, after physicians had been exposed to ideas about racial bias, which may have influenced responses. Coded responses fell into the three major of themes of patient driven factors, physician driven factors, and a belief that Asians have a relative health advantage. Each physician was given a score corresponding to how many coded items they endorsed per theme. These scores were entered into an exploratory binary logistic regression to examine the association between beliefs about why other physicians do not recommend screening to Asian American clients and their own recommendation behavior. Linear regressions were used to examine the association between these beliefs and bias scores.

CHAPTER III

RESULTS

Participants

Tables 1 and 2 present the descriptive characteristics of study participants, as well as a comparison to the overall populations of physicians in the American Medical Association (AMA), the largest association of physicians in the United States. The sample was predominantly White American (61%), followed by Asian American (23%), African American (5%), Latino American (4%), and Mixed Race (3%). The race of 5% of the sample is unknown, either because they declined to provide this information, or answered in a way that is impossible to determine race (e.g. 'human'). Mean age was 49 years; two thirds of the sample (66%) was men. Physicians reported a mean of 18 years in practice. On average 11% of their practice was comprised of Asian clients. Computer-assisted diagnostic software was used 31% of the time. Physicians in the Asian and White conditions were similar with respect to age, gender, race, percentage of practice comprised of Asian patients, and percentage of time using computer assisted software (*p* value range = .35 to .94). The sample in this study closely reflected the demographics of the AMA in terms mean age, gender, and racial background. One difference was that the percentage of physicians who identified as Asian was approximately 8% higher in this sample than are represented in the AMA. This could suggest that this sample was slightly more knowledgeable or familiar with Asian American patients than a nationally representative sample, and less likely to endorse Asian-related stereotypes.

Manipulation Check

Participants were asked to report the age and race of the patient in the target vignette. Results are presented in Table 5. There were no significant differences in age, race, experience, percentage of Asian clients, or use computer assisted software, among participants who correctly or incorrectly identified patient age. There were significant differences based on gender of the physician with 91% of female physicians and 78% of male physicians reporting age within the correct decade (50-59 years-old) $\chi^2(1) = 7.21$, $p < .01$. Males reported the target patient as younger than 50 years old 19% of the time, whereas females did so 8% of the time. There were no significant differences in any of the demographic variables for reporting the patient's race correctly or incorrectly.

Stereotype Endorsement

Across both the perpetual foreigner and model health stereotypes, implicit attitude effect sizes were larger than explicit self-report effect sizes. Table 4 shows the mean, standard deviation, and effect size for implicit and explicit attitudes across all respondents. There was a significant negative correlation between the two implicit measures ($r = -.23$, $p < .001$). There was also a significant positive correlation between implicit and explicit attitudes of the Model Health stereotype ($r = .18$, $p < .001$). I found no significant association between implicit and explicit measures of the perpetual foreigner stereotype ($r = -.01$, $p = .83$), or between both explicit measures of bias ($r = .05$, $p = .36$).

Perpetual Foreigner. I found strong implicit Asian-foreign bias ($M = .38$, Cohen's $d = 1.09$). Scores ranged from -0.79 to +1.20, with 75% of the sample showing some degree of Asian-foreign bias (e.g. percentage of IAT scores, ≥ 0.15). The measure

demonstrated good internal consistency in a split-half reliability analysis (Spearman-Brown = .75). Self reported, explicit attitudes about foreignness showed a moderate explicit Asian-foreign bias (M = .74, Cohen's d = 0.62,). Although all ethnic minority groups were considered less "American" than White Americans (see Figure 3), the difference between Asian Americans and White Americans was significantly larger than the difference between African American and White Americans $t(262) = 9.14$, $p < .001$, or Native Americans and White Americans $t(263) = 6.30$, $p < .001$.

Moderating effects of physician characteristics. When the perpetual foreigner stereotype was measured implicitly, age was significantly associated with bias score $F(1, 229) = 5.60$, $p < .05$, such that older physicians had more Asian-foreign implicit bias. Experience with Asian patients reduced bias $F(1, 229) = 5.44$, $p < .05$ such that as the percentage of practice that is comprised of Asian clients increased, perpetual foreigner bias score decreased $r = -.254$, $p < .05$. Physician race was also significantly associated with implicit bias $F(2,219) = 9.48$, $p < .001$. Post hoc tests showed the White American physicians had significantly more implicit bias than Asian American physicians ($p < .01$) or Other Minority physicians ($p < .05$). Asian American and Other Minority physicians did not significantly differ from each other ($p = .10$) There was also a significant ethnicity by gender interaction $F(2, 229) = 4.21$, $p < .05$ (see Figure 5). Men from racial minority groups showed lower levels of implicit bias than women from racial minority groups. Among White American physicians, men had higher levels of implicit bias than women did.

Physician race was the only variable significantly associated with explicit, self-reported measure the perpetual foreigner bias $F(2,228) = 3.81$, $p < .05$. Consistently,

Asian Americans were explicitly rated as more foreign than White Americans. Asian American physicians reported the largest difference, surprisingly rating Asian Americans as more foreign than White Americans ($p < .01$). These results are both counterintuitive and opposite of the pattern of bias endorsement when measured implicitly.

Model Health. There was strong implicit bias in the opposite direction as expected for implicit model health stereotype with physicians showing a White-healthy bias (M = -0.26, Cohen's d = -0.86). Scores ranged from -1.33 to +0.48, with 62% of the sample showing some degree of White-healthy bias (e.g. percentage of IAT scores, ≤-0.15). The measure demonstrated adequate internal consistency in a split-half reliability analysis (Spearman-Brown = .66). Self-reported explicit attitudes about health suggested the opposite association (M = 0.71, Cohen's d = 0.73,). Asian Americans were the only ethnic minority group explicitly rated as healthier than White Americans (see Figure 4). They were also rated as healthier than African Americans $t(260) = 20.13$, $p < .001$ and Native Americans $t(259) = 619.74$, $p < .001$.

Moderating effects of physician characteristics. When measured implicitly, only physician race was significantly associated with bias $F(2,222) = 4.31$, $p < .05$. Although all racial groups saw Asians as less healthy than Whites, contrasts showed that this effect was the smallest among Asian American physicians, as their mean scores were close to zero, which would be an indication of no bias. The effect was strongest amongst White American male physicians (see Figure 5). No physician-level variables were significantly associated with explicit bias scores.

Physician Differences in Screening Recommendations

Table 8 show the results for chi-square analyses for different types of colorectal cancer screening based on the race of the patient. Colonoscopies were the most common form of colorectal cancer screening endorsed, followed by fecal occult blood testing, and flexible sigmoidoscopy. I calculated a composite measure indicating endorsement of any one of these three types of cancer screenings. Physicians in the Asian American patient condition recommended some form of cancer screening 60.5% of the time, compared to 57.3% of physicians in the White American patient condition. There were no significant differences in rate of recommendation based on patient race across any of the individual types of tests or across the composite screening measure $\chi^2 = 0.24$, $df = 1$, $p = .62$.

Association of Attitudes about Foreignness and Health with Colorectal Cancer Screening

As shown in Table 9, none of the independent variables was significantly associated with making a screening recommendation. Table 10 shows the association of attitudes about foreignness with colorectal cancer screening recommendations. The full model showed no relation between implicit ($p = .91$) or explicit ($p = .47$) attitudes about Asian foreignness and screening recommendations and no main effects of physician gender or race. There were no significant interaction effects between bias scores with physician race or gender, suggesting the absence of moderating effects. Overall model fit was poor, explaining roughly 15% of the variance. The addition of predictors and interaction terms only increased the percentage of correct classification of responses by 9% compared to a null model with no predictors.

Table 11 shows the association between attitudes about health and colorectal cancer screening recommendation. In the overall adjusted model there was no significant association between implicit (p = .52) or explicit (p = .41) attitudes about health and rates of recommendation. Again, there were no main effects for gender or race and interaction terms were not significant indicating the absence of a moderating effect. Overall model fit was also poor. The final model accounted for 12% of the variance. Compared to a null model, percentage of cases classified correctly increased by 8% with the addition of predictors.

Exploratory Findings

Correlations. Although I made no a priori hypotheses about the correlations among independent variables, a number of independent variables were significantly correlated (see Table 6). Implicit and explicit measures of health were positively correlated (r = .18) such that higher explicit ratings of Asian American health relative to White American health was also associated with higher implicit attitudes of an Asian health advantage. The two measures of implicit bias were negatively correlated (r = -.23) suggesting that stronger Asian-foreign implicit bias was associated with weaker beliefs that Asians have a health advantage. RACE score, which measures the intentional use of race in clinical practice, was positively correlated with explicit health bias (r = .13). Age was negatively correlated with implicit Asian-health bias (r = -.26) but positively correlated with implicit Asian-foreign bias (r = .25) suggesting that older physicians are less likely to hold implicit attitudes about Asian clients having relative health advantage, but are more likely to see them as foreigners, while younger physicians have opposite attitudes. Years practicing was highly correlated with age (r = .88), which

intuitively makes sense, and showed similar associations to implicit bias measures as age. Interestingly, exposure to Asian clients as a function of percentage of practice comprised of Asian clients was positively associated Asian-model health bias (r = .20) and negatively associated with Asian-foreign bias (r = -.25). Exposure to Asian clients was also associated with age and experience, with younger, and less experience physicians reporting a higher percentage of Asian clients (r = -.14) and (r = -.15), respectively. Level of self-reported Asian-foreign bias was not significantly associated with any other independent variable, nor was the use of computer assisted diagnostic software.

