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Behavioral Health among Asian American and Pacific Islanders: The Impact of Acculturation and Receipt of Behavioral Health Services on Depression and Anxiety

Mari E. Yamamoto

Seattle Pacific University

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The Impact of Acculturation and Receipt of Behavioral Health Services on Depression

and Anxiety

Mari E. Yamamoto, M.S.

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Approved by:

Lynette H. Bikos, Ph.D.
Professor of Clinical Psychology
Dissertation Chair

John W. Thoburn, Ph.D.
Professor of Clinical Psychology
Committee Member

Jacob A. Eide, Psy.D.
Clinical Psychologist & Behavioral Health Supervisor
International Community Health Services
Committee Member

Reviewed by:

David G. Stewart, Ph.D.
Chair, Clinical Psychology

Mícheál D. Roe, Ph.D.
Dean, School of Psychology, Family
& Community

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Abstract

Mari Yamamoto (350 words)

Behavioral health models improve access to mental health care by integrating psychology and medicine. While integrated care is supported among the general population, less research focuses on the model with Asian American and Pacific Islanders (AAPIs). AAPIs are low treatment-seeking due to various barriers (e.g., limited English proficiency, stigma, insurance) and acculturation stressors. Using hierarchical linear modeling, this study examined longitudinal depression (PHQ-9) and anxiety (GAD-7) growth trajectories among AAPIs within a behavioral health model and the moderating impact of acculturation and frequency of behavioral health visits. The best fitting model was from a sample who ($N = 354$; 71.5% female) met the following inclusion criteria: (a) AAPI, (b) over 18 years of age, (c) engaged in three or more behavioral health visits, (d) PHQ-9 and GAD-7 scores at three or more time points, (e) proxy acculturation data. The sample was 39% Vietnamese, mean age was 55.84 ($SD = 16.92$), and behavioral health visits ranged from 3 to 12. Depression and anxiety growth trajectories indicated significant cubic functions (PHQ-9, $\beta_{30} = -.077$, $p < .001$; GAD-7, $\beta_{30} = -.045$, $p < .001$). For depression, there was a non-significant moderating effect of acculturation ($\beta_{11} = .163$, $p = .468$, $\beta_{21} = -.005$, $p = .931$, $\beta_{31} = -.001$, $p = .770$), but significant effect of frequency of behavioral health visits ($\beta_{12} = .252$, $p = .005$, $\beta_{22} = -.080$, $p = .004$, $\beta_{32} = .005$, $p = .010$). For anxiety, there was a non-significant moderating effect of acculturation ($\beta_{11} = .255$, $p = .148$) and frequency of behavioral health visits ($\beta_{12} = .126$, $p = .075$) on instantaneous rate of change (i.e., slope). There was a non-significant moderating effect of acculturation ($\beta_{21} = -.018$, $p = .687$) but significant effect of frequency of behavioral health visits ($\beta_{22} = -.044$, $p = .035$) on change to the rate of change. Both moderators

were non-significant at the cubic level (β_{31} = -.008, *p* = .822, β_{32} = .003, *p* = .057).

Depression and anxiety outcomes among AAPIs improved within the behavioral health

model. Moderation by acculturation and frequency of behavioral health visits varied.

CHAPTER I

Introduction and Literature Review

Purpose

International Community Health Services (ICHS) is a Federally Qualified Health Center (FQHC) that provides "culturally- and linguistically-appropriate health services to anyone in need, including Asian [American and] Pacific Islanders (AAPIs), the unemployed, immigrants and refugees" ("International Community Health Services," 2014). Within its primary care setting, patients with limited access to healthcare, and varying healthcare needs receive care. Given its patient population (predominantly AAPIs many of whom are limited English speaking), the organization engages in program evaluation to assess the efficacy of its services in treating its unique and diverse patients. The purpose of my dissertation is to provide program evaluation regarding depression and anxiety outcomes in AAPI populations. My dissertation will examine the impact of behavioral health services and level of acculturation on depression and anxiety outcomes over time.

Depression and anxiety are among the most encountered mental health problems within the primary care setting (Ansseau et al., 2004; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; Leon et al., 1995) and the most commonly missed (alcohol abuse and cognitive impairment are the others; Halverson & Chan, 2004). Depression rates within the primary care population are estimated between 10-30% (Hunter, Goodie, Oordt, & Dobmeyer, 2009; Pignone et al., 2002) but estimates indicate that half of those patients have undetected diagnoses (Badamgarav et al., 2003). Depression results in significantly more frequent health care utilization and may increase medical costs up to

50% (Unützer et al., 2009). It is an independent risk factor associated with a variety of medical conditions including diabetes (Musselman, Betan, Larsen, & Phillips, 2003); cardiovascular disease (Parissis et al., 2007; Rugulies, 2002; van Melle et al., 2004); HIV (Cruess et al., 2003); various hypothalamic-pituitary-adrenal axis dysfunction and cytokine elevations that results in chronic conditions (e.g., hypertension, ulcers, chronic obstructive pulmonary disease, arthritic, obesity, chronic pain, and osteoporosis; Iosifescu, 2007); and neurological disorders such as cerebrovascular disease, epilepsy, dementia, Parkinson's Disease, and multiple sclerosis (see Li & Rodin, 2010 for brief review). Increasingly, primary care recognizes the need to screen for and engage in early prevention of depression given its prevalence, impact, and associations with various deleterious outcomes.

Anxiety rates within the primary care setting are estimated at 2.8-8.5% (Spitzer, Kroenke, Williams, & Löwe, 2006) with the following four most common disorders: generalized anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder (PTSD; Kroenke et al., 2007). Individuals with anxiety disorders are often considered high utilizers of medical services. Anxiety is experienced with a myriad of often distressing somatic symptoms such as chest pain and shortness of breath, which mimics some medical conditions (Deacon, Lickel, & Abramowitz, 2008). This makes detection of anxiety disorders more difficult for providers (Fleet et al., 1996) and results in misdiagnosis and often more frequent visits to medical settings for anxiety related symptoms (Deacon et al., 2008). Anxiety disorders are associated with more workday losses and unofficial work absences (Marciniak, Lage, Landbloom, Dunayevich, & Bowman, 2004) and are commonly comorbid with other psychiatric illnesses, depression

being prominent (Marciniak et al., 2004; Spitzer et al., 2006). Improving screening and

diagnosis for anxiety disorders could reduce medical utilization costs. Enhanced

diagnostic practices will likely improve treatment and overall outcomes for patients with

anxiety disorders.

Integrated primary care or behavioral health models are prime treatment

modalities for depression and anxiety. Approximately 80% of the population visits a

primary care provider (PCP) in the course of a year (Strosahl, 1998) and approximately

70% of visits stem from psychosocial problems and/or mental disorders (Gatchel &

Oordt, 2003; Stroshal, 1997). Behavioral health offers mental health services within a

primary care setting. Behavioral health services may include but are not limited to: initial

screenings to determine needs for mental health services, provision of functional and

diagnostic evaluation, aid for patients in managing chronic medical conditions, and

coordination and delivery of medical and/or mental health services (O'Donahue,

Cummings, & Ferguson, 2003). Yet, a core goal of behavioral health in primary care is

to help manage patients presenting with common mental health disorders (e.g.,

depression and/or anxiety). Behavioral health interventions have been found efficacious

in the management of depression (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006;

Katon et al., 2002b; Ray-Sannerud et al., 2012) and increasingly, as the field moves

toward integrated care, prevention and the benefits of screening for mental health

disorders within a primary care setting are being touted (U.S. Preventive Services Task

Force [USPSTF], 2009). As an organization, ICHS engages in regular depression and

anxiety screening practices for behavioral health patients utilizing the PHQ-9 (Kroenke,

Spitzer, & Williams, 2001) and GAD-7 (Spitzer et al., 2006). The PHQ-9 is a

recommended depression screening tool endorsed by the USPSTF (2009), American

Psychiatric Association (Online Assessment Measures, 2015) as well as the American

Psychological Association (Patient Health Questionnaire [PHQ-9 & PHQ-2], 2015) for

primary care settings. The GAD-7 has also been recommended as an anxiety screen in

primary care settings (Roy-Byrne et al., 2009; Ruiz et al., 2011). However, given the

diverse (culturally, linguistically, economically) patient base that is served at ICHS, it is

important to examine the effectiveness of screening and behavioral health interventions

among AAPI populations.

AAPI populations tend to engage in lower treatment seeking for mental health

problems compared to non-Hispanic White counterparts (Lu, 2010; Xu et al., 2011).

While estimated rates of mental health disorders among AAPIs may be lower than non-

Hispanic Whites (Xu et al., 2011), AAPIs also seek services at a lower rate than would be

expected given the prevalence of disorders (Abe-Kim et al., 2007). When they do seek

mental health services, it tends to be at a more critical point (Lu, 2010). AAPI patients

also encounter various barriers to receiving care, including but not limited to stigma,

limited English proficiency (LEP), and insurance status (Abe-Kim et al., 2007; Lu, 2010).

Given the established prevalence of mental health disorders and low utilization rates,

engaging the AAPI population in an integrated care model may create opportunities to

screen and intervene earlier. Earlier intervention in an integrated behavioral health model

will foster better prevention and intervention with this population.

In addition to limited access to care and low treatment seeking, AAPI populations

experience significant levels of stress due to acculturation, an identified risk factor for

mental health problems in populations who are acculturating (i.e., immigrants, refugees,

sojourners; Berry, 2005; Berry, 2006; Hwang & Myers, 2007; Kiang, Grzywacz, Marin, Arcury, & Quandt, 2010). Acculturative stress may occur as individuals seek to transform or maintain language, cultural identity, and attitudes within a new cultural environment; adapt to different customs and social norms; and/or implement general lifestyle changes (Balls Organista, Organista, & Kurasaki, 2003; Bernstein, Park, Sin, Cho, & Park, 2011; Sáez-Santiago & Bernal, 2003). Understanding the impact of acculturation and acculturative stress among the AAPI individuals served by ICHS, may inform specific behavioral health interventions and treatment goals.

ICHS seeks to provide linguistically and culturally appropriate care to the AAPI and other communities it serves. Exploring the impact of behavioral health services on mental health outcomes for ICHS patients will provide helpful programmatic data relevant to its AAPI populations. Further, delineating the role of acculturation in mental health outcomes may support current culturally sensitive interventions or may inform the need for more culturally focused interventions. Treating depression and anxiety within an integrated care setting that strives to be culturally sensitive will hopefully improve overall functioning and reduce impairment for patients. As ICHS has engaged in a screening process for anxiety and depression, a touted best practice (USPSTF, 2009), it behooves the organization to engage in psychometrically sound program evaluation to determine if its interventions are beneficial to its populations. Hence, I propose to examine the extent of depression and anxiety symptom reduction in individuals receiving behavioral health services (as measured by the PHQ-9 and GAD-7) among the AAPI populations at ICHS.

This literature review will include information relevant to the following: (a) the behavioral health delivery model, its organization, goals, and treatment efficacy; (b) the mental health and treatment seeking behaviors among AAPIs; (c) the impact of depression on individual functioning related to AAPI populations; (d) the impact of anxiety on individual functioning related to AAPI populations; and (e) the impact of acculturation and acculturative stress on health outcomes.

Behavioral Health and Primary Care Psychology

Primary care behavioral health represents an integration of mental health and primary care medical services (Byrd, O'Donohue, & Cummings, 2004; Robinson & Reiter, 2007). It is a model in which both biological and psychological care are addressed. Defined and conceptualized, primary care behavioral health (behavioral health) or integrated care is "the process and product of medical and mental health professionals working collaboratively and coherently toward optimizing patient health through biopsychosocial modes of prevention and intervention" (Byrd et al., 2004, p. 2). While this model of care has been referred to as *integrated primary care* (Blount, 1998) and *primary care behavioral health* (PCBH; Robinson & Reiter, 2007), the focus of the intervention is psychological. In this literature review, I will primarily use the term *behavioral health*.

Historical development of the behavioral health model. The behavioral health model has its roots in managed care. During the 1960s, the medical cost offset of Kaiser Permanente, a health maintenance organization (HMO), was examined (Cummings, Cummings, Johnson, & Baker, 1997; Follette & Cummings, 1967). Researchers found that 60% of physician visits could not be attributed to a physical disease diagnosis, which

suggested that 60-70% of visits were due to individuals with solely somatic complaints (i.e., "somaticizers"; Cummings et al., 1997, p. 4; Mechanic, 1991). With a high load of somaticizers, Kaiser Permanente implemented a behavioral health intervention, with psychotherapy as the treatment of choice. The implementation of a behavioral health intervention resulted in a 62% reduction in medical utilization by patients over a 5-year period. In addition, the reduction of costs, which occurred with decreased medical utilization, exceeded that of providing behavioral health services (Cummings et al., 1997), such that the implementation of behavioral health resulted in beneficial cost offset results. The medical field began to recognize the cost-saving benefits of including behavioral health within a primary care setting.

While the cost offsets incurred from behavioral health were significant from a monetary standpoint, the additional need to provide quality care and access to care was and is evident. Eighty percent of the population visit their primary care provider (PCP) over the course of the year (Stroshal, 1998). Of this group, up to 79% of primary care appointments are reportedly related to psychosocial issues (Gatchel & Oordt, 2003). Additionally, it is estimated that 50% of patients with mental disorders receive care in the primary care setting; 50% seek no mental health care at all (Strosahl, 1997). Thus general physicians are providing approximately half of formal mental health care in the U.S. (Strosahl, 1997). These statistics highlight the large portion of the population that may need, but do not seek mental health care. This discrepancy between identified need and treatment seeking challenges the medical system to recognize the benefits of integrating mental health services into the primary care setting. Thus, behavioral health

has developed and been supported, merging the psychology and medical fields to target the mental health needs encountered in primary care.

What behavioral health models offer. Behavioral health also seeks to address behavioral issues that impact health. PCPs are known to provide education around various health behaviors such as seat-belts, bike helmets, contraceptives, and smoking (Robinson & Reiter, 2007); patients also need counsel in managing chronic medical problems (e.g., diabetes, hypertension), improving medication compliance, and developing healthier habits and behaviors (e.g., exercise). Byrd and colleagues (2004) identify specific behavioral health goals, which include the following: (a) improved recognition of behavioral health needs within medical settings, (b) improved management and collaboration of care for patients with psychosocial issues, (c) increased internal resources for PCPs to address psychosocial issues as well as expedited feedback due to co-location of behavioral health providers, (d) enhanced fit between services sought by patients and services received in a primary care setting, (e) early prevention, recognition, and intervention of more serious behavioral and physical health problems, and (f) triage to more intensive health care when necessary. With these goals in mind, behavioral health sits at the forefront of primary care to aid in visits that involve psychological symptoms as well as enhance and improve health behaviors that impact physical health.