I also examined the association between specific measures of health (e.g. obesity, smoking, unhealthy alcohol use), and overall ratings of health. Among White physicians, all measures of specific health behaviors for both races were significantly correlated with each other (values ranged from r = .29 to r = .69). Overall Asian health was also positively correlated with overall White health (r = .55) suggesting a relationship of overall response style where high ratings of one group was also likely to elicit high ratings of the other. No specific health behaviors were significantly correlated with overall health ratings of White American. Ratings of obesity were negatively correlated with overall health ratings of Asian Americans (r = -.29) such that increased endorsement of obesity in Asian Americans was associated with lower overall health ratings.

Ethnic minority physicians showed similar response style patterns, as all measures of specific health behaviors for both races were significantly correlated (values ranged from r = .33 to r = .87), as were overall health ratings between Asian and White Americans (r = .42). Perceptions of increased rates of obesity, was associated with lower overall health ratings for both White Americans (r = -.41) and Asian Americans (r = -

.27). Perceptions of increased rates of smoking (r = -.35) and unhealthy levels of alcohol use (r = -.24) were associated with lower ratings of overall White American health only. It is interesting that among both White and ethnic minority physicians, specific health behaviors were significantly correlated with overall health for the other group, but not for their own racial group.

Overall Number of Recommendations and Recommendation Types. Although there were no race-based differences in recommending colorectal cancer screening tests, I also considered the possibility that the model health stereotype would be expressed as fewer overall recommendations for the Asian patient vignette, or that recommendations would be symptom-focused rather than preventative in nature. None of these possibilities were supported by the data. Independent t-tests found no significant difference in overall number of recommendations made $t(264) = -.11$, $p = .91$, number of preventative tests recommended $t(264) = .26$, $p = .79$, or the number of symptom focused tests recommended $t(264) = -.77$, $p = .44$.

Physician Given Reasons for Cancer Screening Disparity. Table 12 shows the types and frequency of responses physicians gave to explain the differences in screening recommendations found in the CHIS dataset. Some physicians provide multiple possibilities, all of which were coded individually. Inter-rater reliability was acceptable at ICC = .82. Overall, there were 359 different codeable responses, which fell into three major themes. About a quarter (26.0%) of responses indicated that the lack of screening were due to patient factors such as language barrier; a lack of understanding of preventative medicine and underutilization of health care; or a lack of interest from the patient. Physician factors, such as a lack of familiarity with Asian patients and ethnic-

specific guidelines; prejudice; and discomfort about bringing up the procedure because of assumptions of how the patient would respond, accounted for 13.8% of the reasons. The largest reason, accounting for 40.4% of the responses, was that Asians are healthier overall. Physicians specifically cited lower genetic risk, better diet, less substance use, and less obesity. A small number of responses (4.4%) denied that this disparity existed, or stated that it is not a problem in their hospital/practice. 8.6% of responses indicated they were unsure why this was happening, 3.1% gave a response that did not fit with any code, and 3.9% of physicians did not give any response.

Association Between Given Reasons for Cancer Screening Disparities and Behavior. Exploratory binary logistic regressions (see Table 13) found that among physicians who saw the Asian American vignette, citing cancer screening disparity reasons associated with an Asian American health advantage such as less overall risk for cancer, less obesity, or a better diet, was associated with nearly twice the odds of making a screening recommendation ($OR = 1.92$, $p < .05$). Citing patient or physician factors did not significantly predict to their own screening decisions. Among physicians who saw the White American vignette, none of the explanatory categories was associated with their own screening behavior.

Table 14 shows the association between reasons given and implicit and explicit bias scores. In terms of model health bias, none of the explanations predicted implicit attitudes, but explaining the screening difference by citing Asian health advantages was significantly associated with increased explicit bias scores ($p < .01$). For every additional reason, the explicit bias score increased by .26, indicating a stronger belief in an Asian health advantage. Attributing screening differences to patient factors (e.g. Asians

underutilize preventative care, have low English proficiency) was significantly associated with Asian-foreign implicit bias scores ($p < .05$) such that every additional patient reason given was associated with a .08 decrease in *D* score, or a weaker association of Asians with foreign. No explanatory category was associated with explicit Asian-foreign bias.

CHAPTER IV

DISCUSSION

The current study focuses on physician colorectal cancer screening behaviors toward White American and Asian American patients. My primary objective was to determine if the implicit or explicit endorsement of two common stereotypes about Asian Americans was significantly associated with recommendation behavior, and if this effect was further moderated by the physician characteristics of race and gender.

To this end, clinical vignettes were created asking physicians to make clinical recommendation for a 51-year-old White American or Asian American female who was presenting for a wellness check, and had no contact with a medical professional in the prior three years. The vignette was successful in obtaining screening rates similar to national screening rates. I included the Asian IAT, an established measure of the differences in association strength of Asian and White faces with the concepts 'American' or 'foreign'. I also developed a Health IAT to examine beliefs about relative health advantages in Asian Americans. To the best of my knowledge, this is the first study to measure implicit and explicit physician-held beliefs about Asian health and use that as a predictor of recommending preventative cancer screening.

Physicians demonstrated both implicitly and explicitly held attitudes that Asian Americans are perpetual foreigners. Physicians also reported explicit beliefs that Asian Americans have health advantages relative to other races. Implicitly, their attitudes indicated that White Americans are a healthier group. Physician race and gender moderated reported levels of bias, but bias did not predict screening behavior. I found no differences in the rate of screening recommendation based on patient race. Although I

was not able to detect a bias that influenced screening decisions, the results may be a byproduct of the final sample that is potentially less biased than most practicing physicians.

Hypothesis Testing

Perpetual Foreigner. I had hypothesized that I would able to document physician endorsement of Asian Americans as perpetual foreigners. This hypothesis was supported, as there was evidence of both implicit and explicit endorsement of the perpetual foreigner stereotype. Although all ethnic minority groups (Asian American, African American, Native Americans) implicitly ascribed to the belief that Asians were more foreign than Whites were, this effect was the strongest among White American physicians, particularly men.

Although there were race and gender effects in the endorsement of bias, perpetual foreigner implicit bias was not significantly associated with treatment recommendations. Other studies have found that implicit beliefs about race affect medical care (Green et al., 2007; Sabin, & Greenwald, 2012; Weisse, Sorum, Sanders, & Syat, 2001). However, these studies have all used African American patients as the comparison group, and implicit bias measured the concept of good vs. bad rather than American vs. foreign. It may be that bias about who is 'good' is proximally associated with who deserves optimal care, which directly influences treatment behaviors. The bias that someone is foreign or American may be too distal to treatment decisions. The standard Asian IAT only measures the foreign versus American construct. Future work should examine whether a good vs. bad bias exists for Asian Americans as it does for African Americans, and if this bias is large enough to explain differences in care. Given model minority stereotypes

about Asian Americans, it is likely that there is not a strong good/bad bias in this population. Taken together with results about bias and qualitative data from physicians, additional explanatory possibilities are the degree to which physicians believe it is the patient's responsibility to be informed of guidelines and to advocate for their care, as well as beliefs about the compliance or non-compliance of Asian American patients and their willingness to use Western medicine.

Physicians also explicitly rated Asian Americans as more foreign than White Americans, which was also not associated with treatment recommendations. It is notable that all ethnic minority groups, including Native Americans are considered less American than White Americans, and Asian Americans are considered significantly less American than other ethnic minority group. When looking at explicit responses by physician race, there was an unexpected finding that Asian American physicians endorsed the largest difference between Asian Americans and White Americans.

As with implicit bias, it is not clear if the explicit American/foreign dichotomy is associated with the good/bad bias that has predicted differential treatment behaviors. Rating oneself as less American than others, as Asian American physicians did, could also be a product of internalized racism. Internalized racism is the acceptance and internalization of "mainstream racist values and rationales, often without a conscious awareness of doing so... justifying the oppression of their group with a belief in their own inferiority" (Pyke & Dang, 2003). Although the majority of literature on internalized racism examines the phenomena in African American populations, Pyke and Dang (2003) found evidence of internalized racism during interviews with 184 grown children of Korean and Vietnamese immigrants. More acculturated individuals used the phrase

"FOB" (fresh off the boat) both to denigrate other co-ethnics who were deemed "too ethnic", and to distinguish and distance themselves from these individuals in order to avoid being assumed to be a FOB themselves. Pyke and Dang (2003) concluded that the shame and embarrassment of this identity indicates an internalization of the racial and anti-immigrant biases of mainstream America. Although, on an individual level, this behavior is an adaptive response to societal racism, it is problematic because as a whole, it perpetuates racial stereotypes and the belief that less acculturated Asian Americans are inferior to acculturated White Americans. Internalized racism was not assessed in this study, but might be informative in future research.

Model Health. The hypothesis that there would be an Asian American model health stereotype was partially supported. When measured explicitly by computing difference scores in overall health, physicians rated Asian Americans as healthier than White Americans. All other ethnic minority groups were rated as less healthy than White Americans. The estimated prevalence rates of smoking, unhealthy alcohol use, and obesity was also lower for Asian Americans than all other ethnic groups. Interestingly, the association between these individual risk factors and overall health ratings differ based on the rater's ethnicity. White American physicians' estimation of Asian American prevalence rates of obesity and alcohol use were significantly negatively correlated with their ratings of overall Asian American health; however, none of the specific risk factors was correlated with overall ratings of White American health. Among ethnic minority physicians, all three risk factors were negative correlated with overall White American health, but only obesity was correlated with overall Asian American health. This pattern suggests that information may be used differently when reaching decision about one's in-

group versus an out-group. These results also suggest that although Asian Americans are explicitly rated as healthier and there is evidence for a model health stereotype, beliefs about these three risk factors do not directly contribute to beliefs about that stereotype, particularly among non-White physicians. Future research needs to determine which beliefs are directly contributing to the broader stereotype. I speculate, based on qualitative data, that perception about difference in diet and genetics may be promising avenues to explore.