In an attempt to impact physical health, behavior health models move away from the traditional therapist role that exists separate from medical service delivery, and instead improve access to care by having behavioral health providers who are part of the treatment team in primary care. Behavioral health providers are an integral part of the primary care team, tasked with improving "detection, diagnosis, and treatment of

psychosocial health issues" (Ray-Sannerud et al., 2012, p. 61). Because they are co-located with medical providers, the PCP may easily and seamlessly refer a patient with any health concern to the behavioral health provider on site. This may occur during the same appointment where the PCP brings the behavioral health provider into the medical appointment, often termed a "warm hand-off" (Robinson & Reiter, 2007). This model of seeing patients when they are already in clinic for medical appointments improves access to care. Warm hand-offs can result in 85-90% of patients entering treatment compared to the 10% that seek care in a traditional mental health setting when referred (Cummings, O'Donahue, & Cummings, 2009). With its emphasis on improved functioning, behavioral health models ideally utilize a 15-30 minute brief intervention that is accomplished in one to four visits (Robinson & Reiter, 2007; Strosahl, 1997). The preventative and time-limited focus of behavioral health allows for behavior health providers to see multiple patients in the course of a day (e.g., 10-15) and collaborate closely with the PCP in providing quality care. Thus patients in a behavioral health model should experience improved access to care and engagement in treatment.

It is important to recognize that not all patients will be best served within behavioral health models because of condition severity or chronicity. *Integrated* programs target "high frequency primary care populations" for issues such as major depression (Strosahl, 1997, p. 51). Many of these patients benefit from and receive adequate treatment with short and brief interventions. For patients with chronic or more complex psychosocial or medical issues (e.g., chronic pain, personality disorders, chronic medical illness), the model may need to take more of a *specialty consultation* approach as these patients often require more long-term management (Strosahl, 1997, p. 50).

Furthermore, integrated primary care does not seek to eliminate traditional mental health services, and patients who do not respond to integrated care can be referred to traditional mental health settings (Strosahl et al., 1994).

Outcomes of behavioral health models. With the increased implementation of behavioral health models in primary care, the field is challenged to establish the efficacy of the model. Over the past decade and a half, researchers have repeatedly cited the benefits of behavioral health in primary care, with outcomes including but not limited to increased access to mental health services, patient satisfaction, provider satisfaction, improved compliance with treatment, enhanced clinical outcomes and maintenance of these outcomes, cost effectiveness, and medical cost offset (Blount, 2003). In a behavioral health model, patients experience collaborative care, which may often incorporate multiple psychiatric visits, psychoeducation regarding mental health diagnoses, brief psychotherapy appointments, and follow-up contact by the psychiatrist or behavioral health provider (Bryan, Morrow, & Appolonio, 2009; Katon et al., 2002b). This intervention model allows for easy exchange of information between providers (i.e., psychiatrist and PCP), as well as allows the patient to receive mental health services without having to be referred to an outside clinic.

Treating depression and anxiety in behavioral health models. The efficacy of collaborative care behavioral health interventions has been cited for depression and anxiety. In a collaborative care random control trial intervention looking at depression outcomes, Unützer and colleagues (2002) found that patients evidenced significantly lower depression severity scores and significantly higher treatment response compared to controls. Katon and colleagues (2002b) found a significant reduction in depressive

symptoms, which was sustained at 28 months. In the control group (Usual Care; UC),

patients were prescribed an antidepressant by their PCP and were offered 2 or 3 visits in

the first six months of treatment, with an optional referral to mental health services. In

the intervention group (Collaborative Care; CC), patients were provided initial

psychoeducation regarding depression (e.g., booklet and video highlighting bio-

psychosocial model of depression, the benefits of medication and psychotherapy, and the

individual patient role in managing depression) as well as two sessions with a psychiatrist

(50 minutes and 25 minutes, respectively) and potential for two brief phone calls to

review progress. Results indicated a significant treatment effect for patients with

moderate depression.

These findings were similar in another collaborative care (CC) versus usual care

(UC) study addressing panic disorder; patients experienced significantly more "anxiety-

free" days during a 12-month intervention (Katon, Roy-Byrne, Russo, & Cowley, 2002a,

p. 1098). Studies by Ray-Sannerud and colleagues (2012) and Bryan and colleagues

(2009; 2012) found that patients in a behavioral health model (primarily cognitive-

behavioral interventions; no medication information reported) improved over time on a

Behavioral Health Measure (BHM) and maintained that improvement in global mental

health functioning up to two years later. The BHM assesses four life dimensions

including well-being, symptoms (such as depression and anxiety), life functioning, and

global mental health (Kopta & Lowry, 2002). Roy-Byrne, Katon, Cowley, and Russo

(2001) found that patients with depression and anxiety were more likely to receive proper

medication (type, dosage, and duration) and engage in medication adherence at 3 months

and 6 months when in the CC condition. Specifically, panic disorder patients in the CC

condition compared to the UC condition significantly improved in quality of care and clinical functioning. In a recent meta-analysis, Katon and Seelig (2008) reviewed 37 collaborative care trials for depression and found a two-fold increase in antidepressant medication adherence over a 6 month period. Furthermore, more successful collaborative care models demonstrated improved medication adherence, utilization of "depression care specialists with mental health backgrounds," and caseload supervision by a psychiatrist (Katon & Seelig, 2008, p. 464). Roy-Byrne and colleagues' (2010) intervention among anxiety patients who met criteria for Panic Disorder, GAD, Social Anxiety Disorder, or PTSD demonstrated significant response and remission to a CBT-based intervention compared to controls at 6, 8, and 12 months post-intervention.

The abovementioned studies were among predominantly Caucasian populations. A study by Ratzliff, Ni, Chan, Park, and Unützer (2013) examined the efficacy of collaborative care among Asian and White populations. Care was provided at a general community health center compared to culturally matched clinic. Patients who received "culturally sensitive" treatment (i.e., the clinic served predominantly Asian Americans and Pacific Islanders and offered culturally appropriate and in-language services) demonstrated depression improvement at 16 weeks (Ratzliff et al., 2013, p. 487). Compared to the general clinic, patients who received care at the culturally sensitive clinic improved at a rate of 35% compared to 24%, which was not statistically significant. This provides support for the efficacy of a behavioral health model among AAPI populations, but also highlights the paucity of research specific to this population.

As the primary care system becomes the "de facto" mental health care system (Byrd et al., 2004; Regier et al., 1993; Robinson, Geske, Prest, & Barnacle, 2005, p. 79),

providing an estimated 50% of mental health care in the U.S. (Strohsal, 1997), primary

care and behavioral health providers must be aware of common mental health disorders

such as depression and anxiety. Understanding prevalence rates and how the behavioral

health model can screen for, intervene in, and seek to treat depression and anxiety is

important for providing the best care to patients presenting in the primary care setting.

The field also needs to assess the efficacy of the behavioral health model among diverse

populations, thus this project will add to the literature regarding the efficacy of behavioral

health interventions among AAPIs.

Depression and Anxiety in Primary Care

Depression and anxiety are the two most commonly seen disorders in primary

care, with some prevalence estimates at close to 50% (Kessler, Bennewith, Lewis, &

Sharp, 2002). Both depression and anxiety are associated with similar but different levels

of impairment, medical utilization, and clinical presentation. Data from the U.S. National

Comorbidity Survey Replication (NCS-R; Kessler & Merikangas, 2004) and the

Adolescent Supplement to the NCS-R survey (NCS-A; Merikangas, Avenevoli, Costello,

Koretz, & Kessler, 2009) indicated lifetime morbid risk (LMR) and 12-month prevalence

of depression at 16.6% and 29.9% respectively among U.S. individuals (Kessler,

Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). Anxiety rates varied by disorder,

with LMR and 12-month prevalence for specific phobia at 15.6% and 18.4%, social

phobia at 10.7% and 13.0%, agoraphobia at 2.5% and 3.7%, obsessive-compulsive

disorder at 2.3% and 2.7%, and generalized anxiety disorder at 9.0% and 2.0%

respectively. Depression rates within a primary care setting are varied from 6.6% (Löwe

et al., 2008) to 12% (McQuaid, Stein, Laffaye, & McCahill, 1999) to 15% (Pignone et al.,

2002), but suggest that depression is a significant concern with primary care patients. Comparatively, anxiety rates range from 8% (Löwe et al., 2008) to 19.5% (Kroenke et al., 2007).

In a study looking at disorder rates in primary care for a low-income immigrant patient population, rates for major depression and generalized anxiety were 18.9% and 14.8% respectively (Olfson et al., 2000). Comparatively, among a low-income uninsured population, the rate of at least one current psychiatric diagnosis was 51% compared to a general primary care sample (28%; Mauksch et al., 2001). Within this same low-income uninsured sample, mood disorder rates (major depression or other depressive disorder) were 33% compared to 16% in the general primary care population, and anxiety disorder (panic or other anxiety disorders) rates were 36% versus 11% in the general primary care sample (Mauschk et al., 2001).

Finally, depression and anxiety are commonly comorbid. In the study by Olfson et al. (2000), major depression was comorbid 63.8% of the time with patients also meeting criteria for panic disorder, generalized anxiety disorder, or substance use disorder. Generalized anxiety disorder was comorbid 76.9% of time with major depression, panic disorder, or substance use disorder. Rates of comorbidity between depression and anxiety are estimated at about 50% (Löwe et al., 2008) and the literature recognizes significant syndrome overlap. While the clinical necessity to fully differentiate symptoms by disorder may be called into question, factor analyses have found depression and anxiety (GAD) to be distinct dimensions (Spitzer et al., 2006). Perhaps the clinical importance of differentiating both disorders lies in the need to assess for both depression and anxiety within the primary care setting. To focus solely on one

disorder may result in missing symptoms or misdiagnosis. Depression and anxiety are

highly prevalent within primary care settings, which suggests the need to ensure

appropriate screening and provision of services to patients in primary care.

     Clinical correlates of depression and anxiety. Depression has been identified

as the "single most burdensome disease in the world" and the most prevalent of all

psychiatric disorders (Gotlib & Hammen, 2002, p. 1). Depression is associated with poor

physical health outcomes (e.g., cardiovascular disease; Rugulies, 2002; Van der Kooy,

van Hout, Marwijk, Stehouwer, & Beekman, 2007) and medical illness (see Iosifescu,

2007 for brief review), consistent reduction in work performance and lost productivity,

and is known to be high in prevalence, early in onset, and high in chronicity (Kessler et

al., 2002). For example, Ruo et al. (2003) found that patients with coronary heart disease

evidenced a strong association between depressive symptoms and patient-reported health

status. More specifically, patients with depression endorsed greater symptom burden,

greater physical limitation, poorer quality of life, and worse overall health. It is estimated

that almost 20% of the U.S. population will experience a depressive episode within the

lifetime (Gotlib & Hammen, 2002), and the World Health Organization Global Burden of

Disease Study has identified depression as the leading cause of disability (Lopez,

Mathers, Ezzati, Jamison, & Murray, 2008). In a meta-analysis by Rugulies (2002),

which reviewed studies (through 2000) on depression and coronary heart disease (CHD),

the author found depression to be associated with a 1.64 relative risk for CHD among

healthy participants. Both depressive mood and clinically significant depression

predicted CHD outcomes, but clinical depression was a stronger predictor (Rugulies,

2002). Because of its high prevalence and association with significant deleterious

outcomes and cost, the USPSTF (2009) has recommended routine screenings for depression in primary care settings when there are staff able to engage in accurate diagnosis, treatment, and subsequent follow-up. The USPSTF does not recommend screening without adequate supports in place. However, generally, screening combined with clinical support results in improved clinical outcomes (USPSTF, 2009).

Individuals with anxiety are typically high utilizers of the medical system (Fleet et al., 1996). Because common anxiety symptoms appear congruent with serious medical conditions (i.e., chest pain, shortness of breath), many individuals often seek care within medical settings, all of which contributes to diagnosis difficulties (Deacon et al., 2008). This high utilization of medical services makes anxiety disorders costly, with some estimating the economic burden of anxiety disorders in the U.S. at 42.3 billion dollars per year (Greenberg et al., 1999). More specifically, individuals suffering from anxiety disorders have been found to be more likely to have comorbid conditions, seek out services, present in the emergency room, and require hospitalization compared to controls. They also are more likely to have unofficial work absences, have short-term disability, and be involved in worker compensation claims, all of which contribute to more work absences (Marciniak et al., 2004). Common anxiety disorders presenting in primary care include generalized anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder. Although anxiety disorders are prevalent in primary care, individuals often go undiagnosed; only 39% of disordered patients in a primary care setting study were given depression or anxiety diagnoses (Kessler et al., 2002). Finally, anxiety is commonly comorbid with other disorders, namely depression, within primary care settings.

Comorbid depression and anxiety among individuals with chronic medical illness have been implicated in significantly higher levels of medical symptoms (Katon, Lin, & Kroenke, 2007). Furthermore, individuals in a low-income uninsured population with threshold psychiatric diagnoses were found to have significantly lower functional status, more disability days, and higher levels of physician visits compared to groups who screened positive/sub-threshold or negative for psychiatric diagnoses (Mauksch et al., 2001). Given the impairment, financial burden of disorder, and need for treatment among individuals suffering from anxiety and depression, detection and treatment within a primary care setting needs to be a clear focus for providers. Understanding the rates of the disorders as well as implications for specific ethnic groups is also important in order to develop and implement interventions that are efficacious and culturally sensitive.

Asian American and Pacific Islanders: Mental Health and Treatment Seeking

Asian American and Pacific Islanders (AAPIs) are a growing population. As of the 2010 U.S. Census, there were 540,000 Native Hawaiians and Other Pacific Islanders alone and 14.7 million Asians. When combined, these numbers indicate that about 6% of the U.S. population is Asian or Native Hawaiian and Other Pacific Islander (Hixson, Hepler, & Kim, 2011; Hoeffel, Rastogi, Kim, & Shahid, 2012). Individuals who identify as "Asian" have origins from the Far East, Southeast Asia, or the Indian subcontinent. This includes countries such as: "Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippines, Thailand, and Vietnam" (Hoeffel et al., 2012, p. 3). Individuals who identify as Native Hawaiian and Other Pacific Islander include those who are native Hawaiian, Guamanian or Chamorro, Samoan or from entities such as: Polynesia (Tahitian, Tongan, and Tokelauan); Micronesia (Marshallese, Palauan, and Chuukese);

and Melanesia (Fijian, Guinean, and Solomon Islander; Hixson et al., 2011). According to the 2010 U.S. Census, Asian Americans are the fastest growing among other race groups in the U.S., increasing at a rate four times faster than the total U.S. population. Comparatively, Native Hawaiian and Pacific Islanders increased at a rate three times faster than the total U.S. population. Many AAPI individuals are immigrants to the U.S. within the last century. While dates of immigration vary often by country and historical foreign policies, demographic data clearly points to this being a growing group.

Together Asian American and Pacific Islanders represent at least 43 separate subgroups/ethnic groups who speak over 100 languages (Office of the Surgeon General [US], 2001). Despite the fact that AAPIs represent a growing portion of the U.S. population, there is limited data regarding mental health rates as well as utilization of mental health services. In general, mental health rates are lower among AAPI populations than the general population and have been found to be at 17.30% for overall lifetime and 9.19% for 12-month prevalence rates (Takeuchi, et al., 2007). Despite prevalence of mental health disorders, utilization rates among AAPIs are low. Abe-Kim and colleagues (2007) published a recent study on mental health utilization rates among Asian Americans from data gathered through the National Latino and Asian American Study (NLAAS). Their results indicated that among Asian Americans impacted by mental health concerns, mental health services were sought out at lower rates (8.6%) compared to the general population (17.9%). This is a trend that has been supported previously; Asian Americans appear to seek services at consistently lower rates compared to the general population (Abe-Kim et al., 2007; Chen, 2005; Matsuoka, Breaux, & Byujin, 1997; Xu et al., 2011).

Various identified factors impede treatment seeking such as cultural barriers, service barriers, and limited access to care. Cultural barriers may include cultural stigma, beliefs about the etiology of the problem, and concerns about saving face. Additionally, the concern of stigma among AAPI populations often results in a more somatic presentation of symptoms, which is viewed as more culturally acceptable (Chen, 2005). Service barriers include culturally insensitive interventions, ethnic or language match difficulties, or lack of cross-cultural understanding. It is estimated that 1 of 2 AAPI individuals will experience difficulties accessing health care because they do not have sufficient English language skills or cannot find services that match their needs (Lu, 2010). Limited access to care may occur when individuals lack insurance or funds to pay for care costs (Abe-Kim et al., 2007; Kang et al., 2010). When AAPI populations present for treatment, they tend to seek services in the primary care setting (Chen, 2005; Yeung, Yu, Fung, Vorono, & Fava, 2006), but may wait until symptoms are more critical because they pursue other forms of care (i.e., traditional healers, community support; Spencer, Chen, Gee, Fabian, & Takeuchi, 2010). Thus, they present in medical settings when other resources are exhausted, making primary care the predominant setting in which AAPI populations seek care (Chung et al., 2003). This pattern of care-seeking results in more significantly impaired individuals presenting for treatment (Kang et al., 2010). These factors independently or in combination may contribute to lower utilization rates of mental health services as well as treatment seeking.

Depression and anxiety among AAPI populations. While mental illness rates among AAPIs are estimated as comparable to rates among Whites, rates tend to vary when symptom scales are implemented. Researchers from the first national study

investigating disorder rates among Asian Americans (National Latino and Asian American Study; NLAAS) found overall lifetime rates of any disorder (depression, anxiety, substance use) to be 17.3%, with 12-month prevalence rates at 9.2% (Takeuchi et al., 2007). In the NLAAS data, lifetime rates of disorder were not found to differ by gender, ethnicity, or English language proficiency. However, U.S. born AAPI individuals experienced the highest lifetime and 12-month prevalence rates of any disorder. Disorder rates have also been found to differ by generational status, with first-generation individuals experiencing lower disorder rates compared to second- and third-generation individuals (Takeuchi et al., 2007).

This phenomenon of lower disorder rates in earlier generations has been referred to as the *immigrant paradox*, or the finding that foreign-born nativity appears to play a protective role against mental health disorders (Alegria et al., 2008; Hwang & Ting, 2008; John, De Castro, Martin, Duran, & Takeuchi, 2012). The immigrant paradox has been cited among Asian populations, with findings indicating that foreign-born individuals experience a protective effect against anxiety and mental health disorders (John et al., 2012; Takeuchi et al., 2007). Taken together, the immigrant paradox suggests that as acculturation level and generational status increases, there may be an increase in rates of mental health disorders. Furthermore, among Asian immigrants, later generations have been found more likely to utilize formal mental health services compared to first generation immigrants (Nicdao, Hong, & Takeuchi, 2008; Spencer et al., 2010). Despite experiencing depression and anxiety, AAPI populations are less likely (estimates at one-third) to utilize available mental health services (Matsuoka et al., 1997), which may also differ among generations. Thus, understanding the composition of

AAPIs as well as their mental health seeking behaviors is important when considering

best modalities of care.

Recognizing the barriers and challenges to engaging AAPI populations in mental

health care (i.e., cultural factors, service factors, and limited access to care), behavioral

health may offer a model in which AAPI populations are more likely to have access to

and engage in care. Organizations like ICHS, which emphasize and value culturally and

linguistically appropriate care, should ideally reduce barriers to mental health care by

providing many services in patients' native languages as well as interventions where

providers are more focused on cultural factors. Recognizing the impact of acculturation

and stressors associated with establishing life in another culture may also be important

for providers to understand. AAPIs are a population that is growing, experiences mental

health challenges, but consistently is low in treatment seeking and mental health care

utilization. Thus, examining provision of care in a behavioral health setting, as well as

factors that may impact mental health and care will inform possible efficacious care

settings and interventions for this population.

The Impact of Acculturation

Acculturation has been defined as a process of psychological change that occurs

when two culture groups come in contact with each other (Berry, 2006; Redfield, Linton,

& Herskovits, 1936). Immigrants are one identified group that experiences acculturation,

and among the AAPI population, many are recent immigrants or refugees. Acculturation

seeks to explain the experiences of ethnic and cultural minorities who find themselves

living in larger societies that are not their societies of origin. With the rise of

immigration (due in part to international migration, economic globalization, and political

conflicts) societies are becoming increasingly multicultural (Trimble, 2003).

Acculturation researchers explore the changes that occur at both an individual or

psychological level as well as the sociocultural changes that may result within these

multicultural communities. As a construct, acculturation accounts for the impact of

social and environmental influences on an individual's beliefs, behavior, and affect.

In its early conceptualization, acculturation was defined as a "…phenomena

which results when groups of individuals having different cultures come into continuous,

first hand contact with subsequent changes in the original culture patterns of either or

both groups" (Redfield et al., 1936, p. 149). In 1954, the Social Science Research

Council expanded the definition of acculturation to "…cultural change…[whose]

dynamics can be seen as the selective adaptation of value systems, the processes of

integration and differentiation, the generation of developmental sequences, and the

operation of role determinants and personality factors" (p. 974 in Marín, Balls Organista,

& Chun, 2003, p. 209). Early conceptualizations looked at acculturation as a

unidimensional process (Gordon, 1964), in which the acculturating individual moved

from one way of living (based on values and practices of culture of origin) to another

(based on values and practices of host culture) over time. This promoted an assimilation

model as acculturating individuals were expected to adapt and conform to the culture to

which they were immigrating/acculturating, "losing" or letting go of their culture of

origin (heritage culture). As researchers have continued to explore acculturation

processes, a multidimensional approach, which seeks to account for the individual, the

culture to which they are acculturating, and the acculturation strategy the individual

endorses, has been supported.

Models of acculturation. Berry's (1997, 2005) proposed conceptualization of acculturation suggests that acculturation may result in varied outcomes depending on individual factors and the acculturating strategy employed. Moderating factors prior to acculturation and moderating factors that arise during acculturation impact psychological acculturation (behavioral shifts, acculturative stress, and psychopathology) and ultimately results in adaptation as defined by sociocultural and psychological adaptation (Berry & Sam, 1997). Utilizing a multidimensional approach, Berry (1997) posits that acculturation incorporates two levels or planes of potential change: (a) orientation toward one's own group (heritage culture) and (b) orientation toward other groups (host culture). It is within the framework of these two dimensions that four strategies for acculturation emerge. Individuals who do not wish to maintain their cultural identity and seek full emersion in the host culture are said to use the strategy of *assimilation*. Comparatively, seeking to maintain the heritage culture and avoid the host culture is termed *separation*. Equally maintaining both the heritage culture and interacting with the host culture is *integration*. Finally, having little interest in or inability to maintain the heritage culture and also having little interest in the host culture is *marginalization*. Integration has been identified with the best mental health outcomes (Berry, Kim, Minde, & Mok, 1987; Berry & Sam, 1997; Ward & Rana-Deuba, 1999), while separation and assimilation strategies produce more variable outcomes (Berry, 2005). Individuals who use the marginalization strategy are the least well adapted (Berry & Sabatier, 2011). When individuals encounter challenges or problems during this period of cultural adjustment, acculturative stress is said to occur.

Searle and Ward (1990) added to the acculturation literature by identifying two core adjustment processes that occur during acculturation: psychological adaptation and sociocultural adaptation. This distinction accounts for the difference between internal changes and external behavioral changes. Searle and Ward (1990) posit that individuals may vary along these two adaptation dimensions, thus seeking to assess for the psychological and internal changes that result from the acculturation process, as well as the behavioral and adaptive changes that occur when living in another culture. More specifically, psychological adaptation measures emotional and affective components of acculturation processes, such as personal and cultural identity, mental health, and an individual's personal satisfaction in a new context (Searle & Ward, 1990; Ward & Kennedy, 1999). Sociocultural adaptation is behavioral. It assesses an individual's ability to deal with problems in a new context and to "fit in" and "negotiate" interactions in the host culture (Ward & Kennedy, 1993, p. 131). Both components of acculturation are important. The new immigrant or refugee who experiences difficulty in language acquisition and shopping at the store for food (sociocultural) may experience acculturative stress. Comparatively, the same individual may experience stress in determining his or her new cultural identity or understanding how the gender expectations in the host culture meld with the gender role of his or her home culture. Searle and Ward's (1990) contribution to the literature regarding what constitutes adjustment helped to clarify the constructs that acculturation measures and acknowledge the varying acculturation processes that may be occurring within one individual.

LaFramboise, Coleman, and Gerton (1993) wrote about cultural interactions in their discussion of biculturalism. Biculturalism looks at the psychology of individuals

living in two cultures. In their review of this process of being bicultural and the larger experience of second culture acquisition, LaFramboise and colleagues (1993) reviewed assimilation, acculturation, alternation, multicultural, and fusion models of cultural contact. They posited that to become biculturally competent, individuals need to: (a) have knowledge of cultural beliefs and values of both cultures, (b) have positive attitudes towards both groups, (c) understand and demonstrate bicultural efficacy, (d) have strong communication abilities, (e) possess *role repertoire*, or the ability to read social situations and cues, and (f) demonstrate groundedness (LaFramboise et al., 1993). All of these skills contribute to an individual's successful navigation of two cultures, and also explore and highlight some of the skills necessary in an acculturation process.

Knowledge of cultural beliefs and values includes understanding gender role norms, religious practices, politics, and rules (e.g., social norms) that govern everyday interactions. A positive attitude toward both groups emphasizes an adaptation process in which both cultures have recognizable strengths that are unique but not inherently better than one another. This allows individuals to focus more on the benefits of biculturalism and both cultures rather than feeling resentment or value of one culture over the other. Bicultural efficacy emerges from Bandura's (1977) concept of self-efficacy. Bicultural efficacy is defined "as the belief, or confidence, that one can live effectively, and in a satisfying manner, within two groups without compromising one's sense of cultural identity" (LaFramboise et al., 1993, p. 404). This sense of bicultural efficacy may buoy an individual through difficult cultural moments and help him or her strive towards a goal of cultural competency or understanding. Strong communication abilities include language competency and more specifically the ability to communicate feelings and ideas

effectively. Role repertoire represents an individual's ability to engage in culturally

appropriate behaviors and/or roles. It includes social skills to engage in, interpret, and

understand social situations in another cultural context. Finally, groundedness refers to

an individual's place within a culture and his or her ability to establish social support

networks in both cultures as well as external supports. All of these abilities are

hypothesized to make cross cultural transitions and the experience of cultural contact for

bicultural individuals more successful. Given that immigrants and refugees that relocate

in the U.S. are undergoing an acculturation process, LaFramboise and colleague's

considerations for navigating cross cultural spaces may inform points of intervention

within the acculturation process. Individuals lacking in these skills may be at risk for

experiencing higher levels of acculturative stress.

All of the abovementioned conceptualizations of acculturation seek to explain the

process of leaving one's home culture and navigating a new culture. The individual who

is a refugee or recent immigrant may encounter various stressors as they navigate the

cross-cultural transition, which may contribute to various deleterious health outcomes.

Acculturation and health correlates. Individuals undergoing the acculturation

process experience a variety of stressors, which can be psychological, social, or physical.

These stressors are often referred to as *acculturative stress,* which can lead to a

"reduction in health status" (Berry et al., 1987, p. 491), and occur when the challenges

and demands of adjusting to situations and processes specific to acculturation exceed an

individual's ability to successfully manage and navigate those demands. As individuals

work to transform or maintain language, establish (perhaps a new) cultural identity and

attitudes within a new cultural environment, adapt to different customs and social norms,

and/or implement general lifestyle changes (Balls Organista et al., 2003; Bernstein et al., 2011; Sáez-Santiago & Bernal, 2003), acculturative stress may result. Individuals undergoing the process of acculturation may also be struggling with issues of identity (e.g., adopting the mainstream host country label or maintain heritage/ethnic label), changes in their role within society or the family system (e.g., men who were the primary breadwinner may find themselves unemployed while their wives work), and subsequent increased isolation perhaps due to language barriers or lack of familial and/or familiar social systems (Sáez-Santiago & Bernal, 2003). Such experiences may contribute to general feelings of being overwhelmed, and individuals may feel that they are encountering "insurmountable difficulties" (Berry & Sam, 1997, p. 319), all stressors of the acculturation process.

Acculturation and its associated stressors have been linked to poor physical health (Finch & Vega, 2003). It is associated with feelings related to marginality and alienation and an increased attunement to psychosomatic symptoms, and identity confusion (Berry et al., 1987). More specifically, acculturative stress is positively associated with increased levels of suicidal ideation (Hovey, 2000) and depression (Kiang et al., 2010; Torres, 2010). It has been linked to anxiety, depression, and substance use in immigrant populations within the U.S. (Ortega, Rosenheck, Alegria, & Desai, 2000) and has been associated with poor mental health outcomes in Latino immigrant populations (Hovey, 2000; Hovey & King, 1996) as well as Asian American populations (Hwang & Ting, 2008). Furthermore, acculturative stress has been identified as a more proximal risk factor for mental health problems than global perceptions of stress (Hwang & Ting, 2008).