The hypothesis that there would be evidence of implicit attitudes of Asian Americans as a model health minority was not supported. Physicians were more easily able to pair health words with White surnames and risky health behaviors with Asian surnames than the other way around. White American physicians showed significantly more White-health bias than Asian American or other minority physicians. This effect is both opposite of what was hypothesized and counter to what explicit bias findings suggested. As discussed earlier, variables in addition to beliefs about the specific risk factors considered in this study, influence beliefs about overall health. For instance, despite explicitly rating White Americans are more likely to smoke, use alcohol, and be obese, it was easier to pair the non-white names with these behaviors on an implicit measure of these same constructs. I speculate that there may be an implicit 'White = good' halo bias that is effecting implicit ratings of white health. Words meant to represent health or risky behavior began operating as markers for good and bad attributes and it was easier to pair White names with good attributes. Without the current existence of research looking at the good/bad bias between Asians and Whites, it is difficult to support or reject this assertion. Removing the good/bad valence of categorization in

IATs can also help with this problem. For instance, instead of having physicians characterize Asians and Whites as healthy and unhealthy, which carries the broader connotations of good and bad, physicians could be asked to characterize individuals based on health and another positive attribute that is not associated with either racial group, such as 'curious', or 'happy' (B. A. Nosek, personal communication, April 15, 2016).

Miller, Taylor and Buck's (1991) extension of norm theory (Kahneman & Miller, 1986) may also help to explain this finding. Miller and colleagues (1991) suggest that when people are trying to understand the differences between two groups like men and women, they implicitly set one group as the norm or referent group (men), while the other group (women) is the subject of comparison, and the "effect to be explained." Differences between the two groups are seen as deviances or even deficiencies in the comparison group and are often explained with stereotypes (Hegarty & Pratto, 2001). Cultural beliefs about what is considered 'normal' or prototypical is often reflective of privileged identities and dictates which group is set as the referent group, to whom all others are compared. Serving as the reference is group is a non-trivial matter, as the reference group is implicitly ascribed more power and status than non-normative comparison groups (Bruckmüller & Abele, 2010). In our culture, White is seen as the racial norm (Devos & Banaji, 2005), and it follows that White behavior and White attributes, such as levels of health, become the normative level to which other ethnic groups are compared.

Explicit versus implicit bias. My hypothesis that implicit bias effect sizes would be larger than explicit bias effect sizes was supported. This is consistent with the

literature that suggests that levels of conscious and unconscious bias as related but separate constructs (Nosek et al., 2005). This also suggests that physicians in the sample self-reported smaller levels of bias than what was internally ascribed. Self-reported biases can also be different from internally held beliefs, as with health stereotypes in this study. It remains important to consider both forms of biases in health care research.

Association of Bias with Race and Gender. I had hypothesized that gender and race would moderate the amount of stereotype endorsed with women showing less implicit bias than men, and White American physicians showing a preference for White patients. Across both stereotypes, I found evidence that there were larger levels of pro-white bias among White American physicians, which is consistent with previous literature (e.g., Sabin et al., 2009). Contrary to my hypotheses and previous studies, female physicians showed higher levels of bias than their male counterparts did, although there were significant gender and race interactions. Higher levels of bias were found in non-White American female physicians, but not White American female physicians. Higher level of implicit bias among female physicians was not associated with older age or less exposure to Asian clients, both of which were independently associated with high levels of bias in the overall sample. It is unclear why female physicians in this study had higher levels of bias than their male counterparts did. One possible explanation could again be internalized racism and acceptance of stereotypes, which is expressed with higher bias scores.

Patient Race and Screening. Based on published data (CHIS, 2005), I expected that given identical vignettes, physicians would recommend colorectal cancer screening for Asian American patients at a lower rate than for White American patients. This

hypothesis was not supported. Physicians recommended all forms of colorectal cancer screening at equivalent rates across conditions. I also expected strength of bias to mediate screening rates with physician race and gender moderating the mediation effect. This hypothesis was not supported. Strength of implicit or explicit bias was not associated with screening recommendations. No personal or professional characteristics were associated with screening practices. There were also no racial differences in the overall number of recommendations made, or whether the recommendation was preventative or symptom focused.

This is not the first study to find that implicit attitudes do not predict physician behavior. In an online vignette study of pediatricians, implicit attitudes were not associated with differential treatment recommendations for urinary tract infection, ADHD, or asthma in African American or White American children (Sabin & Greenwald, 2012). Study authors suggest that stereotypes may not influence care for many chronic and acute pediatric conditions. They also found that physicians reported "warm feelings" for patients of both races. In the medical field, warmth predicts receiving the most appropriate and effective treatment (Dovidio & Fiske, 2012). Sabin and colleagues (2015) found that despite strong implicit bias about weight, physicians showed no difference in treatment and referral behaviors in treating childhood overweight. They suggest that physicians who treat children may be less likely to develop strongly negative attitudes about race, perhaps due to specific family-centered training. I did not ask physicians in this study the average age of their clients, so it is unclear if similar mechanisms are operating.

The absence of screening differences based on patient race is a positive outcome, particularly if it reflects a shift in actual medical practice. In the eleven years since the CHIS data was collected, there has been a concerted effort toward patient centered care and cultural competence. Cultural competency in particular has specifically tried to address and reduce race-based health disparities identified in the 2002 IOM report (Smedley et al., 2002).

Patient centered care and cultural competence complement each other in many ways. Patient centered care emphasizes respect for patient values and preferences with the goal of increasing overall quality of care (Saha, Beach, & Cooper, 2008). Although ideas about patient centered care were first proposed in the 1960s, a 2001 report of the Institute of Medicine listed patient centered care as one of six goals of a 21st century health care system. This ushered patient-centered care into the forefront of clinical practice and medical education (Millenson, Shapiro, Greenhouse, & DiGioia, 2016).

As support for patient centered grew, cultural competence was concomitantly gaining strength. Standards for cultural competence in medical care were established by the American Medical Association in 1999 (American Medical Association [AMA], 1999), by the Office of Minority Health in 2001 (Office of Minority Health [OMH], 2001), and incorporated into medical school curriculum in 2000 (Association of Medical Colleges [AMC], 2005). Cultural competency strives to improve equity and reduce disparities (Saha et al., 2008). Physicians are encouraged to become familiar with specific cultural groups and relevant health disparities as well as examine their own cultural influences and biases. Similar to patient centered medicine, cultural competence encourage physicians to treat each patient as a unique person and consider patient beliefs,

values, and preferences, including beliefs about the origins and treatment of disease (Saha et al., 2008). It is plausible that the increased focus on quality and equity has significantly reduced colorectal cancer screening disparities. Future epidemiological research should address whether the lack of race-based screening disparities found in the current finding is replicating in real-world medical settings.

Exploratory Findings

Although there is evidence of Asian American-foreigner bias in the lay population (see Lane et al., 2007), I was unsure if this bias would exist in physician samples. I was also not aware of any studies that had examined an Asian American model health bias in a physician sample. Because of this, I had no hypotheses about the possible association between these two variables. In this study, I found evidence that these two types of implicit bias were negatively correlated. This suggests two possible interpretations. The most straightforward is that stronger beliefs that Asian Americans are foreign are associated with stronger beliefs that Asian Americans are unhealthy (or, because IATs cannot be separated into two separate measures of association strength, stronger beliefs that White Americans are American are associated with stronger beliefs that White Americans are healthy). This Asian-unhealthy-foreigner association harkens back to older and longer standing stereotypes of the Asians as "the yellow peril". First used to describe the threat of Genghis Khan and a Mongolian invasion of Europe, the idea was resurrected in the late 19th and early 20th century in response to fears of an influx of Asian immigrants to the United States and the perceived threat that posed to American (White) culture, the American economy (Kawai, 2005). As the "yellow peril", Asian immigrants were characterized, in part, as "filthy" and "pollutants" (Yoo et al., 2010). So

great was this fear that it contributed to the passing of discriminatory legislation such as the Chinese Exclusion Act of 1882 and Executive Order 9066 authorizing the internment of American citizens of Japanese descent during World War II (Kawai, 2005). Although contemporary characterization of Asian Americans is of the positive-sounding model minority, "yellow peril" beliefs are deeply woven into our country's not-so-distant history, and may still be reflected in measures of implicit bias. This interpretation is also consistent with finding that older age was correlated with stronger beliefs that Asian Americans were foreign and weaker beliefs that Asian Americans are a model health group. A second possible interpretation is that the bias is not Asian-specific, but another example of norm theory and the 'White = good' halo effect. It is possible that regardless of race, foreigners, who embody the idea of, "others", would be thought of as less healthy than a prototypical American would.

Another significant correlation suggested that increased exposure to Asian Americans, operationalized as a function of the percentage of the physician's practice that was comprised of Asian American clients, decreases levels of Asian American-foreign bias. This finding is consistent with intergroup contact theory, which suggests that increased contact between groups typically reduces intergroup prejudice (Pettigrew & Tropp, 2006). Conflictingly, increased exposure to Asian Americans was also associated with increased endorsement of explicit Asian model health biases. In this case, because Asian Americans do have lower prevalence rates of cancer and many of the risk factors associated with cancer, an increase in exposure to these clients may activate the availability heuristic and lead an over-generalization of good health.