Predicting acculturative stress. When seeking to understand the precipitants of acculturative stress, the literature indicates that acculturation attitudes are largely related to mental health outcomes. Research supports a bidimensional approach in conceptualizing these attitudes, finding differential outcomes based upon individual attitudes towards the mainstream host versus heritage cultures. Ryder, Alden, and Paulhus (2000) performed several studies looking at a bidimensional acculturation approach among ethnic Chinese and non-Chinese East Asians by assessing individuals' attitudes towards the mainstream host culture versus one's heritage culture. Mainstream host culture identity was significantly associated with greater adjustment whereas the heritage culture identity demonstrated no significant association to adjustment outcomes. Students' attachment avoidance, attachment anxiety, and acculturation to the U.S. culture significantly predicted psychosocial adjustment with better adaptation to life in the U.S. as measured by self-report of more Western attitudes, beliefs, behaviors, and life style (Wang & Mallinckrodt, 2006). Among Asian American college students, acculturation level and acculturative stress were proximal risk factors for psychological maladjustment. Lack of identification with the mainstream host culture was significantly associated with maladjustment, but retention or relinquishment of heritage culture was not significantly associated with maladjustment (Hwang & Ting, 2008). Among immigrant groups of South Asian acculturative stress was reported at different levels among ethnic groups and was significantly associated with depression among specific ethnic groups (namely Vietnamese and Filipino; Tummala-Narra, Alegria, & Chen, 2012). Finally, acculturative stress (independent of socio economic status, limited English proficiency, and experiencing discrimination) was associated with poorer mental health outcomes

among Asians in the 2002-2003 National Latino and Asian American Study (John et al.,

2012).

Acculturation is a process that includes experiences of acculturative stress, which

may be an acute and chronic stressor, resulting in various negative health outcomes

(Berry et al., 1987; Berry, 1998; Myers & Hwang, 2004). Thus, understanding its impact

on depression and anxiety among AAPI populations in a primary care setting may inform

improved health interventions and care.

Dissertation Purpose

While behavioral health models of care have demonstrated efficacy in treating

depression and anxiety within a primary care setting (Barlow, Lerner, & Elser, 1996;

Katon et al., 2002a; 2002b) the literature is limited in establishing the benefits of a

behavioral health model among diverse populations, namely AAPIs. The purpose of my

dissertation is to look at treatment benefits of a behavioral health model for depression

and anxiety among AAPI populations, and how acculturation may also impact depression

and anxiety outcomes (see Figures 1 and 2).
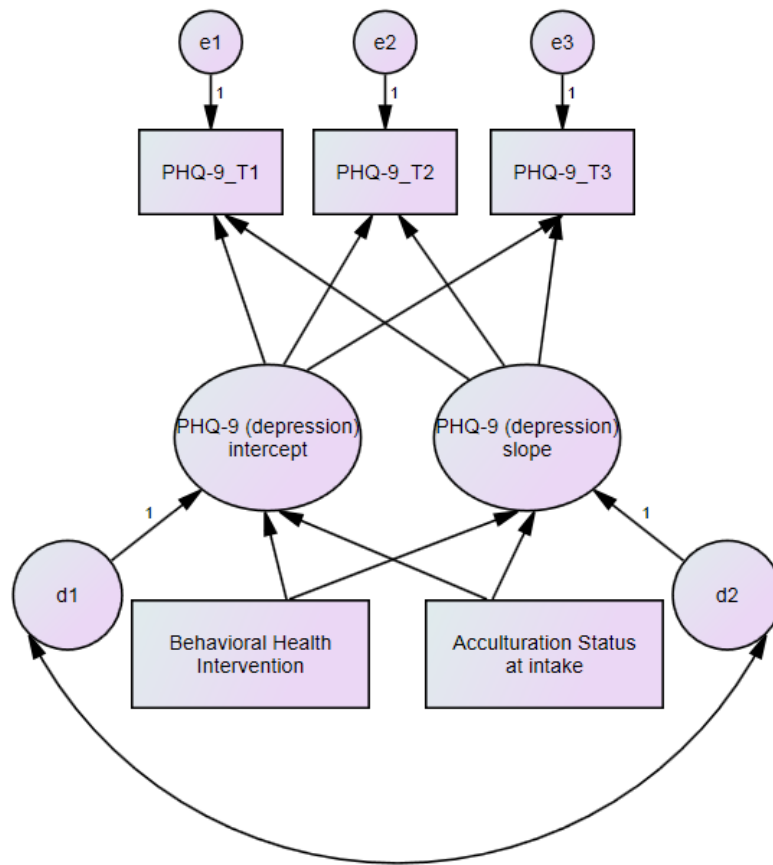
Figure 1. Proposed model to assess depression scores (PHQ-9) as a function of change over time and the moderating role of behavioral health interventions and acculturation on depression.
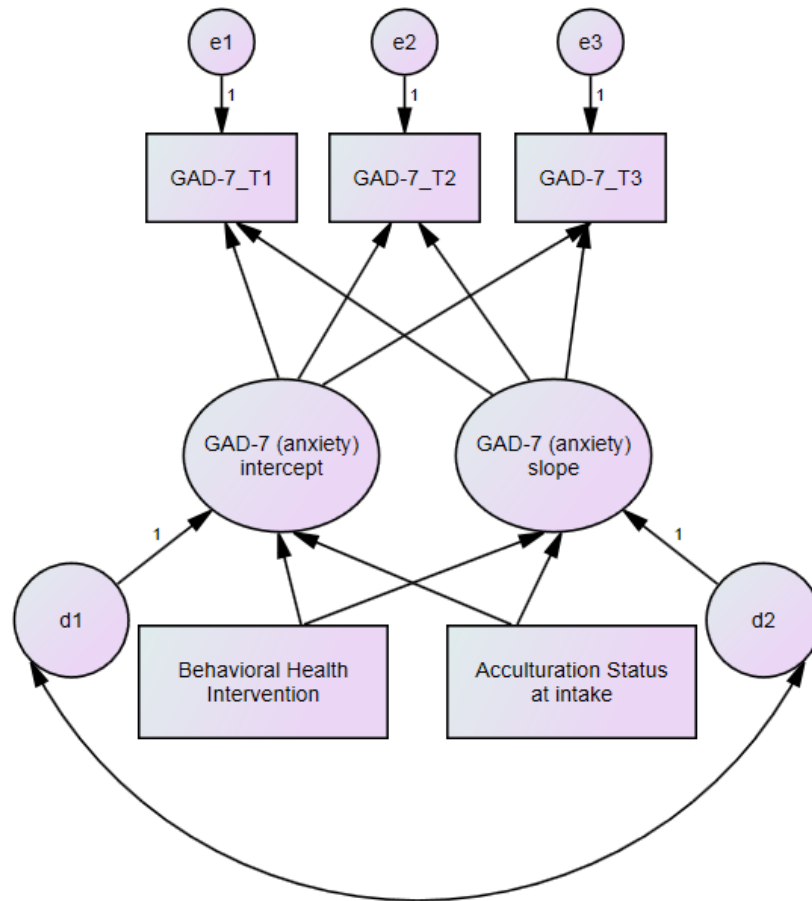
Figure 2. Proposed model to assess anxiety scores (GAD-7) as a function of change over time and the moderating role of behavioral health interventions and acculturation on anxiety.

Understanding the efficacy of behavioral health interventions specific to the AAPI populations that utilize services at ICHS will aid in programmatically identifying whether the current delivery of care is efficacious with ICHS patients. The study will also increase understanding within the literature regarding the potential benefits of behavioral health interventions in treating depression and anxiety among AAPI populations. Finally, understanding the impact of acculturation on mental health may also inform areas upon which to focus treatment (e.g., addressing the experiences of common stressors specific to acculturating populations, talking about cultural identity challenges, and discussing

shifts in gender roles in the U.S. as compared to country of origin). Such treatment may

require further educating providers to the *risks* of acculturation, common stressors

associated with acculturation, and methods by which to engage patients in understanding

the acculturative stressors they may be experiencing and how those stressors contribute to

and maintain depression and anxiety symptoms.

CHAPTER II

Method

Participant Characteristics

Participants consisted of AAPI individuals who engaged in behavioral health services (i.e., received primary care services and were referred to a behavioral health specialist) at ICHS in Seattle, Washington. Participant data was pulled from a current tracking database utilized by ICHS called the Mental Health Integration Tracking System (MHITS). The MHITS database is part of the larger Mental Health Integration Program (MHIP; "MHIP for Behavioral Health," 2014), which is run by the University of Washington (UW). The database is controlled by Community Health Plan of Washington (CHPW), but programmed and maintained by UW. CHPW pulled patient data from the MHITS database for ICHS, which included responses to the PHQ-9 and GAD-7 as well as the following demographic data: race (Asian, American Indian, Native Hawaiian, White, Mixed, Other, and Unknown), language (English, Spanish, Other), whether or not they are "best served in language other than English," gender, and age. The ICHS data department also pulled demographic data including primary language spoken, preferred language, and date of immigration to the U.S. Data encounters from 1,408 past and current ICHS patients were extracted from the MHITS database. Of the 1,408 patients pulled from the MHITS database, 505 patients met inclusion criteria: (a) member of an AAPI population; (b) over 18 years of age; (c) participation in behavioral health services during at least one time point; (d) depression scores (using the PHQ-9) for at least one time point and anxiety scores (using the GAD-7) at one time point; (e) proxy acculturation data including indication if best served in language other than English (i.e.,

language of the interview), primary language spoken, and time in the United States (e.g.,

date of immigration). The sample was 72.5% female. The average age was 54.35 (SD =

17.28). Patient ages ranged from 18.44 to 111.60 years. Among participants, 81.6%

indicated experiencing a language barrier. The mean number of behavioral health visits

was 5.80 (SD = 3.94). The ethnic breakdown of AAPI individuals as coded by ICHS was

42.2% Chinese, 39.8% Vietnamese, 5.0% Filipino, 3.8% Korean, 3.2%

Cambodian/Khmer, 1.4% Japanese, 1.2% Laotian, .6% Mien, .4% Samoan, .2% Hindi,

.2% Taiwanese, .2% Thai, 1.6% Other Asian, and .2% unlisted. The following languages

were represented in the sample: 37.8% Vietnamese, 26.5% Cantonese, 13.9% English,

6.7% Mandarin, 3.8% Toisanese, 3.0% Korean, 2.8% Cambodian/Khmer, 1.8% Tagolog,

.6% Mien, .6% Nepali, .4% Ilokano, .4% Lao, .2% Burmese, .2% Japanese, .2% Punjabi,

.2% Thai, and .6% other.

Sampling Procedures

All ICHS patients signed a Notice of Privacy Practices (see Appendix A) form for

treatment, which allowed for use of their medical data for program evaluation research

and organizational quality improvement purposes (see page 2 of Appendix A). Data was

collected by behavioral health providers (e.g., psychologists, counselors, and social

workers) at ICHS during patient visits and then entered into the MHITS database.

Patients in the MHITs database were selected by the primary investigator for inclusion in

the study if they were from an AAPI population, over 18 years of age, received care at

and attended at least one behavioral health appointment, were administered the PHQ-9

and GAD-7 during at least one time point, and had the following proxy acculturation

data: primary language spoken, indication of whether or not there was a language barrier (i.e., language of interview), and date of arrival to the U.S.

Sampling Size, Power, and Precision

Recommendations within the literature regarding sufficient sample size requirements for use with Hierarchical Linear Modeling (HLM) are varied. In longitudinal designs, the individual trajectory of change over time is at Level 1 of analysis and represents the "within-person" growth model (Willett, Singer, & Martin, 1998, p. 397). This is modeled by taking measures at multiple time points for each individual. The individual "growth parameters" become the outcome variable at Level 2 (L2), and are often dependent on "person level characteristics" (Hox, 2000, p. 19). Typically, n denotes the number of units at the Level 1 (L1) variable, with N denoting number of Level 2 units (Snijders, 2001). Total sample size is determined and denoted as *Nn*. Bosker, Snijders, and Guldemond (2003) suggest that there be at least six Level 1 (n) individuals and 10 (N) Level 2 groups for nested data. According to Maas and Hox (2005) a group size of five is standard for longitudinal modeling. Willett and colleagues (1998) state that there needs to be one more data point than known parameters for a linear individual growth model, thus three waves of data (or time points) for each participant. The ability to model individual growth improves with more waves of data (Cook & Ware, 1983), but O'Connell, Logan, Pentimonti, and McCoach (2013) discuss trade-offs among "study duration, the frequency of observation, and the sample size" in relation to power (p. 165). They articulate that in situations of high within-person variance among individual growth trajectories, increasing the number of observations may provide more information related to growth trajectories than adding individuals to the sample.

Furthermore, they posit that more observations per individual are important for non-linear

growth models than linear growth models. Increasing the number of time points

improves statistical power most for models with higher order polynomials (Raudenbush

& Liu, 2001). Comparatively, increasing sample size aids in detecting between-person

variance and improves statistical power (O'Connell et al., 2013). Hedeker, Gibbons, and

Waternaux (1999) suggested the following sample sizes for a test of between groups with

a linear trend effect estimated by four time points, .10 attrition rate, and intra-class

correlation greater than or equal to .10: 102 (medium effect) and 40 (large effect; p. 82).

Given the variability in the literature regarding sample size, the goal for the present study

was a sample size of 200 with at least three waves (time points). The original data set for

the current study varied widely in number of observations (e.g., visits and PHQ-9 and

GAD-7 score) and ranged from 1 to 77 visits. Because of the limitations of HLM to

handle data sets with excessive observations, I made the decision to limit the number of

observations to 12 PHQ-9 or GAD-7 scores within a 12-month period. This decision was

further supported by O'Connell and colleagues (2013) acknowledgement of a "level of

diminishing returns" when adding more time points (p. 165). Whereas increasing the

number of observations from 3 to 4 will result in fairly large improvements to statistical

power, increasing from 9 to 10 observations will impact power to a lesser effect

(O'Connell et al, 2013). Raudenbush and Liu (2001) state that generally, increasing

sample size (as opposed to number of observations) will increase ability to detect group

differences (i.e., increase power). My study included data from 1,867 repeated

observations (L1 units) from 505 participants (L2 units). The highest frequency of

observations was one PHQ-9 or GAD-7 observation ($n = 110$, $n = 137$, respectively),

however, over 71.5% of the sample had three or more BH visits, 76% of the sample had

three or more PHQ-9 scores, and 70.9% had three or more GAD-7 scores (see Table 1 for

frequency of BH visits, PHQ-9, and GAD-7 observations per observation).

Table 1
*Frequency (percent) of behavioral health visits (BH visits), PHQ-9 scores, and GAD-7
scores (N = 505)*

Total	BH Visits	PHQ-9	GAD-7
0		10(2.0)	10(2.0)
1	73(14.5)	110(21.8)	137(27.1)
2	71(14.1)	89(17.6)	92(18.2)
3	46(9.1)	65(12.9)	67(13.3)
4	46(9.1)	62(12.3)	52(10.3)
5	43(8.5)	39(7.7)	37(7.3)
6	34(6.7)	35(6.9)	35(6.9)
7	23(4.6)	30(5.9)	22(4.4)
8	28(5.5)	17(3.4)	17(3.4)
9	20(4.0)	11(2.2)	14(2.8)
10	14(2.8)	20(4.0)	14(2.8)
11	15(3.0)	14(2.8)	6(1.2)
12	92(18.2)	3(.6)	2(.4)

Measures

Depression. Depression symptoms were assessed using the Patient Health

Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, Williams,

& Patient Health Questionnaire Primary Care Study Group, 1999). The PHQ-9 is a self-

report measure that was developed to assess for depression within primary care settings.

It is based on the primary care evaluation of mental disorders (PRIME-MD®) and

includes the nine DSM-IV depression criteria. The PHQ-9 is comprised of 9 items plus

an additional impairment question, which asks the respondent how difficult the problems

have made it for him or her to engage in work, home, and social arenas. On a 4-point

Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*), individuals are asked to

respond to the prompt, "Over the last *two weeks*, how often have you been bothered by

any of the following problems?" Sample items include, "Feeling down, depressed, or

hopeless," "Poor appetite or overeating," and "Trouble concentrating on things, such as

reading the newspaper or watching television." Criteria for a diagnosis of major

depression is met if five or more of the depression symptoms are endorsed to occur *more*

than half the days in the past two weeks, and at least one of the symptoms includes

depressed mood or anhedonia. A total scale score is computed by summing the

individual item scores together. Scores range from 0 to 27, with higher scores indicative

of more depressive symptoms. The PHQ-9 scores are divided into the following cut-offs

of increasing depression severity: 0-4 (none), 5-9 (mild), 10-14 (moderate), 15-19

(moderately severe), and 20-27 (severe). A PHQ-9 score of 10 or greater is cited as

having "a sensitivity for major depression at 88%" (Kroenke & Spitzer, 2002, p. 2). The

PHQ-9 has established criterion, construct, and external validity as well as strong alpha

reliability coefficients, which range from .86 to .89 (Kroenke et al., 2001). The data

acquired through the MHITS database is scale-level data with reported total scale scores

of the PHQ-9 and reliability estimates cannot be calculated. The mean PHQ-9 score was

13.52 ($SD = 6.51$) and scores ranged from 0 to 27.

Anxiety. Anxiety symptoms were assessed using the Generalized Anxiety

Disorder scale (GAD-7; Spitzer et al., 2006). The GAD-7 is a self-report measure that

was developed to assess for anxiety within primary care settings. It includes the DSM-IV

symptom criteria for generalized anxiety disorder. The GAD-7 is comprised of 7 items

plus an additional impairment question, which asks the respondent how difficult the

problems have made it for him or her to engage in work, home, and social arenas. On a

4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*), individuals are

asked to respond to the prompt, "Over the last *two weeks*, how often have you been

bothered by any of the following problems?". Sample items include, "Feeling nervous,

anxious, or on edge," "Worrying too much about different things," and "Becoming easily

annoyed or irritable." A total scale score is computed by summing the individual item

scores together. Scores range from 0 to 21, with higher scores indicative of more anxiety

symptoms. The GAD-7 scores are divided into the following cut-offs of increasing

depression severity: 0-4 (none), 5-9 (mild), 10-14 (moderate), and 15-21(severe). Most

patients with generalized anxiety disorder (GAD) score above the 10-point cut-off. A

GAD-7 score of 10 or greater is sensitive at greater than a .80 level. The GAD-7 has

established criterion, construct, and external validity as well as strong internal

consistency at .92. Test-retest reliability was .83 (Spitzer et al., 2006). The data acquired

through the MHITS database was scale-level data with reported total scale scores of the

GAD-7 thus reliability estimates in the current study were not calculated. The mean

GAD-7 score was 9.77 (*SD* = 5.62) and scores ranged from 0 to 21.

     Acculturation. Acculturation was assessed with slight modification to the Proxy

Acculturation Scale (PAS-3; Cruz, Marshall, Bowling, & Villaveces, 2008). The PAS-3

is an acculturation scale developed with Hispanic populations to assess for acculturation

in health contexts via single proxy acculturation measures. It is comprised of three

acculturation-related variables that are routinely collected in health surveys and settings,

namely: (a) language spoken at home, (b) language in which the interview was

conducted, and (c) proportion of life lived in the United States (U.S.). In the original

PAS-3, participants were asked whether they spoke "mostly a language other than

English," "mostly English," or "both about the same" in conversations with spouses,

children, siblings, and parents. Responses were scored as 1 = mostly other language, 2 =

both about the same, or 3 = mostly English. Scores were subsequently coded 0 if the

average score for conversations with others was < 2, or 2 if the average score for

conversations with others was ≥ 2. Because the most commonly used single item proxy

of acculturation is language use or preference (Arends-Tóth & van de Vijver, 2006;

Cuellar, Harris, & Jasso, 1980; Zane & Mak, 2003), language items were weighted more

heavily. The language in which the interview was conducted was coded as 0 (Other

language) or 2 (English). Proportion of life living in the U.S. was coded from 0 to 1

(number of years in the U.S. divided by participant's age). Scores across the three proxy

measures were summed together to create a total PAS-3 score, which ranged from 0 to 5.

Higher scores are indicative of higher acculturation. The PAS-3 was derived using data

from a nationally representative sample of U.S. Hispanics and produced a Cronbach's

alpha of .79 (Cruz et al., 2008). The PAS-3 was highly correlated with the National

Alcohol Survey (NAS) acculturation scale (Caetano, 1987a in Cruz et al., 2008) at .80,

demonstrating concurrent validity. In the current study, primary language spoken was

coded 0 (Other language) or 2 (English). The language in which the interview was

conduction (i.e., language barrier) was coded as 0 (Other language) or 2 (English).

Proportion of life lived in the U.S. was calculated by subtracting date of first behavioral

health visit from date of immigration and dividing by patient age, producing a value

ranging from 0 to 1. All three values were summed together to create a total PAS-3 score

ranging from 0 to 5, with higher scores indicating higher acculturation. Due to the

manner in which the PAS-3 was scored, an alpha coefficient or other measure of internal

consistency would not be appropriate. The mean PAS-3 score was .78 (*SD* = 1.51).

Because my study used archival data, I was limited in my ability to assess acculturation using an administered measure. The community health center currently collects information from patients regarding patient language spoken, and language of the interview. A modification to the PAS-3 (using primary patient language and language of interview) was a strong and logical fit to the data I had access to, and it has established validity and reliability. There was slight concern about cross-cultural validity; the PAS-3 was developed with Hispanic populations and the participants in my dissertation are AAPI. However, language of interview has been supported as a valid proxy for acculturation in settings providing care for AAPIs (Kang, 2006; Lee, Nguyen, & Tsui, 2011). Furthermore, Escobar and Vega (2000) recommend a "utilitarian and pragmatic" approach to measuring acculturation, citing use of proxy and demographic variables "(e.g., place of birth, age at arrival in the US, years residing in the US, primary language use including a measure of the proficiency of the second language)" as sufficient until researchers can establish psychometrically sound standards for measuring acculturation (p. 740). I believe that the proxies of primary language and language of interview ("best served in language other than English") for AAPI populations are comparable to the Hispanic populations assessed in the original development of the PAS-3.

Frequency of behavioral health visits. To determine frequency of behavioral health visits, each encounter date in the MHITS file was counted as a behavioral health visit. The mean number of behavioral health visits was 5.80 ($SD = 3.94$) and ranged from 1 to 12. Although some patients within the MHITS file had more than 12 visits, for data analysis purposes, patients were limited to 12 visits within a 12-month period.

CHAPTER III

Results

Data Analytic Plan

The project was a prospective study growth curve analysis that utilized

hierarchical linear modeling (HLM) to explore patient depression (using PHQ-9 scores)

and anxiety (using GAD-7 scores) as a function of change over time. The study

examined the effects of receipt of behavioral health services (frequency of behavioral

health visits) and acculturation (measured by language spoken for interview, primary

language spoken, and time in country) on depression and anxiety (See Figures 1 and 2).

Data were analyzed using HLM 7.0, which allowed for multi-level analyses (i.e., nested

data) by utilizing Level 1 and Level 2 equations. Each equation included an *intercept*

(i.e., the expected initial level of a variable) and a *slope* (i.e., change over time). Level 1

equations model variation in the repeated measures dependent variable (i.e., depression

[PHQ-9] or anxiety [GAD-7]) as a function of time. Level 2 equations model individual

differences in Level 1 variables as a function of Level 2 variables (i.e., frequency of

behavioral health visits, acculturation). Models were estimated for depression and

anxiety separately (see Figures 1 and 2). Depression and/or anxiety scores were collected

from patients who had received behavioral health services, ranging from 1 to 12

administrations of the PHQ-9 and 1 to 12 administrations of the GAD-7 during a 12-

month period. While it might make conceptual sense to look at depression and anxiety

together (i.e., combining scores as they are commonly comorbid; Löwe et al., 2008;

Olfson et al., 2000), not all patients were consistently screened for both depression and

anxiety. Additionally, it was not feasible to guarantee concurrent depression and anxiety

scores for each participant and thus models for depression and anxiety were run

separately.

In the current analyses, time was computed by using the intervals in months

between each score time point. The initial screening score, the baseline, was coded as

zero. All subsequent time points were computed by subtracting the screening score date

from the subsequent score dates (e.g., second behavioral health visit date minus screening

date). In all analyses, the outcome of interest was modeled in Level 1 as a function of

intercept, slope, and random error; in Level 2, it was modeled as a function of predictor

variables.

Data Preparation and Missing Data

Of the 1,408 patients in the original MHITS file, participants who did not meet

the initial study criteria (i.e., over 18, having at least 1 PHQ-9 or GAD-7 score, being

AAPI) were eliminated. Patients who did not have information regarding date of

immigration, primary language spoken and whether or not there was a language barrier

were also deleted. Finally, patients lacking a date of immigration were eliminated. This

Table 2

Correlations among Level 2 (Between Persons) Variables

	1	2	3	M	SD
1. BHvisits				5.80	3.94
2. Acculturation	-.019			.78	1.51
3. Age	.137**	-.120**		54.35	17.28
4. Gender	-.092*	.013	-.127**	73% female	

*Note. **p < .01; *p < .05*

reduced the number of patients with usable data from 1,408 to 597. In HLM 7.0, the

program deletes participants that are lacking sufficient data for running the analyses in

the L2 file. Participants were deleted if they did not have scores for both the GAD-7 and

PHQ-9. Of the 597 patients, 505 were used in the current analyses. Table 2 contains

information regarding correlations among L2 variables.

Evaluating the Impact of Acculturation and Behavioral Health on Depression

I tested a model predicting the repeated measures depression variable PHQ-9 as a

function of acculturation status and frequency of behavioral health visits. I entered time

in its linear and quadratic forms and entered the acculturation and frequency of

behavioral health (BHFreq) visits separately. With respect to depression, as shown in

Table 3 and illustrated in Figure 3, results indicated a significant quadratic function.
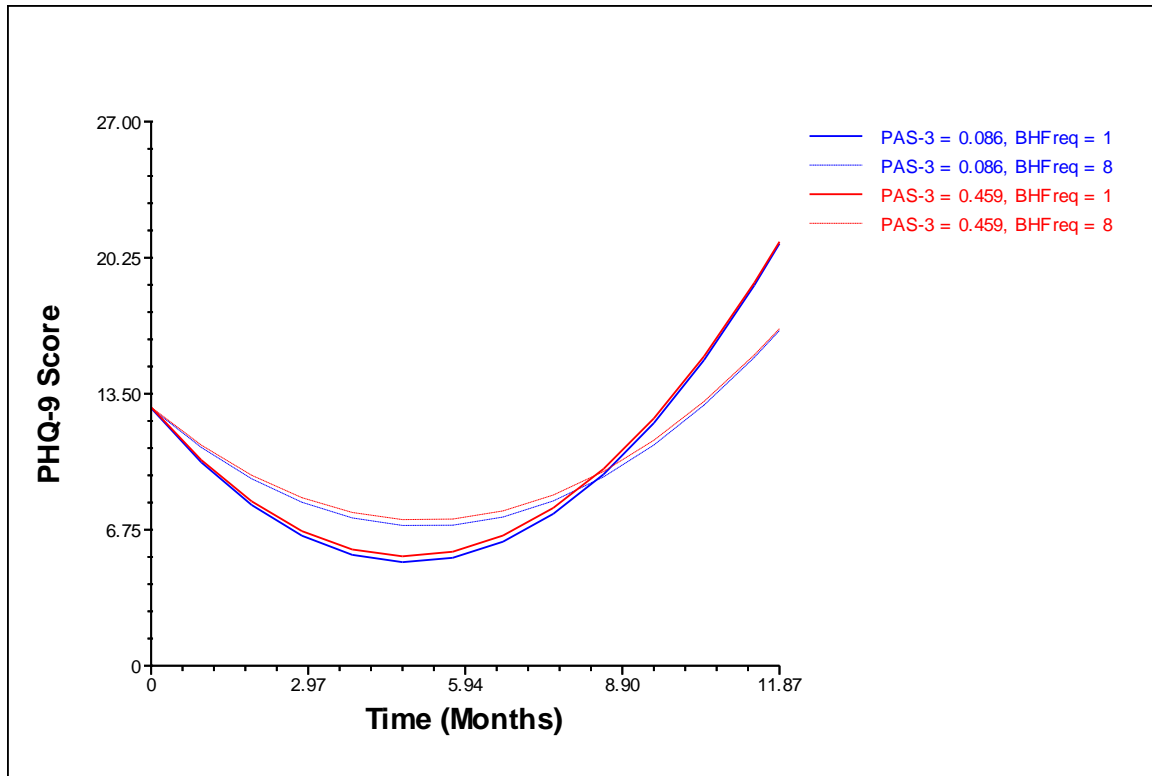
Figure 3. Graph of PHQ-9 scores as a function of change over time, moderated by acculturation (PAS-3) and frequency of behavioral health visits (BHFreq). Graph indicates a significant curvilinear function ($\beta_{20} = .339$, $p < .001$) with a significant instantaneous rate of change ($\beta_{10} = -3.288$, $p < .001$). The non-significant moderating effect of acculturation on instantaneous rate of change was $\beta_{11} = .228$ ($p = .061$) and the significant moderating effect of BHFreq was ($\beta_{12} = .126$, $p = .013$). There was a non-significant moderating effect of acculturation (PAS-3; $\beta_{21} = -.018$, $p = .221$), but a significant moderating effect of BHFreq ($\beta_{22} = -.015$, $p = .035$) on the change to the rate of change. The 25th and 75th, percentiles of acculturation (PAS-3) are represented by blue and red, respectively. The 25th and 75th percentiles of behavioral health visits (BHFreq) are represented by bold and regular line formatting, respectively. Corresponding data is found in Tables 3 and 4.