The qualitative open-ended response question yielded three major response categories, (1) patient-driven factors; (2) physician-driven factors; and (3) beliefs about an Asian health advantage. These three categories accounted for roughly 80% of all responses. In general, there was not a significant association between the types of beliefs physicians attributed to the disparity and their own screening behavior in the vignette portion of the study. The one significant finding, that citing health advantage beliefs was associated with increased screening recommendation behaviors is somewhat counterintuitive. It could be that in order to prioritize limited colorectal cancer screening resources and reduce unnecessary risk and discomfort to patient, physicians are more likely to recommend preventative cancer screenings, which confers immediate risks (e.g. perforation) but delayed benefits (reduced cancer mortality), to healthier individuals with longer life expectancies (Braithwaite, Fiellin, & Justice, 2009).

The open-ended responses also suggest other biases to pursue in future research. Approximately a quarter of the responses blamed patient factors for lower rates of physician screening toward Asian American patients. Future studies should consider which characteristics make "good" or "bad" patients (e.g. compliant versus non-compliant with medical suggestions), and if beliefs about whether a patient is good or bad impacts the quality of care and efforts to provide preventative medicine, rather than just responding to symptoms.

There also additional biases about health that can be explored. In this study, better health was represented by lower levels of behaviors that are known risk factors for colorectal cancer, such as smoking and obesity. Although the open-ended responses also highlighted the presence of beliefs about an Asian health advantage, the majority of

responses cited naturally occurring lower levels of risk more often than all health behaviors combined (see Table 12). Sometimes this lower level of risk was attributed directly to better genetics. Naturally having lower risk or better genetics are passive qualities. An individual is born with them and they do not have to do anything to earn those benefits, compared to those who make conscious decisions about eating right and exercising regularly, which takes effort and dedication. Future research should consider the differences between earned and unearned health advantages, and if physicians' biases distinguish between the two. Just as the model minority stereotype can lead to feelings of resentment which can lead to harm (see the murder of Vincent Chin), it is possible that if Asian Americans are perceived as having unearned health advantages, this bias can lead to unconscious resentment. This unconscious resentment can manifest in a number of ways that can be linked to the race-related health disparities discussed earlier such as lower referral rates to specialists, or non-treatment for ambiguous symptoms.

Both explicit model health bias and implicit perpetual foreigner bias were associated with the reasons that physicians gave to explain the disparity. Citing more examples of an Asian health advantage was correlated with personally having high explicit model health bias scores. It could be that when asked to rationalize a finding, people give answers that also reflect their personal beliefs. In future research, asking people to self-report in this non-defensive way (i.e., assessing the behavior of other physicians) may be an alternate strategy to access an individual's biases. However, this association was not present for explicit measures of Asian-foreign bias. Citing patient reasons for the disparity was actually correlated with lower levels of Asian-foreign implicit bas. All post hoc exploratory results should be interpreted cautiously and as

avenues to guide future research, rather than as empirically supported findings driven by hypothesis testing.

Limitations and Future Directions

Representativeness of sample. This study was a convenience of sample of physicians, a group for whom time is at a premium. Although the demographic profile of this sample closely matched the demographics of the American Medical Association, Asian American physicians were slightly over represented. Selection bias may have influenced these results, as the busiest physicians may not have participated. Additionally, 63% and 65% of participants in the Asian and White conditions, respectively, discontinued the study at some point between randomization and completion leading to an overall completion rate of 23% based on initial traffic to the survey or 35% based on eligible participants. This could represent an individual starting the study, closing the browser, and then completing the study at a future day. It could also represent an individual who began the experiment and decided partway thought that they were not interested in completing it. With the data available, it is not possible to differentiate between the two types of non-complete. The low response rate, coupled with the slight overrepresentation of Asian American physicians relative to national demographics, might suggest that those who took the time to complete the study may have been more interested in cultural competency and health disparities and less prone to show racial biases than physicians less interested in these issues. Additionally, the average level of experience of physicians in this sample was 18 years and ranged from 3 to 45 years. The sample was quite experienced and may be more sophisticated in practice or well trained in bias reduction than relatively inexperienced physicians. There is a

strong possibility that the sample was biased and does not represent a general population of primary care physicians. The overall study can be seen as exploratory study, which established the existence of physician-held biases reflecting two common stereotypes about Asian Americans. Future research should focus on obtaining a more representative sample.

Obtaining adequate physician participation is research challenging, even under optimal circumstances. The National Survey of Primary Care Physician's Recommendation and Practices for Breast, Cervical, Colorectal, and Lung Cancer Screening, which was led by the National Cancer Institute and co-sponsored by the Agency for Healthcare Research and Quality and the CDC, only obtained a 69% response rate. A significant amount of money, time, and staffing went into getting this rate. This included the use of a cover letter from the National Cancer Institute requesting participation, letters of support the targeted physician's specialty association (e.g. The American Society of General Internal Medicine), a $50 honorarium check, and multiple follow up mailings and phone calls to the physician's place of employment over the span of seven months (National Cancer Institute [NCI], 2006). The current study was the first step in indentifying theory-based mechanisms that perpetuate disparities. Small-scale studies based on convenience samples of physicians are a reasonable compromise for early stages of research in order balance testing hypotheses in the appropriate population with the time burden of research participation for busy physicians. Once there is promising evidence for specific mechanisms in small-scale studies, samples that are more representative can be obtained beginning with partnerships with hospitals or targeted

recruitment at medical conferences and progressing, when appropriate, to national mailings on the scale of The National Survey of Primary Care Physicians.

Power. An initial power analysis suggested that a sample of $n = 278$ was required to detect a medium sized odds ratio with covariates. I was able to recruit $n = 254$ physicians into the study. Of these 254, additional physicians were excluded from the main analyses based on being in the White-American patient experimental condition, not passing the manipulation check, or not meeting quality assurance standards for IAT scores. As a result, the final analysis of 144 participants was underpowered which limited my ability to detect effects. As suggested above, future research should consider alternate recruiting methods in order to obtain a more representative sample, limit attrition, and raise sample size for a fully-powered study.

Heterogeneity of Asian Americans. Asian Americans are a diverse racial group comprised of multiple ethnic groups that vary widely in respect to length of time in the United States, socioeconomic status, and health risks (McCracken et al., 2007). In this study, an Asian American patient was represented by a picture of an East Asian woman. When cancer screening rates are looked at by Asian ethnic group, different patterns of vulnerability emerge. In an aggregated CHIS dataset from 2001, 2003, and 2005, Asian Americans as a whole were are screened about 10% less frequently than White Americans. When looking at individual ethnic groups and controlling for demographic factors and access to care, only Filipino, Koreans, and South Asians showed a statistically lower likelihood of obtaining colorectal cancer screening compared to White Americans (Lee, Lundquist, Ju, Luo, & Townsend, 2011). Koreans had the lowest screening rates (33%) and Japanese had the highest (60%). Review of over 800,000 electronic health

records in Northern California between 2012-2013 found a that Asian Indians had the lowest screening rate (46%) followed by Native Hawaiians (54%) and Filipinos (59%). Japanese again had the highest screening rates (68%) (Thompson et al, 2014). I speculate that the overall increase in screening is associated with the identification of increasing colorectal cancer screening rates as an objective of Healthy People 2020, which began in 2010, and the subsequent introduction of screening interventions and attention to screening. Despite the positive change, differences between ethnic groups remain with a general trend of poorer outcomes for non-East Asian individuals (except Korean Americans).

Cancer incidence and mortality rates also vary by ethnic group. McCracken and colleagues (2007) reviewed findings from the 2003 California Health Interview Survey and reported statistics for the five largest Asian American ethnic groups. They found that colorectal cancer incidence and mortality is highest among Japanese American males followed by Korean American males. Among women, Japanese American women, then Chinese American women have the highest incidence and mortality rates. Across multiple types of cancer, Vietnamese American men and Japanese American women have the highest incidence rate, while Korean American men and Japanese American women have the highest mortality rate. Other cancers (e.g. breast, lung, stomach), also show variability by ethnic group in terms of risk and mortality. Very few epidemiological studies report statistics at this level. Future research should sample and report data at as disaggregated a level as possible, and at minimum, clearly state the limits to generalizability of the findings. Future research on physician bias should

examine if physicians make distinctions between Asian ethnic groups, and if so, which specific biases are associated with each group.

Nativity status and variables associated with acculturation also influence rates of cancer screening. Naturalized citizens are about 10% less likely to complete colorectal cancer screening than US-born citizens are, and non-citizens are about 30% less likely to complete (Shahidi, Homayoon, & Cheung, 2013). Low health literacy and low English proficiency, which disproportionately affect immigrants and refugees, are also known correlates with lower cancer screening rates (Sentell, Tsoh, Davis, Davis, & Braun, 2015).

Clinical Applications and Recommendations

Although race-based cancer screening disparities were not found in this study, only 60% of physicians recommended some form of colorectal cancer screening to a 51-year-old woman who had not seen a medical professional in the past three years and was presenting for a wellness exam. Based on USPSTF guidelines, this is precisely the type of patient who should be screened. National rates of colorectal cancer screening are similar to the recommendation rate found in this study. 58% of Americans ages 50-75 have undergone colorectal cancer screening within the recommended time interval (Shapiro, Klabunde, Thompson, Nadel, Seeff, & White, 2012).

Interventions to Increase Screening. Physician referral remains an important predictor in colonoscopy completion. The most common reason for nonuse of colorectal cancer screening is "never thought about it," (Shapiro et al., 2012) which can directly be addressed with physician recommendation. In addition to making the recommendation, patient follow through can be increased if physicians spend adequate time with their

patients and explain the rationale for the resting in a way that is clearly understood by the patient (Carcaise-Edinboro & Bradley, 2008), which is consistent with a patient-centered care approach. This can be particularly challenging with clients with limited English proficiency, in which case the use of translator is recommended, as suggested by cultural competency principles.