The PHQ-9 score at intake for patients with an acculturation score of 0 was 12.78 ($p < .001$). The gain in PHQ-9 score was .110 points ($p = .593$) for every 1 point increase in acculturation, which was not significant. Because of the significant quadratic function, the average instantaneous rate of change as a function of month was -3.287 ($p < .001$). Consequently, for those who were 1 point higher in acculturation, the instantaneous rate of change increased by .228 (i.e., -3.06, $p = .061$) but this was non-significant. Similarly,

each additional BH visit adjusted the instantaneous rate of change by .126, such that for

every additional BH visit, the instantaneous rate of change was -3.162 ($p = .013$), which

was significant.

Because of the significant quadratic, the change in the rate of change (how

quickly or slowly the simple slopes were changing for one unit change in time) indicated

that the slope was significantly increasing and becoming more positive over time at the

rate of .339 for patients with an acculturation score of 0 at intake ($p < .001$). For every 1

point increase in acculturation, the change to the curvature was decreasing (becoming

more negative) at a rate that was -.018 less than .339 (i.e., .321, $p = .221$), which was

non-significant. For every additional behavioral health visit, the change in the rate of

change decreased by -.015 compared to the change in the rate of change of .339 (i.e.,

.324, $p = .035$), which was significant. Results indicated that both an increase in

acculturation and behavioral health visits caused a deceleration in the positive change to

the instantaneous rate of change.

The tau correlation (representing the correlation between initial status and growth)

can be used to determine whether intake depression levels predict later levels. The linear

term ($\tau = -.313$, $p < .05$) was statistically significant, suggesting that higher intake PHQ-9

(depression) scores were associated with lower PHQ-9 instantaneous rate of change

scores. The quadratic term ($\tau = .196$, $p > .05$) was not statistically significant, suggesting

that in the full and final model intake PHQ-9 scores were not statistically significantly

related to growth curvature.

Understanding the variance components in a multilevel model is critical in

understanding its adequacy. The tau coefficient (τ_{00}) associated with the empty model

was 23.586 and the σ^2 was 21.170. The resulting intraclass correlation (.539) suggested that 54% of the variance was between persons, 46% within persons. Relative to the empty model, my full and final model explained 30% of between-persons variance and 42% of within-persons variance. The variance components associated with the intercepts and slopes were all statistically significant, suggesting that more variance could still be explained.
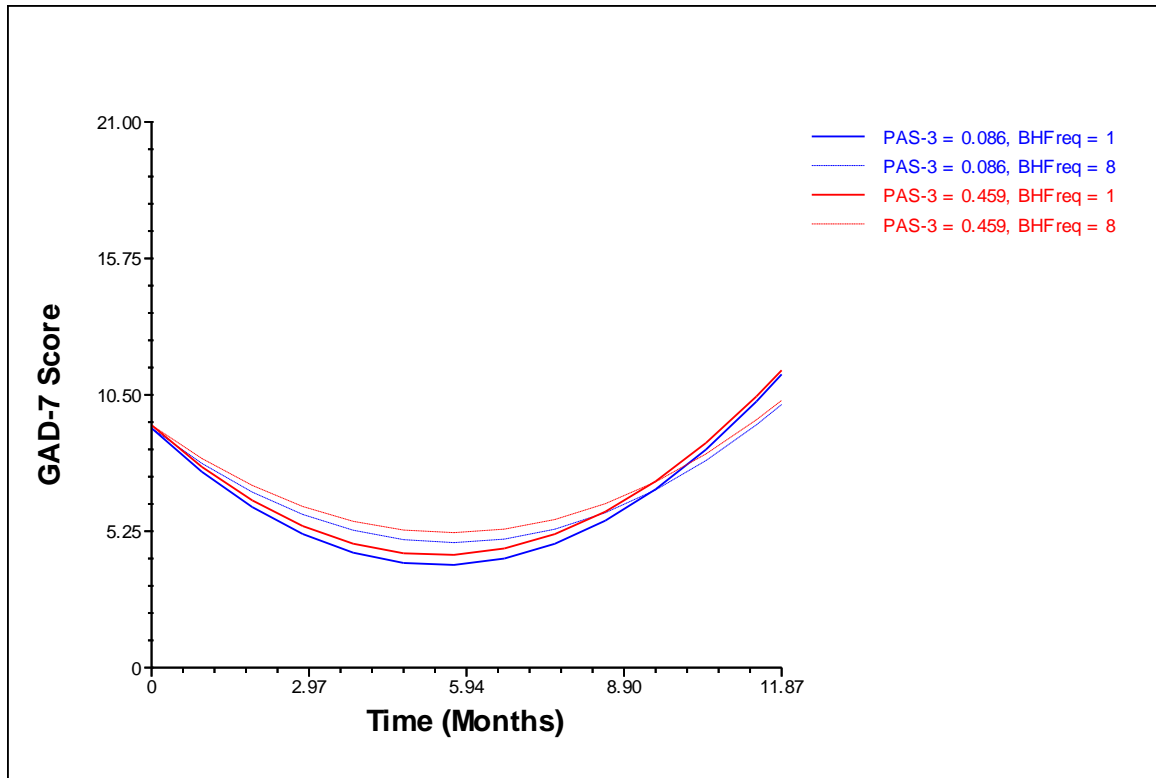
Figure 4. Graph of GAD-7 scores as a function of change over time, moderated by acculturation (PAS-3) and frequency of behavioral health visits (BHFreq). Graph indicates a significant curvilinear function (β_{20} = .185, p < .001) with a significant instantaneous rate of change (β_{10} = -2.011, p < .001). There was a significant moderating effect of acculturation on instantaneous rate of change (β_{11} = .235, p = .020) but a non-significant moderating effect of BHFreq (β_{12} = .054, p = .175). There was a non-significant moderating effect of acculturation (PAS-3; β_{21} = -.019, p = .075) and BHFreq (β_{22} = -.005, p = .225) on the change to the rate of change. The 25th and 75th, percentiles of acculturation (PAS-3) are represented by blue and red, respectively. The 25th and 75th percentiles of behavioral health visits (BHFreq) are represented by bold and regular line formatting, respectively. Corresponding data is found in Tables 3 and 4.

The GAD-7 score at intake for patients with an acculturation score of 0 was 9.19

(p < .001). For each additional point in acculturation, intake scores were .306 points (p =

.090) higher and would be considered statistically significant if p < .10. Because of the

significant quadratic function, the instantaneous rate of change (i.e., slope of the tangent

line), as a function of month, was -2.011 (p < .001). Consequently, for those who were 1

point higher in acculturation, the instantaneous rate of change increased by .235 (i.e.,

-1.78, p = .020), which was significant. Similarly, each additional BH visit adjusted the

instantaneous rate of change by .054, such that for every additional BH visit, the instantaneous rate of change was -1.96 ($p = .175$), which was non-significant. Results indicated that both an increase in acculturation and behavioral health visits caused a non-significant deceleration in the positive change to the instantaneous rate of change.

Because of the significant quadratic, the change in the rate of change (how quickly or slowly the simple slopes were changing for one unit change in time) indicated that the slope was significantly increasing and becoming more positive over time at the rate of .185 for patients with an acculturation score of 0 at intake ($p < .001$). For every 1 point increase in acculturation, the change to the curvature was decreasing (becoming more negative) at a rate that was -.019 less than .185 (i.e., .166, $p = .075$), which was non-significant. For every additional behavioral health visit, the change in the rate of change decreased by -.006 compared to the change in the rate of change of .185 (i.e., .179, $p = .225$), which was non-significant. Results indicated that both an increase in acculturation and behavioral health visits caused a non-significant deceleration in the positive change to the instantaneous rate of change.

The tau correlation (representing the correlation between initial status and growth) can be used to determine whether intake depression levels predict later levels. The linear term ($\tau = -.469$, $p < .05$) was statistically significant, suggesting that higher intake GAD-7 scores (anxiety) were associated with lower GAD-7 instantaneous rate of change scores. The quadratic term ($\tau = .432$, $p < .05$) was statistically significant, suggesting that in the full and final model intake GAD-7 (anxiety) scores were statistically significantly related to growth curvature.

Understanding the variance components in a multilevel model is critical in understanding its adequacy. The tau coefficient (τ_{00}) associated with the empty model was 18.570 and the σ^2 was 14.069. The resulting intraclass correlation (.539) suggested that 54% of the variance was between persons, 46% within persons. Relative to the empty model, my full and final model explained 29% of between-persons variance and 34% of within-persons variance. The variance components associated with the intercepts and slopes were all statistically significant, suggesting that more variance could still be explained.

Table 3

Evaluating the Fit of Linear and Quadratic Growth Models on Dependent Variables

	Coefficients			Variance Components					Deviance		
	β_{00}	β_{10}	β_{20}	r_{0i}	r_1	r_2	$\sigma^2 (e_{ti})$	$\downarrow\sigma^2$	Dev	Par	ΔDev
PHQ-9: ICC = 57%											
Empty	10.856***			23.59***			20.17		11,661.98	3	
MNTH	12.05***	-.82***		28.00***	1.03***		14.46	28%	11447.13	6	214.85 *
MNTH^2	12.81***	-2.163***	.214***	30.66***	4.94***	.06***	11.85	18%	11303.20	10	143.93*
MNTH^2 with PAS3 and BHFREQ	12.777***	-3.288***	.339***	30.72***	5.11***	.06***	11.78	1%	11287.82	15	15.38*
GAD-7: ICC = 57%											
Empty	8.099***			18.57***			14.07		352.91	3	
MNTH	8.946***	-.565***		21.28***	.66***		10.88	23%	10882.33	6	152.81*
MNTH^2	9.423***	-1.399***	.126***	24.18***	3.86***	.03***	9.37	14%	10759.47	10	122.86*
MNTH^2 with PAS3 and BHFREQ	9.191***	-2.011***	.185***	23.96***	3.76***	.03***	9.34	.4%	10736.61	15	22.86*

Note. ICC is the intraclass correlation. $\downarrow\sigma^2$ is the reduction in within-persons variance from the immediately previous model. ΔDev is the reduction in deviance from the immediately previous model and the results of a chi-square difference test of the nested models. Empty is intercept only. MNTH includes Month with random intercept and slope. MNTH^2 includes Month and Month^2 with random intercept, slope and curvature. MNTH^2 with PAS3 and BHFREQ includes Month and Month^2 with random intercept, slope and curvature and L2 variables of acculturation (PAS3; entered at intercept, slope, and curvature) and frequency of behavioral health visits (BHFREQ; entered at slope and curvature). *** denotes $p < .001$, ** denotes $p < .01$, * denotes $p < .05$, † denotes $p < .10$.

Table 4
Full and Final Model Evaluating Depression (PHQ-9) and Anxiety (GAD-7) as a Function of Time, Acculturation (PAS-3), and Frequency of Behavioral Health Visit (BHFREQ)

Fixed Effect				
For INTRCPT1, π_0	Depression (PHQ-9)		Anxiety (GAD-7)	
Fixed Effect	Coefficient	*SE*	Coefficient	*SE*
INTRCPT2, β_{00}	12.777***	.324	9.191***	.301
PAS3ACCU, β_{01}	.110	.205	.306†	.181
For MNTH slope, π_1				
INTRCPT2, β_{10}	-3.288***	.429	-2.011***	.347
PAS3ACCU, β_{11}	.228†	.102	.235*	.100
BHFREQ, β_{12}	.126*	.050	.054	.040
For MNTH^2 slope, π_2				
INTRCPT2, β_{20}	.339***	.062	.185***	.041
PAS3ACCU, β_{21}	-.018	.015	-.019†	.041
BHFREQ, β_{22}	-.015*	.007	-.006	.005
Random Effect	Coefficient	*SD*	Coefficient	*SD*
INTRCPT1, r_0	30.720***	5.543	23.957***	4.895
TIME slope, r_1	5.105***	2.260	3.756***	1.938
TIME^2 slope, r_2	.065***	.255	.035***	.187
level-1, e	11.777	3.432	9.339	3.056

Note. *** denotes $p < .001$, ** denotes $p < .01$, * denotes $p < .05$, † denotes $p < .10$.

Post Hoc and Exploratory Analyses

Because HLM modeling recommendations suggest that there should be one more data point than known parameters for a linear individual growth model, three waves of data (or time points) for each participant is commonly recommended (Willett et al., 1998). In the prior analyses participants were required to have at least one PHQ-9 and GAD-7 score. Frequency data indicated that 28.6% of the sample had only one or two behavioral health visits, 39.4% only one or two PHQ-9 scores, and 45.3% only one or two GAD-7 scores (see Table 1). Given these percentages in conjunction with HLM common practice, I made the decision to run post-hoc analyses excluding individuals with less than three PHQ-9 and

GAD-7 scores. Inclusion criteria remained the same with the exception that each participant

was required to have three or more behavioral health visits (i.e., three or more PHQ-9 and

GAD-7 scores). Of the 597 initial participants, 354 were included for analyses, meaning that

they had participated in at least three behavioral health visits and had at least three PHQ-9

and GAD-7 scores. The sample was 71.5% female. The average age was 55.84 ($SD =$

16.92). Patient ages ranged from 18.44 to 111.60 years. Among participants, 82.5%

indicated experiencing a language barrier. The mean number of behavioral health visits was

7.49 ($SD = 3.36$).