Qualitative data from this study suggests that some physicians believe that recommendation rates are lower for Asian American patients because patients do not advocate for themselves and request screening. The AMA publishes a list of suggested patient responsibilities including, "patients have a responsibility to request information or clarification about their health status or treatment when they do not fully understand what has been described" (AMA, 2016). However, the patient responsibility is to request or clarify is in response to an initial recommendation, for which with responsibility lies with the medical professional.

Despite the responsibility lying with the physician, intervening on patient factors such as efforts to increase health literacy, or organizational factors, such as increasing the number of bilingual staff, is possible and can be helpful. A randomized controlled study in a New York City primary care clinic found that it was possible to increase patient self-advocacy by providing patients with a pre-visit education handout that prompts patients to discuss colonoscopies with their physicians. When these low-cost handouts were provided and patients initiated a discussion with their physician, physician referral increased from 52.0% to 88.9% (Sriphanlop, Hennelly, Sperling, Villagra & Janford, 2016). The adoption of electronic medical records also provides another avenue to increase cancer screening. Incorporating patient and provider reminders for age-

dependent screening into the health record increased colorectal cancer screening among Alaska Native populations (Joseph, Redwood, Degroff, & Butler, 2016). A 2011 review identified 30 interventions designed to increase cancer screening specifically in the Asian American population. The majority of these interventions targeted breast and cervical cancer screening. The use of ethnic-congruent lay health workers; the provision of logistic assistance; bilingual, bicultural health educators; translated educational material; and culturally targeted delivery channels (language-specific television stations, churches, Asian grocery stores) all were successful in increasing screening rates (Hou, Sealy, & Kabiru, 2011).

Misconceptions. This study highlights a number of physicians-held beliefs about Asian American health and cancer risk factors that may be inaccurate. Although these beliefs were not associated with differences in cancer screening in this study, they may suggest areas of need for physician education. Qualitative data suggests one reason for lower rates of physician recommended screening is lower levels of obesity among Asian Americans relative to White Americans. Although obesity is a risk factor for colorectal cancer, a meta-analysis of 23 studies comprised of primarily White American participants, found that BMI was not associated with colorectal cancer screening. Obese White American men and women were screened as similar or lower rates than individuals within the normal BMI range (Marthur, Bolen, Gudzune, Brancati & Clark, 2012). Although there were not a large number of Asian Americans in this study, these findings challenge the idea that a normal BMI is associated with lower rates of screening due to decreased risk. Multiple physicians also suggested that screening rates are lower among Asian Americans because physicians are not knowledgeable about ethnic-specific

screening guidelines saying things like, "we are not familiarized with the appropriate screening recommendations for Asian Americans," or "not being confident on recommendations applying across all ethnicities." In fact, even thought there are ethnic differences in rates of colorectal cancer, the USPSTF states that recommendations apply to all races equally. The fact that some physicians believe that there are different guidelines for different ethnic groups indicates an area for additional education. Another belief that some physicians endorsed is that their Asian American clients do not follow through with recommendations. Missed colonoscopy appointments are problematic because they a waste resources and cause delays in diagnoses (Partin et al., 2016). One way to reduce missed appointments is not to make them with clients who are not likely to follow through. In a study of nearly 28,000 Veteran's Administration patients, Partin and colleagues (2016) did not find any difference between Asian American and White American patients in terms of canceling or skipping scheduled colonoscopies. There are obviously limitations to the applicability of that finding. VA settings are unique in that they reduce disparities associated with access to care and insurance status. Individuals who go through an American military training program are also likely to be more acculturated and have fewer language barriers than recent immigrants. However, what this study may tell us, are which factors, when addressed, leads to the reduction of utilization disparities.

Conclusion

In conclusion, this exploratory study demonstrated strong perpetual foreigner bias involving Asians and weaker model health bias involving Asians exist among a sample of physicians. Levels of bias are moderated by race and gender. I did not find evidence of a

race-based screening disparity in this study, however, the results may be a byproduct of a final sample that was potentially less biased that most practicing physicians. Future research should focus on replication in a more representative sample. Additionally, overall screening recommendation rates were only 60%, mirroring actual screening rates, but far below national guidelines. Considering the increased attention to patient centered care, cultural competence, and cancer screening as part of Healthy People 2020, future epidemiological research should address whether there are still race based cancer screening disparities both in terms of completion, and physician recommendation. If disparities still exist, explanatory mechanisms should be identified. Findings from this study suggest that beliefs about lower risk due to diet and genetics, and low likelihood of patient compliance may be promising avenues to pursue. In addition, the applicability of the Race IAT, which considers the attributes of good/bad instead of foreign/American, to Asian Americans should be established.

Colorectal cancer is the second leading cause of cancer death in the United States. In 2015, an estimated 133,000 individuals were diagnosed and 50,000 died. There is a high certainty that early detection through colorectal cancer screening beginning at age 50 will reduce mortality. As the demographics of the United States both ages and becomes more racially diverse, identifying mechanisms and implementing interventions with the ability to increase rates of colorectal cancer screening and lower instances of racial disparities should remain a priority.

Appendix A:

Experimental Vignette

Patient 3: 51-year-old Asian/White female.

Family/Social History: Family history of diabetes. Patient is married, two children, ages 24 and 22. Employed. Does not drink, does not smoke.

Primary Purpose for Visit: Annual check-up

Medical History: Occasional heartburn for 3 years. Back pain while lifting a 45-lb suitcase, but resolved within six weeks. Postpartum tubal ligation in 1993. Patient is not concerned with any medical problems at this time, and requested a check-up because she has not seen a medical professional in the past 3 years.

Medication: No medications at present. No known allergies.

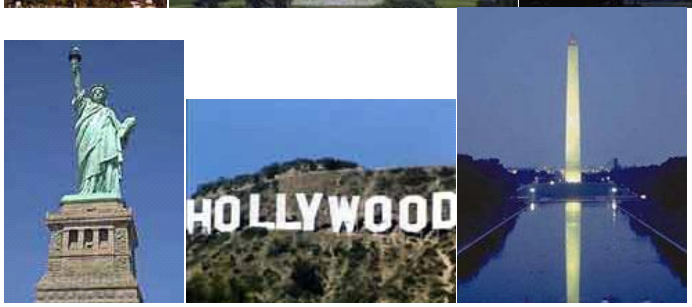
Vital Signs: Temperature 37.0; pulse 66; blood pressure 110/70.

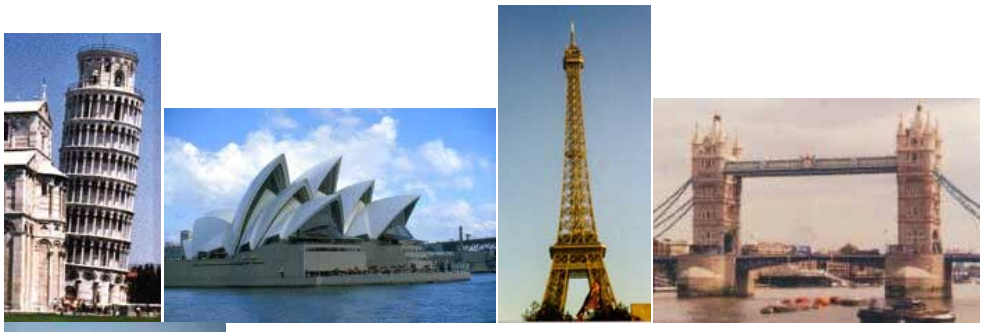
Appendix B:

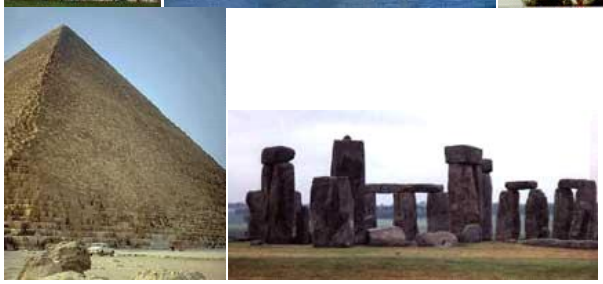
Asian Attitudes Implicit Association Task

Asian/White Stimuli

American/Foreign Stimuli







Explicit Questions

1) In your mind, how American are people who belong to the following groups? That is, how strongly are they identified with American and all things American?

   (All groups have the response options: Absolutely American; Strongly American; Fairly American; Moderately American; Slightly American; Barely American; Not at all American)

   White Americans
   Asian Americans
   African Americans
   Native Americans

2) Some people say that there are certain qualities that make a person a true American. Please rate your agreement or disagreement with each statement. To be a true American it is important to:

   (All qualities have the response options: Strongly Agree; Moderately Agree; Slightly Agree; Neutral; Slightly Disagree; Moderately Disagree; Strongly Disagree)

   a. Defend America when it is criticized
   b. Be a Christian
   c. Be able to speak English
   d. Feel American
   e. Respect America's political institutions and laws
   f. Vote in elections
   g. Have been born in America
   h. Have American citizenship
   i. Be patriotic
   j. Believe in God

Appendix C:

Health Attitudes Implicit Association Task

Asian/White Implicit Stimuli

Asian: Zhang, Huang, Choi, Nguyen

White: Wood, Sullivan, Miller, Peterson

Healthy/Unhealthy Implicit Stimuli

Healthy: well, hearty, fit, healthy

Unhealthy: obese, alcoholic, smoker, unhealthy

Explicit Stimuli

1) How healthy, on average, are people who belong to the following groups?
   (All groups have the response options: Completely Healthy; Very Healthy; Fairly Healthy; Moderately Healthy; Slightly Healthy; Barely Healthy; Not at all Healthy)

   White Americans
   Asian Americans
   African Americans
   Native Americans

2) On average what is the prevalence rate of obesity among:
   White Americans
   Asian Americans
   African Americans
   Native Americans

3) On average what is the prevalence rate of smoking among:
   White Americans
   Asian Americans
   African Americans
   Native Americans

4) On average what is the prevalence rate of unhealthy levels of alcohol consumption among:
   White Americans
   Asian Americans
   African Americans
   Native Americans

Appendix D:

RACE Scale (Bonham, Sellers, & Woolford, 2014)

1) I consider information from patients about their racial background.
2) I consider my patients race to better understand their genetic predispositions
3) I consider my patients race when making decisions about which medications to prescribe.
4) I consider my patients race in determining genetic risk for common, complex diseases (e.g. kidney disease or diabetes).
5) I consider my patients race in making medication dosage decisions.
6) I consider my patients race when determining age of initiation of screening for certain diseases.
7) I consider my patients race in determining how aggressively to treat particular diseases.

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FIGURES

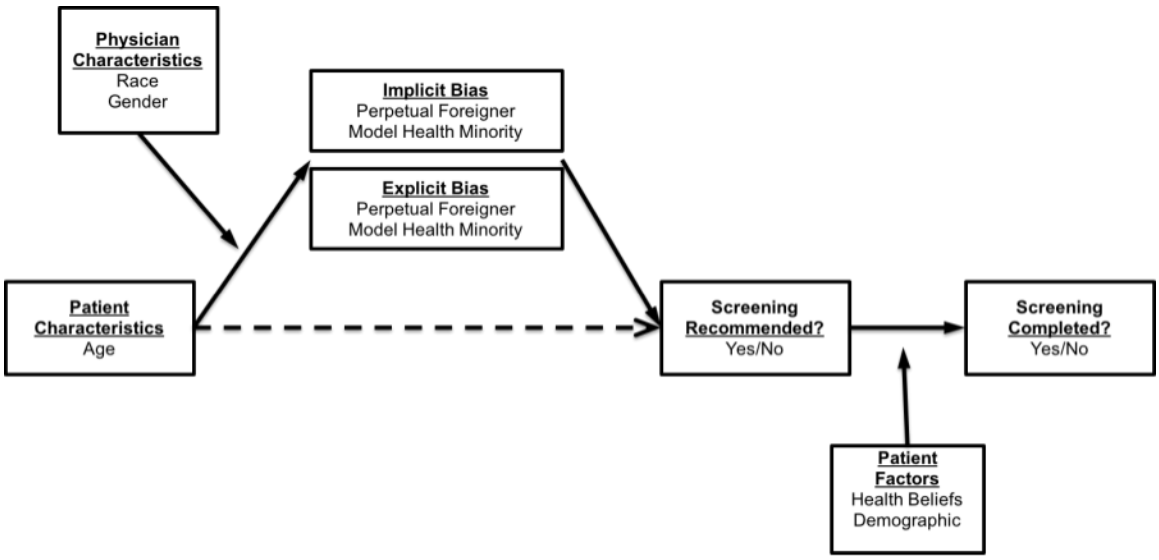

Figure 1. A conceptual model of cancer screening.

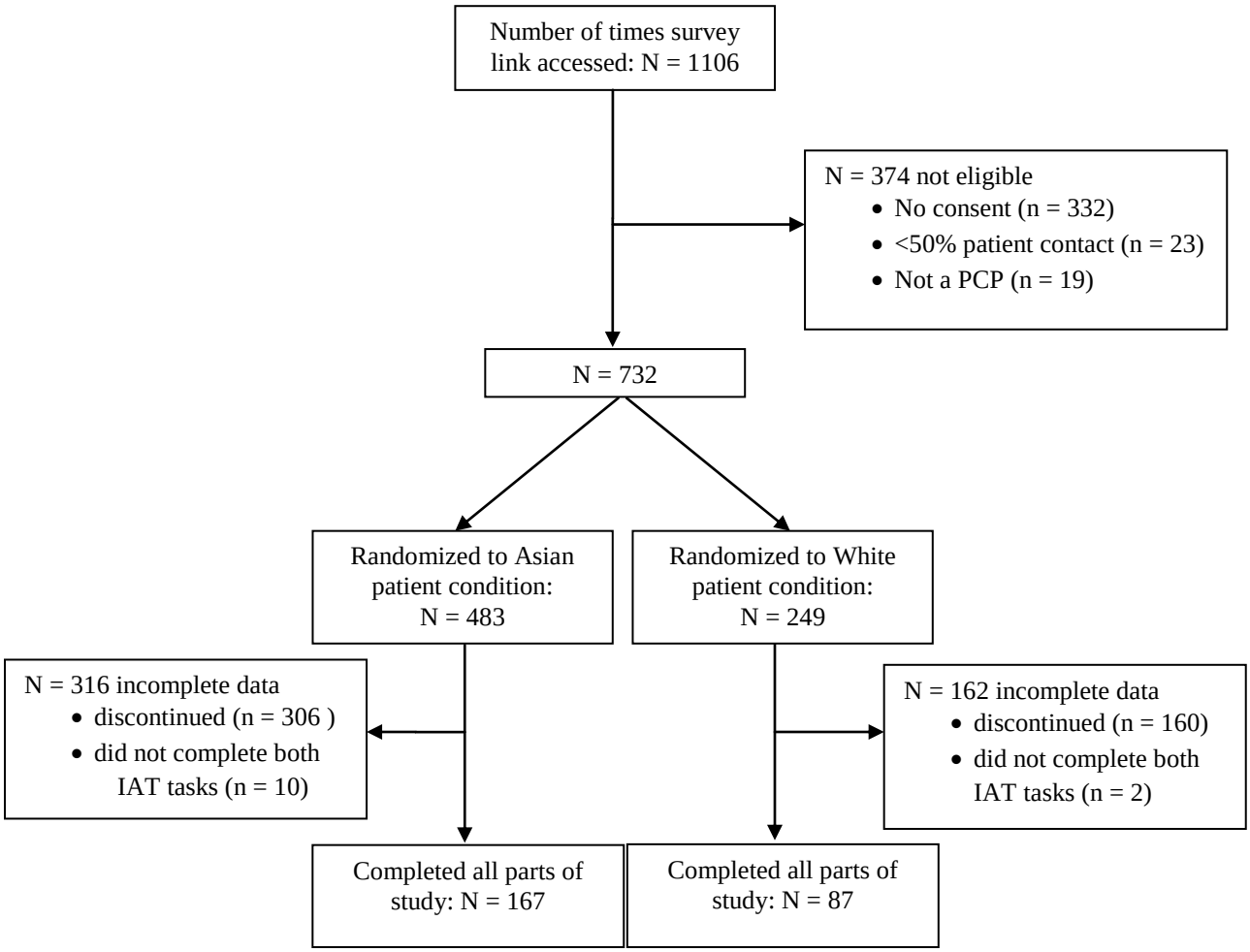

Figure 2. Flow chart of study enrollment

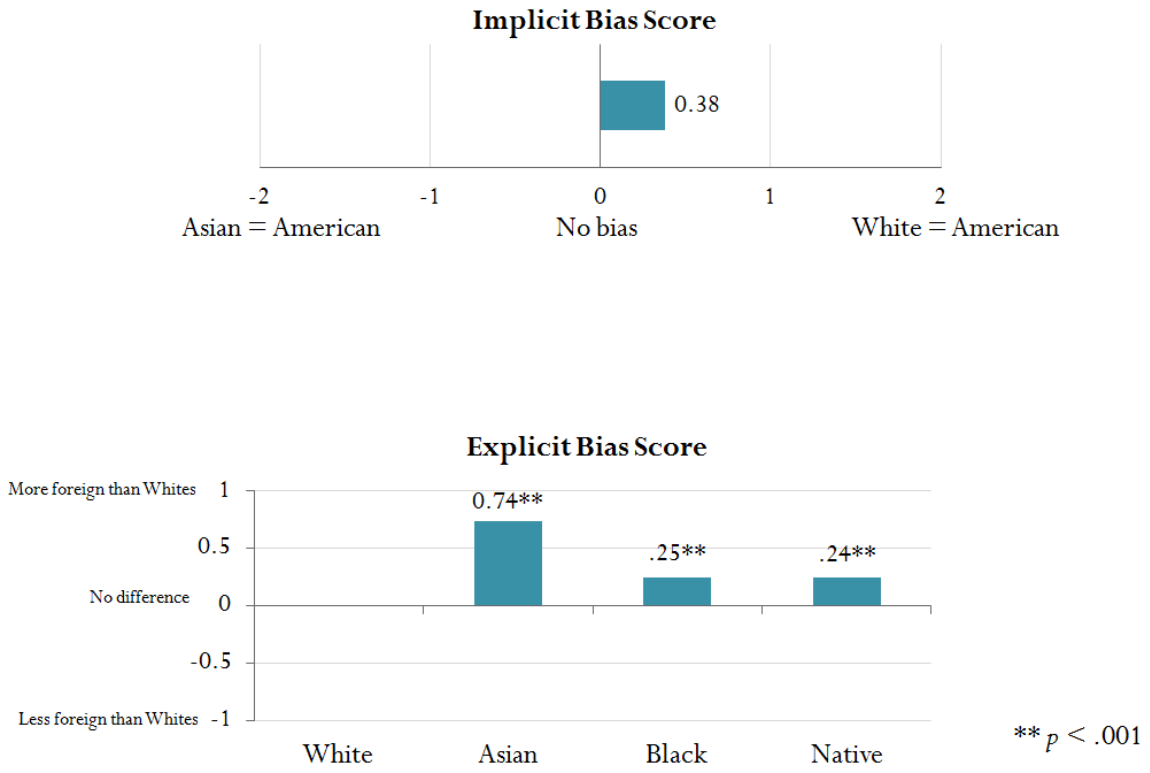

Figure 3. Implicit and explicit biases reflecting the perpetual foreigner stereotype