Evaluating the Impact of Acculturation and Behavioral Health on Depression

Similar to the prior analyses, I tested a model predicting the repeated measures

depression variable PHQ-9 as a function of acculturation status and frequency of behavioral

health visits. However, in this set of analyses I entered time in its cubic form in addition to

its linear and quadratic forms. I entered the acculturation and frequency of behavioral health

(BHFreq) visits separately. With respect to depression, as shown in Table 5 and illustrated in

Figure 5, results indicated a significant cubic function.
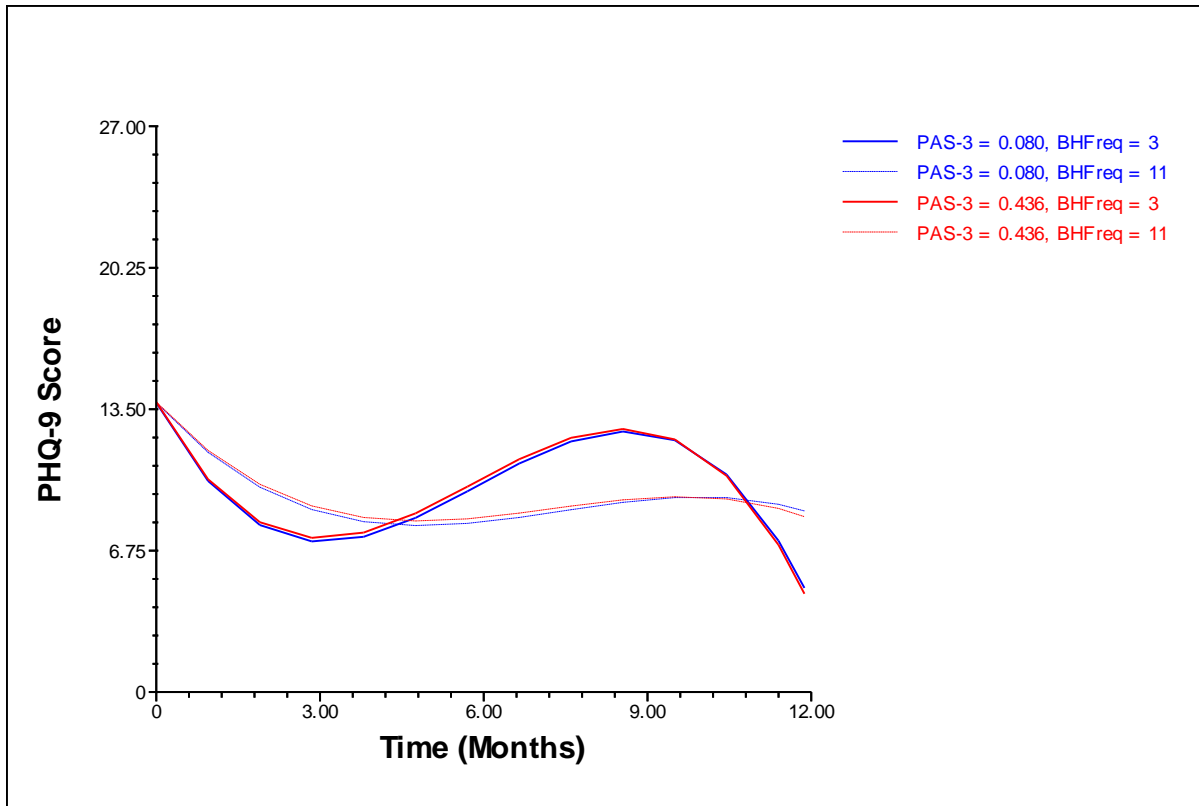
Figure 5. Graph of PHQ-9 scores as a function of change over time, moderated by acculturation (PAS-3) and frequency of behavioral health visits (BHFreq). Graph indicates a significant cubic function (β_{30} = -.077, $p < .001$) with a significant instantaneous rate of change (β_{10} = -5.669, $p < .001$). The non-significant moderating effect of acculturation on instantaneous rate of change was β_{11} = .163 (p = .468) and the significant moderating effect of BHFreq was (β_{12} = .252, p = .005). There was a non-significant moderating effect of acculturation (PAS-3; β_{21} = -.005, p = .931), but a significant moderating effect of BHFreq (β_{22} = -.080, p = .004) on the change to the rate of change. There was a non-significant moderating effect of acculturation (PAS-3; β_{31} = -.001, p = .770) and BHFreq (β_{32} = .005, p = .010) on the cubic term. The 25th and 75th, percentiles of acculturation (PAS-3) are represented by blue and red, respectively. The 25th and 75th percentiles of behavioral health visits (BHFreq) are represented by bold and regular line formatting, respectively. Corresponding data is found in Table 5.

The PHQ-9 score at intake for patients with an acculturation score of 0 was 13.80 ($p < .001$). The gain in PHQ-9 score was .089 points (p = .708) for every 1 point increase in acculturation, which was not significant. The average instantaneous rate of change as a function of month was -5.669 ($p < .001$). Consequently, for those who were 1 point higher in

acculturation, the instantaneous rate of change increased by .163 (i.e., -5.506, $p = .468$) but this was non-significant. Similarly, each additional BH visit adjusted the instantaneous rate of change by .251 such that for every additional BH visit, the instantaneous rate of change was -5.417 ($p = .005$), which was significant.

The change in the rate of change (how quickly or slowly the simple slopes were changing for one unit change in time) indicated that the slope was significantly increasing and becoming more positive over time at the rate of 1.320 for patients with an acculturation score of 0 at intake ($p < .001$). For every 1 point increase in acculturation, the change to the curvature was decreasing (becoming more negative) at a rate that was -.005 less than 1.320 (i.e., 1.315, $p = .931$), which was non-significant. For every additional behavioral health visit, the change in the rate of change decreased by -.080 compared to the change in the rate of change of 1.320 (i.e., 1.240, $p = .004$), which was significant. The cubic term for patients with acculturation score of 0 at intake was significant at -.077 ($p < .001$). The moderating impact of acculturation on the cubic term was non-significant ($\beta_{31} = .001$, $p = .770$), but the moderating impact of behavioral health visit was significant ($\beta_{32} = .005$, $p = .010$). Results indicated that frequency of behavioral health visits significantly moderated depression growth trajectories.

The tau correlation (representing the correlation between initial status and growth) can be used to determine whether intake depression levels predict later levels. The linear term ($\tau = -.315$, $p < .05$) was statistically significant, suggesting that higher intake PHQ-9 (depression) scores were associated with lower PHQ-9 instantaneous rate of change scores. The quadratic ($\tau = .193$, $p > .05$) and cubic ($\tau = -.126$, $p > .05$) terms were not statistically

significant, suggesting that in the full and final model intake PHQ-9 scores were not statistically significantly related to growth curvature.

Understanding the variance components in a multilevel model is critical in understanding its adequacy. The tau coefficient (τ_{00}) associated with the empty model was 23.586 and the σ^2 was 21.170. The resulting intraclass correlation (.539) suggested that 51% of the variance was between persons, 49% within persons. Relative to the empty model, my full and final model explained 29% of between-persons variance and 49% of within-persons variance. The variance components associated with the intercepts and linear slope were statistically significant, suggesting that more variance could still be explained. The variance components for the quadratic and cubic slopes were not statistically significant.
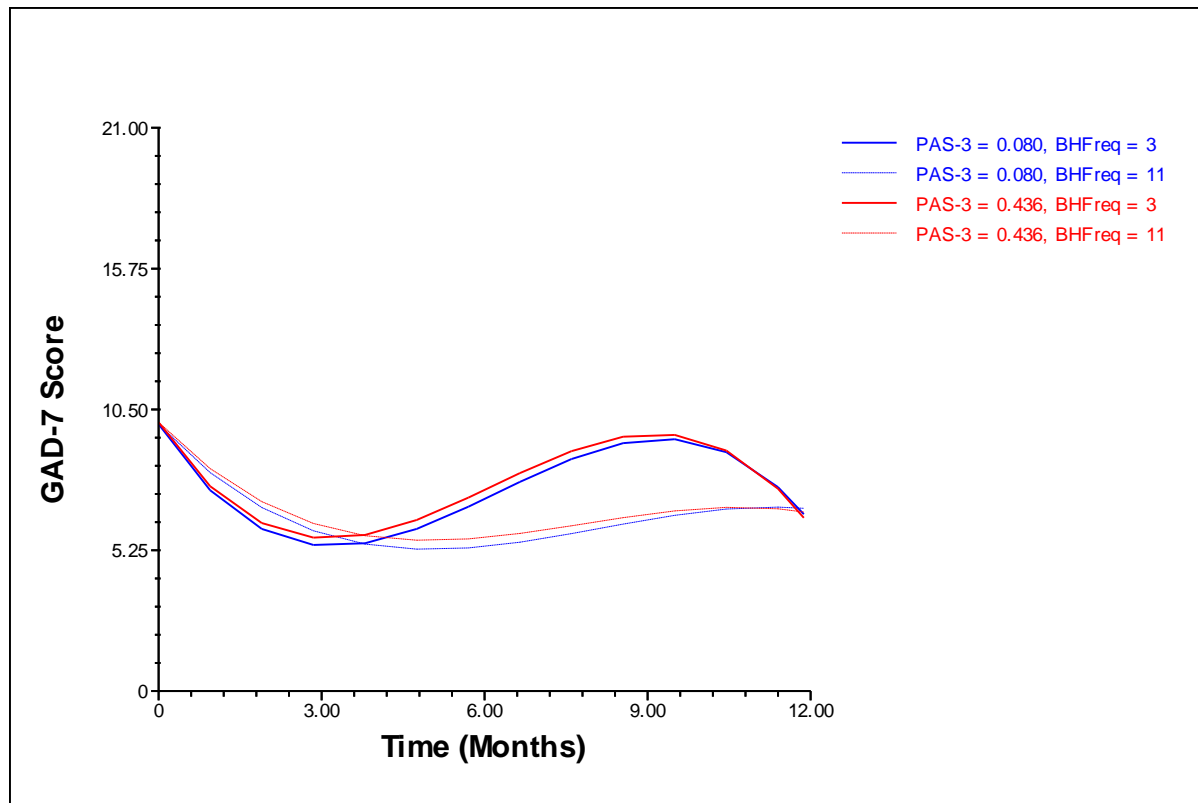
Figure 6. Graph of GAD-7 scores as a function of change over time, moderated by acculturation (PAS-3) and frequency of behavioral health visits (BHFreq). Graph indicates a significant cubic function ($\beta_{30} = -.044$, $p < .001$) with a significant instantaneous rate of change ($\beta_{10} = -3.599$, $p < .001$). The non-significant moderating effect of acculturation on instantaneous rate of change was $\beta_{11} = .255$ ($p = .148$) and the moderating effect of BHFreq was ($\beta_{12} = .126$, $p = .075$), which was also non-significant. There was a non-significant moderating effect of acculturation (PAS-3; $\beta_{21} = -.018$, $p = .687$), but a significant moderating effect of BHFreq ($\beta_{22} = -.044$, $p = .035$) on the change to the rate of change. There was a non-significant moderating effect of acculturation (PAS-3; $\beta_{31} = -.001$, $p = .882$) and BHFreq ($\beta_{32} = .003$, $p = .057$) on the cubic term. The 25th and 75th, percentiles of acculturation (PAS-3) are represented by blue and red, respectively. The 25th and 75th percentiles of behavioral health visits (BHFreq) are represented by bold and regular line formatting, respectively. Corresponding data is found in Table 5.

The GAD-7 score at intake for patients with an acculturation score of 0 was 9.93 ($p < .001$). The gain in GAD-7 score was .195 points ($p = .350$) for every 1 point increase in acculturation, which was not significant. The average instantaneous rate of change as a function of month was -3.599 ($p < .001$). Consequently, for those who were 1 point higher in

acculturation, the instantaneous rate of change increased by .255 (i.e., -3.343, $p = .148$) but this was non-significant. Similarly, each additional BH visit adjusted the instantaneous rate of change by .126 such that for every additional BH visit, the instantaneous rate of change was -3.472 ($p = .075$), which was non-significant.

The change in the rate of change (how quickly or slowly the simple slopes were changing for one unit change in time) indicated that the slope was significantly increasing and becoming more positive over time at the rate of .805 for patients with an acculturation score of 0 at intake ($p < .001$). For every 1 point increase in acculturation, the change to the curvature was decreasing (becoming more negative) at a rate that was -.018 less than .805 (i.e., .787, $p = .687$), which was non-significant. For every additional behavioral health visit, the change in the rate of change decreased by -.044 compared to the change in the rate of change of .805 (i.e., .761, $p = .035$), which was significant. The cubic term for patients with acculturation score of 0 at intake was significant at -.044 ($p < .001$). The moderating impact of acculturation on the cubic term was non-significant ($\beta_{31} = -.001$, $p = .882$) as was the moderating impact of behavioral health visits ($\beta_{32} = .003$, $p = .057$).

The tau correlation (representing the correlation between initial status and growth) can be used to determine whether intake depression levels predict later levels. The linear term ($\tau = -.341$, $p < .05$) was statistically significant, suggesting that higher intake GAD-7 scores (anxiety) were associated with lower GAD-7 instantaneous rate of change scores. The quadratic ($\tau = .122$, $p > .05$) and cubic ($\tau = .090$, $p > .05$) terms were not statistically significant, suggesting that in the full and final model intake GAD-7 (anxiety) scores were not statistically significantly related to growth curvature.

Understanding the variance components in a multilevel model is critical in understanding its adequacy. The tau coefficient (τ_{00}) associated with the empty model was 18.570 and the σ^2 was 14.069. The resulting intraclass correlation (.539) suggested that 54% of the variance was between persons, 46% within persons. Relative to the empty model, my full and final model explained 26% of between-persons variance and 40% of within-persons variance. The variance components associated with the intercepts and slopes were all statistically significant, suggesting that more variance could still be explained.

Table 5
Restricted Sample (N = 354) - Full and Final Model Evaluating Depression (PHQ-9) and Anxiety (GAD-7) as a Function of Time (cubic), Acculturation (PAS-3), and Frequency of Behavioral Health Visit (BHFREQ)

Fixed Effect				
For INTRCPT1, π_0	Depression (PHQ-9)		Anxiety (GAD-7)	
Fixed Effect	Coefficient	*SE*	Coefficient	*SE*
INTRCPT2, β_{00}	13.798***	.392	9.934***	.343
PAS3ACCU, β_{01}	.089	.238	.195	.208
For MNTH slope, π_1				
INTRCPT2, β_{10}	-5.669***	.761	-3.599***	.614
PAS3ACCU, β_{11}	.163	.225	.255	.176
BHFREQ, β_{12}	.252**	.089	.126†	.071
For MNTH^2 slope, π_2				
INTRCPT2, β_{20}	1.320***	.242	.805***	.188
PAS3ACCU, β_{21}	-.005	.061	-.018	.044
BHFREQ, β_{22}	-.080**	.027	-.044**	.021
For MNTH^3 slope, π_3				
INTRCPT2, β_{30}	.077***	.018	-.044***	.021
PAS3ACCU, β_{31}	-.001	.061	-.001	.003
BHFREQ, β_{32}	-.005*	.002	.003†	.001
Random Effect	Coefficient	*SD*	Coefficient	*SD*
INTRCPT1, r_0	27.221***	5.217	20.656***	4.545
TIME slope, r_1	14.136**	3.759	7.437***	2.727
TIME^2 slope, r_2	.817†	.904	.302**	.549
TIME^3 slope, r_3	.003	.054	.001*	.029
level-1, e	10.430	3.230	8.515	2.918

Note. *** denotes $p < .001$, ** denotes $p < .01$, * denotes $p < .05$, † denotes $p < .10$.

CHAPTER IV

Discussion

Depression and anxiety are highly prevalent disorders among primary care populations, including AAPIs. Among primary care populations, AAPIs are less likely to seek mental health services. Thus integrated primary care provides a logical avenue by which to engage them in mental health care. In the current study, I sought to explore the efficacy of an integrated primary care/behavioral health model in improving depression and anxiety outcomes among AAPIs. Furthermore, I examined the potential moderating impacts of acculturation and frequency of behavioral health visits on depression and anxiety outcomes.