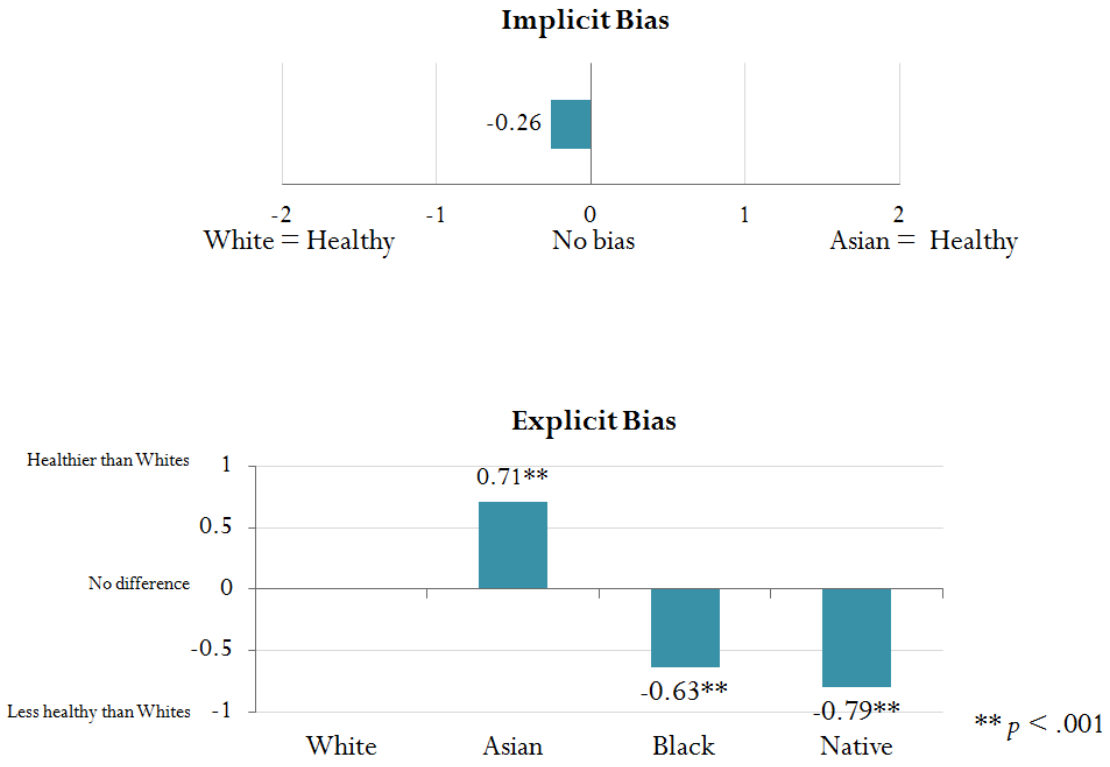

Figure 4. Implicit and explicit biases reflecting the model health stereotype

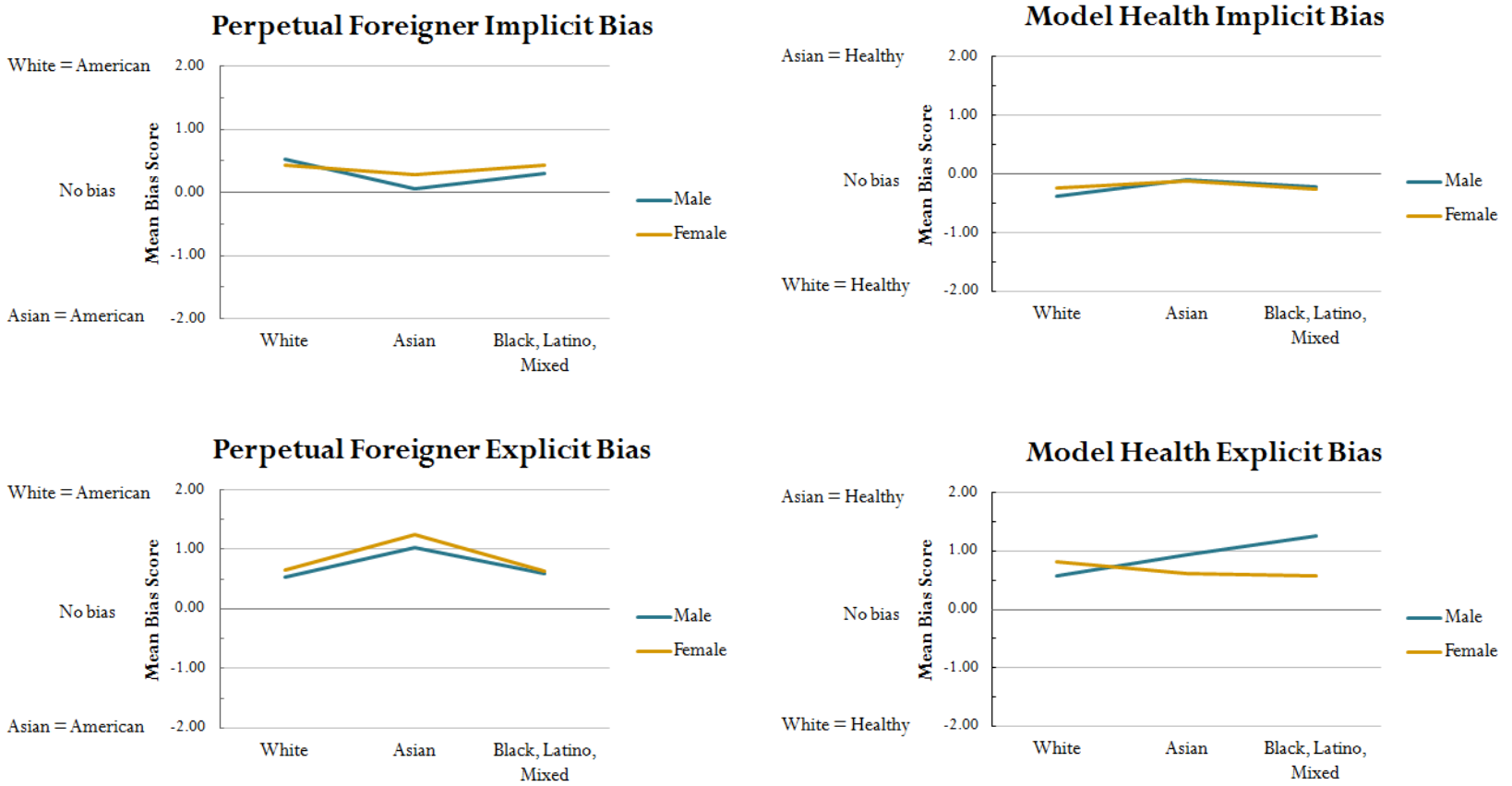

Figure 5. Association between physicians' race and gender with measured level of biases

TABLES

Table 1

Categorical Demographic Information (n = 266)

	Current Sample		American Medical Association
	n	%	%
Race			
Caucasian	163	61.3	59.5
Asian American	60	22.6	14.7
African American	12	4.5	4.5
Latino	10	3.8	4.6
Mixed Race	7	2.6	no data
Missing	14	5.3	14.9
Gender			
Male	176	66.2	67.3
Female	90	33.8	32.7

Table 2

Continuous Demographic Information

	N	Minimum	Maximum	Mean	SD
Age[a]	261	27.00	70.00	49.19	10.16
Years Practicing in Primary Care	264	3.00	45.00	18.52	9.83
Percentage of Asian Clients in Practice	260	0.00	80.00	10.94	11.35
Percentage of Time Using Computer-Assisted Diagnostic	260	0.00	100.00	30.85	37.54

[a] The mean age of physicians in the American Medical Association is 48.1 years

Table 3

Descriptive Statistics of RACE Scale

Scale Item	N	Min	Max	Mean	SD
1) I consider information from patients about their racial background.	266	0	4	2.57	1.00
2) I consider my patients race to better understand their genetic predispositions	266	0	4	2.58	1.03
3) I consider my patients race when making decisions about which medications to prescribe.	266	0	4	2.38	0.99
4) I consider my patients race in determining genetic risk for common, complex diseases (e.g. kidney disease or diabetes).	266	0	4	2.58	0.97
5) I consider my patients race in making medication dosage decisions.	266	0	4	2.09	1.04
6) I consider my patients race when determining age of initiation of screening for certain diseases.	265	0	4	2.21	1.03
7) I consider my patients race in determining how aggressively to treat particular diseases.	265	0	4	1.83	1.18
Total	264	0	4	2.32	0.75

Table 4

Descriptive Statistics of Implicit and Explicit Attitude Measures

	Implicit (IAT)				Explicit (self report)			
	N	Mean	SD	Cohen's D	N	Mean	SD	Cohen's D
Asian IAT	261	0.38	.35	1.09	264	.74	1.20	.62
Health IAT	258	-0.26	.31	-.86	261	.71	.97	.73

Table 5

Reported Race and Age of Target Patient

	Condition 1 (Asian)		Condition 2 (White)	
Race	n	% / 177	N	% / 89
Asian	158	89.3	3	3.4
African	5	2.8	4	4.5
Native American	1	0.6	0	0.0
White	10	5.6	81	91.0
Other/Missing	1	0.6	1	1.1
Age	51 years old		51 years old	
30-39 years old	6	3.4	2	2.2
40-49 years old	22	12.4	10	11.2
50-59 years old	144	81.4	75	84.3
60-69 years old	4	2.3	1	1.1
Other/Missing	1	0.6	1	1.1

Table 6

Bivariate Correlations of Independent Variables

			1	2	3	4	5	6	7	8	9
1.	Health- Explicit	*r*	1.00								
		(n)	(261)								
2.	Foreign- Explicit	*r*	.058	1.00							
		(n)	(259)	(264)							
3.	Health- Implicit	*r*	.178**	.004	1.00						
		(n)	(254)	(256)	(258)						
4.	Foreign- Implicit	*r*	-.022	-.014	-.227**	1.00					
		(n)	(250)	(252)	(253)	(254)					
5.	RACE score	*r*	.128*	.064	.034	.113	1.00				
		(n)	(259)	(262)	(256)	(253)	(264)				
6.	Age	*r*	-.092	-.078	-.258**	.247**	.065	1.00			
		(n)	(256)	(259)	(253)	(249)	(259)	(261)			
7.	Years Practicing	*r*	-.111	-.104	-.267**	.185**	.002	.881**	1.00		
		(n)	(259)	(262)	(256)	(252)	(262)	(259)	(264)		
8.	% Asian Clients in Practice	*r*	.091	.040	.196**	-.254**	.042	-.140*	-.150*	.1.00	
		(n)	(256)	(258)	(252)	(248)	(258)	(255)	(258)	(260)	
9.	% Time Using Computer-Assisted Diagnostic Software	*r*	.038	.040	.098	-.036	.010	-.136*	-.147*	.194**	1.00
		(n)	(259)	(258)	(252)	(248)	(258)	(255)	(258)	(259)	(260)

Note. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

Table 7

Bivariate Correlations of Explicit Measures of Health

			1	2	3	4	5	6	7	8	9
1.	Health- Explicit	*r*		-.276**	-.093	.019	-.002	.027	-.042	.054	.028
		(n)		(155)	(155)	(157)	(157)	(157)	(156)	(157)	(156)
2.	Overall health White American	*r*	-.190		.554**	-.117	-.055	-.075	.017	-.062	-.016
		(n)	(87)		(160)	(160)	(160)	(160)	(159)	(160)	(159)
3.	Overall health Asian America	*r*	-.152	.402**		-.117	-.287**	-.086	-.126	.016	-.179*
		(n)	(86)	(87)		(160)	(160)	(160)	(159)	(160)	(159)
4.	Obesity White American	*r*	-.102	-.408**	.028		.494**	.529**	.358**	.481**	.407**
		(n)	(87)	(87)	(86)		(163)	(163)	(162)	(163)	(162)
5.	Obesity Asian America	*r*	-.065	-.102	-.266*	.547**		.399**	.476**	.288**	.550**
		(n)	(87)	(87)	(86)	(88)		(163)	(162)	(163)	(162)
6.	Smoking White American	*r*	-.058	-.345**	.019	.731**	.329**		.587**	.687**	.626**
		(n)	(87)	(87)	(86)	(87)	(87)		(162)	(163)	(162)
7.	Smoking Asian America	*r*	-.096	-.083	-.165	.432**	.355**	.630**		.387**	.665**
		(n)	(86)	(86)	(85)	(86)	(86)	(87)		(162)	(161
8.	Alcohol White American	*r*	-.093	-.242*	.039	.676**	.285**	.867**	.533**		.666**
		(n)	(88)	(88)	(87)	(88)	(88)	(88)	(87)		(162)
9.	Alcohol Asian America	*r*	-.026	.035	-.187	.503**	.517**	.649**	.693**	.636**	
		(n)	(88)	(88)	(87)	(88)	(88)	(88)	(87)	(89)	

Note. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).
White American physician correlations are presented above the diagonal, ethnic minority physician correlations are presented below.

Table 8

Rates of Colorectal Cancer Screening Recommendation

	Condition 1 (Asian)		Condition 2 (White)	
Recommendation made?	N	% / 177	N	% / 89
Colonoscopy				
Yes	93	52.5	43	48.3
No	84	47.5	46	51.7
Sigmoidoscopy				
Yes	7	4.0	3	3.4
No	170	96.0	86	58.7
Fecal Occult Blood Test				
Yes	50	28.2	26	29.2
No	127	71.8	63	70.8
Any CRC Screen				
Yes	107	60.5	51	57.3
No	70	39.5	38	42.7

Note. The significance of the tests did not change by only including participants who reported age correctly.

Table 9

Associations between Predictor Variables and Recommendation for Any Kind of Colorectal Cancer Screening

Predictor	*OR*	95% CI
Bias		
Health Implicit	1.05	[.31, 3.54]
Health Explicit	1.07	[.74, 1.55]
Foreign Implicit	.64	[.24, 1.67]
Foreign Explicit	.90	[.68, 1.20]
Personal		
Age	.98	[.95, 1.02]
Male (ref)		
Female	1.26	[.61, 2.57]
White (ref)		
Asian	.63	[.27, 1.45]
Other Minority	.58	[.20, 1.72]
Professional		
Years Practicing	.98	[.94, 1.01]
% Asian Clients	.98	[.96, 1.01]
% Diagnostic Software	1.0	[.99, 1.01]

Note. OR = odds ratio; CI = confidence interval.
No predictor was significant at the $p < .05$ level.

Table 10

Association between Attitudes about Foreignness and Colorectal Cancer Screening Recommendations

	Step 1[a]		Step 2[b]		Step 3[c]	
Predictor	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Implicit foreign attitude	.74	[.27, 1.98]	.59	[.20, 1.73]	1.10	[.20, 6.13]
Explicit foreign attitude	.95	[.71, 1.27]	.97	[.71, 1.32]	.80	[.45, 1.45]
Female			1.64	[.75, 3.59]	1.62	[.70, 3.73]
White (ref)						
Asian			.511	[.19, 1.37]	1.02	[.30, 3.49]
Other Minority			.604	[.19, 1.92]	.80	[.14, 4.48]
Model Summary						
R^2	.004		.03		.14	
Percentage correctly categorized	66.2		65.4		71.5	

Note. OR = odds ratio; CI = confidence interval.
[a]Bias scores entered simultaneously. [b]bias, gender, race.
[c] main effects and interaction between each bias score with gender or race

Table 11

Association between Attitudes about Health and Colorectal Cancer Screening Recommendation

	Step 1[a]		Step 2[b]		Step 3[c]	
Predictor	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Implicit foreign attitude	1.20	[.35, 4.19]	1.31	[.35, 4.84]	1.78	[.31, 10.30]
Explicit foreign attitude	1.04	[.71, 1.53]	1.07	[.72, 1.60]	1.37	[.64, 2.93]
Female			1.46	[.67, 3.21]	1.87	[.77, 4.54]
White (ref)						
Asian			.63	[.25, 1.57]	.46	[.17, 1.26]
Other Minority			.46	[.15, 1.44]	.41	[.11, 1.48]
Model Summary						
R^2	.001		.02		.12	
Percentage correctly categorized	66.4		67.2		74.0	

Note. OR = odds ratio; CI = confidence interval.
[a]Bias scores entered simultaneously. [b]bias, gender, race. [c] main effects and interaction between each bias score with gender or race

Table 12

Physician Cited Reasons for Cancer Screening Disparity

Reason	N	%	Example
Patient Factors			
Language barrier	24	6.6	The language barrier may play a significant role in what is recommended to a patient. Often, Asian American patients do not speak English.
Lack of patient willingness/ follow through	25	6.9	Cultural resistance to "Westernized" procedures and test
Patient doesn't request screening	8	2.2	White patients are asking more for cancer screening than Asian patients
Underutilization of medical care	27	7.5	Asians are less likely to show up for appointment
Lack of insurance/cost	10	2.8	Ability to pay
Physician Factors			
Unfamiliarity with best practices for ethnic minority patients	23	6.4	We are not familiarized with the appropriate screening recommendations for Asian Americans
Bias/prejudice	17	4.7	Racial bias
Expectations about cultural differences	9	2.5	Less willingness to broach this subject across ethnic or cultural lines
Asians are Healthier			Better baseline health status
Better diet	23	6.4	Higher fish diets in Asians
Look younger	9	2.5	Younger age perception
Less substance use	8	2.2	They don't drink alcohol as much due to enzyme deficiencies in processing alcohol
Less obesity	10	2.7	Asians are in general slimmer, some cancers seem related to obesity.
Less overall risk	96	26.6	Many forms of cancer are less prevalent in Asian populations
Denial	16	4.3	I screen all of my patients based on age and not by race
Other	11	3.1	There should be more cancer screenings, especially for liver cancer
Unknown/No opinion	31	8.6	Unsure why
No response	14	3.9	

Table 13

Associations between Explanations for Screening Disparity and Own Behavior

	Condition 1 (Asian)		Condition 2 (White)	
Category	*OR*	*p*	*OR*	*p*
Patient Factors	1.07	.81	2.05	.14
Physician Factors	1.92	.43	.85	.74
Asians are Healthier	1.42	.02	1.02	.95

Table 14

Associations between Explanations for Screening Disparity and Bias Scores

Bias Measures	*B*	*t*	*p*
Health- Implicit			
Patient Factors	.012	.373	.71
Physician Factors	-.033	-.697	.49
Asians are Healthier	-.017	-.665	.51
Health- Explicit			
Patient Factors	-.054	-.530	.60
Physician Factors	.086.	.585	.56
Asians are Healthier	.234	2.825	.01
Foreign- Implicit			
Patient Factors	-.070	-1.863	.06
Physician Factors	.101	1.874	.06
Asians are Healthier	-.008	-.268	.79
Foreign- Explicit			
Patient Factors	-.007	-.056	.96
Physician Factors	-.394	-2.170	.03
Asians are Healthier	-.039	-.390	.70