Depression and Anxiety Trajectories and Outcomes among AAPIs

My investigation of growth trajectories among AAPIs supported significant quadratic and cubic functions for depression outcomes. Based on the quadratic growth trajectory, depression levels (PHQ-9 scores) decreased upon engagement in behavioral health services, reached a minimum around 5 months from intake, and then began to increase through 12 months. This significant change over time was consistent with my hypothesis that there would be a decrease in depression levels with treatment. However, the significant quadratic function (i.e., increase in depression levels at 5 months) was incongruent with my hypothesis. Comparatively, in the cubic growth trajectory, depression levels among individuals differed as a function of frequency of behavioral health visits. For individuals with low frequency of behavioral health visits, depression levels reached a minimum around 3 months from intake, and then increased until 9 months, at which point levels again decreased through 12 months. Individuals with high frequency of behavioral health visits demonstrated a decrease in

depression levels through approximately 4 months from intake, with very minimal

fluctuation and maintenance of the decrease through 12 months.

My investigation of anxiety growth trajectories also supported significant quadratic

and cubic functions. In the quadratic growth trajectory, anxiety levels (GAD-7 scores)

decreased upon engagement in behavioral health services, reached a minimum around 6

months from intake, and then increased through 12 months. The significant change over time

was consistent with my hypothesis that there would be a decrease in anxiety levels with

treatment. However, the significant quadratic function was incongruent with this hypothesis.

In the cubic growth trajectory, anxiety levels among individuals differed as a function of

frequency of behavioral health visits with regard to slope. Anxiety levels for individuals

initially decreased from intake through 3 months. At approximately 3 months, anxiety levels

differed as a function of behavioral health visits such that individuals with low frequency of

behavioral health visits demonstrate an increase in anxiety levels through 9 months, and then

a steady decrease again through 12 months. Individuals with high frequency of behavioral

health visits remained generally stable in their anxiety level scores from 3 months through 12

months, maintaining the decrease from intake.

The initial decrease in depression and anxiety scores upon engagement in behavioral

health treatment is congruent with previous research that engagement in behavioral health

models of care improves depression (Bryan et al., 2009, 2012; Katon et al., 2002b; Katon &

Seelig, 2008; Ray-Sannerud et al., 2012; Unützer et al., 2002) and anxiety (Bryan et al.,

2012; Katon et al., 2002a; Ray-Sannerud et al., 2012; Roy-Byrne et al., 2001; 2010)

outcomes. A meta-analysis by Katon and Seelig (2008) cited improvements in symptoms

ranging from 2 to 5 years after treatment. Other studies have found improved outcomes at 12

months (Ünutzer et al., 2002) and up to 2 years later (Bryan et al., 2009; 2012; Ray-Sannerud et al., 2012). When considering the subsequent fluctuations in depression and anxiety scores after 3 months (e.g., increase and later decrease), in many behavioral health models, visits are commonly limited to three to eight visits (Robinson & Reiter, 2007; Roy-Byrne et al., 2009; Strosahl, 1997). Given these outcomes and typical model implementation, it is possible that treatment would have concluded by 6 months for patients for whom the model is a strong fit. In the primary sample, 72.1% of the sample had up to 8 visits, with the remaining sample having up to 12 visits. The increase in scores after 3 months could be explained by the cohort of patients for whom the model is *not* a strong fit (Strosahl et al., 1994). This cohort may be more disordered and higher utilizers, thus needing care that persists beyond 6 months. This hypothesis of differential outcomes based on symptom severity is consistent with Bryan and colleagues (2009) study in which they found that higher utilizers (patients with 4 visits) did not significantly improve compared to patients with 1 to 3 visits. Bryan and colleagues (2009) suggest that this cohort may be better served in a traditional mental health model, which is potentially true of the ICHS patients with more frequent behavioral health visits. However, in the post-hoc analyses of my study, individuals with less frequent visits demonstrated *more* fluctuation in depression levels (e.g., increase in symptoms and then subsequent decrease). It is possible that this is a higher disordered but less treatment compliant cohort of patients. It is possible that this cohort of patients initially sought or was referred for treatment, perhaps improved over the first several months, but was non-compliant with treatment or stopped coming to treatment, during which time their symptom levels increased. They then perhaps were re-referred for treatment, or re-engaged in treatment at a point of higher symptom severity, which again resulted in symptom decrease.

Furthermore, ICHS has been participating in the MHITS program since 2010, during which time the behavioral health department underwent leadership changes. The change in leadership during that time resulted in alterations to the implementation and utilization of behavioral health services. Some of the early patients in the data set were engaged in behavioral health services for much longer and perhaps were treated in a more traditional mental health model (up to 72 visits) than later patients (more commonly several visits).

Practice implications among AAPIs. The behavioral health model of care demonstrated significant clinical changes among AAPI populations with initial decreases in depression and anxiety symptomatology. Given the traditionally low treatment-seeking rates among AAPIs (Abe-Kim et al., 2007; Chen, 2005; Matsuoka et al., 1997; Xu et al., 2011), providing mental health services within an integrated setting provides increased opportunity to engage AAPI individuals in treatment. Also, as primary care has been cited as the de facto mental health system (Byrd et al., 2004; Regier et al., 1993, Robinson et al., 2005), with the majority of primary care visits including a psychosocial component, it behooves the medical and mental health fields to continue towards integrated care. With specific ethnic populations, a clinic like ICHS, which aims to provide culturally- and linguistically-relevant services to AAPIs, will likely increase access to care and result in clinically significant outcomes. My study adds to the current literature in demonstrating the impact of the integrated primary care model with AAPIs. Similar to the study by Ratzliff and colleagues (2013), looking at depression treatment of Asian Americans within a culturally sensitive clinic compared to general community clinics, my study found significant results regarding benefits of collaborative care among racial-ethnic minorities. My study builds upon the work by Ratzliff and colleagues as it models growth trajectories among AAPI individuals for

depression and anxiety outcomes as a function of time. The significant decrease in symptomatology coupled with subsequent differential growth trajectories as a function of frequency of behavioral health visits, suggests that more research should be done to better understand integrated primary care among AAPIs. Furthermore, the fluctuation in symptoms over time suggests the need to identify factors among AAPIS with low frequency behavioral health visits that may contribute to more symptom level change over time.

Moderating Impact of Acculturation

Researchers have explored the impact of acculturation among immigrant and refugee populations, and the role it plays in mental health outcomes (Berry et al., 1987; Finch & Vega, 2003; Hovey, 2000; Hwang & Ting, 2008; Kiang et al., 2010; Ortega et al., 2000). In my study, intake scores did not differ as a function of acculturation, such that there was not a significant difference in intake depression or anxiety scores regardless of acculturation level. The initial growth rate (instantaneous rate of change) was significant for both PHQ-9 and GAD-7 scores, such that patients initially decreased as a function of change over time. The moderating impact of acculturation on the instantaneous rate of change was non-significant for both PHQ-9 and GAD-7 scores. Acculturation did not impact the change to the rate of change (i.e., the deceleration or acceleration of the instantaneous rate of change or slope), and was non-significant at the cubic level.

These findings are incongruent with my hypothesis that higher acculturation would be associated with better depression and anxiety outcomes. Because of the limitations of the data set, a proxy acculturation measure was used, which was a pragmatic and supported acculturation measurement metric (Escobar & Vega, 2000). However, using a proxy acculturation measure was not without limitations. It is possible that the proxy scale was not

able to fully account for the impact of acculturation. A self-report or administered

acculturation measure might produce different results. Furthermore, much of the

acculturative literature emphasizes the role of acculturative stress on health outcomes

(Hwang & Ting, 2008; John et al., 2012). It is possible that future studies that are better able

to disaggregate the construct of acculturative stress from acculturation may provide

additional insight into the impact on acculturation on mental health outcomes.

Moderating Impact of Frequency of Behavioral Health Visits

The current study found a significant moderating effect of frequency of behavioral

health visits on the instantaneous rate of change and change to the rate of change (i.e., the

deceleration or acceleration of the instantaneous rate of change or slope), which was

significant for depression (PHQ-9 scores), but was non-significant for anxiety (GAD-7

scores). For every individual's increase in number of visits, the rate of decrease in

depression rates slowed. Individuals who utilized behavioral health more frequently

decreased in symptomatology at a lesser rate and did not achieve as low of symptom levels

compared to individuals that were less frequent utilizers of behavioral health services.

Frequency of behavioral health visits did significantly impact the change to the rate of

change such that individuals with more behavioral health visits slowed the instantaneous rate

of change (deceleration).

Overall, for depression, individuals differed in growth trajectories as a function of

frequency of behavioral health visits. More specifically, individuals with more behavioral

health visits were slightly higher in depression and anxiety levels, which is consistent with

previous research that higher utilizers tend to be more disordered (Bryan et al., 2009).

However, while symptomatology significantly changed over time, the growth trend indicated

that these individuals did not increase or decrease to the same symptom levels as lower utilizers of behavioral health services. Individuals with lower frequency of behavioral health visits evidenced a more variable growth trajectory, with an increase in symptoms and then subsequent decrease. It is important to note that both groups significantly decreased in depression and anxiety levels. However, this study could be strengthened by looking more specifically at some of the individual differences among low versus high behavioral health utilizers. Additionally, this study limited participants to 12 visits because of statistical software requirements.

Study Limitations

Because my study was a program evaluation utilizing archival data, I was limited to the variables included in the dataset and was unable to implement additional measures beyond what were previously and currently collected (e.g., acculturation measures, item-level data, medication data). While I was still able to explore growth trajectories, the study would potentially be strengthened by an acculturation measure that is more fine-grained and nuanced to the components of acculturation. Furthermore, given the links between acculturative stress and health outcomes, a specific measure of acculturative stress (as opposed to level of acculturation) might provide additional information on the impact of acculturation on mental health outcomes among AAPI individuals.

Some of the literature looking at collaborative care and integrated primary care models utilizes data that is collected within operational clinics and may lack data regarding medication type, adherence, and implementation. My study also does not report medication data, which is a limitation. It is possible that improvements in patient outcomes may be in part due to medication, and future studies would be strengthened by tracking patients'

medications, including use of psychotropic medications, duration of medication prescription, and medication compliance. In my study, the data file included extensive medication data, tracking every medication the patient was taking, which was not limited to psychotropics. In addition, various psychotropic medications were coded with multiple identifiers, such that a standard antidepressant was identified in the data set with five or more different codes. Because of the coding complexity, and overall purpose of my dissertation, I chose not to explore the impact of medication. It is possible that medications could be an indicator of patient severity (e.g., patients with more symptomatology are more likely to be prescribed medication), patient compliance (e.g., patients who are compliant with medication may be more engage in treatment), or could be assumed to be a standard co-therapeutic device (e.g., within primary care, patients often come to providers wanting help, of which medication is an option.). The current data set is limited in that it does not provide information regarding medication compliance or duration of medication use. In future studies, it might be possible to identify whether or not patients are prescribed medication and look for moderating effects, which could contribute to understanding some of the discrepancies in the data with regard to longitudinal growth trajectories.

Using HLM allowed me to look at longitudinal growth trajectories and manage missing data. Typical longitudinal growth modeling encourages the use of at least three time points. In this study I included individuals who only had one behavioral health visit and PHQ-9 and/or GAD-7 score, but in post-hoc analyses, required three or more visits. Having a large number of patients with only one visit may also have impacted initial outcomes. Given the statistical recommendations, I would suggest that future studies looking at patient outcomes/growth trajectories utilize at least three time points. Because of the behavioral

health leadership change at ICHS during the course of data collection, a patient who engaged in behavioral health services pre-leadership change appeared to have more frequent and in-depth behavioral health sessions than those post-leadership change. As such, the model of care would have been less congruent with the behavioral health primary care brief intervention model, therefore impacting overall growth trajectories. Limiting the sample to patients who participated in the brief intervention behavioral health model might provide a more accurate picture of growth trajectories within integrated/collaborative care models.

Behavioral health and integrated primary care focus on brief interventions and improving patient functioning. Thus not all patients are an ideal fit for a behavioral health model. It is possible that patients encounter mental health services for the first time within a behavioral health model, but their needs are greater than the scope of what behavioral health providers can provide. Ideally, in such situations, these patients are referred to outside mental health resources (e.g., outpatient mental health clinics) that are better equipped to deal with longer term and more severe mental illness. Within the patient population at ICHS, I believe that behavioral health currently and historically sees both types of patients. Because of the cultural and language barriers many ICHS patients experiences, they sometimes are wiling to engage in receiving behavioral health/mental health support at ICHS, but are resistant to outside referrals for more long-term and intensive mental health treatment. In the spirit of providing access to care, ICHS providers have at times continued to provide services for more severely disordered patients, believing it is better than the patient refusing any care engagement. This reality, however, challenges the model of care's emphasis on providing access and brief interventions to patients for whom the model is a strong fit. It is possible that my results, demonstrating a quadratic growth trajectory (i.e., symptom improvement and

then return to baseline), are impacted by the cohort of patients for whom behavioral health

care is not the best fit. Disaggregating out patients who are more severely impaired

(indicated by higher PHQ-9 and GAD-7 scores as well as engagement in care for more than

12 months), might provide more accurate data regarding the impact of behavioral health on

AAPI individuals for whom the model is a good fit. Additionally, the cubic growth

trajectory suggests a need to think about patients differentially based on their utilization of

services (i.e., high versus low behavioral health visit frequency). ICHS might want to

consider preventative attempts to re-engage patients with low frequency of behavioral health

visits in care, especially around 6 months given that between 6 and 9 months symptoms

appeared to be increasing for that low utilization group. Given the results of my study, I

believe it important to further explore what contributes to patients' worsening over time.

Finally, with any treatment, patient compliance and engagement in treatment impacts

outcomes. My study does not have data regarding patient engagement or treatment

compliance, but given the differential outcomes based on frequency of visits, information

regarding compliance may add to better understanding characteristics of the group of low

versus high utilizers.

Future Directions and Research

My study is congruent with the literature regarding outcomes for behavioral health

models with some notable additions. Specifically, this study explores depression and anxiety

growth trajectories of AAPI individuals within an integrated care/behavioral health model.

The opportunity to see individuals' engagement in behavioral health services at ICHS

coupled with the longitudinal nature of this study provide important support for continued

engagement of AAPI individuals within collaborative care/integrated care models. My study

did not find significant results regarding the moderating impact of acculturation. Within the acculturation literature, there are varied opinions on the best way to measure the construct, and this continued lack of clarity regarding construct measurement may continue to impact future studies. The significant moderating impact of frequency of behavioral health visits and the respective growth trajectories suggest the need to think more about AAPIs as a population and ways in which treatment can engage lower utilizers. Given the AAPI population's low treatment seeking, integrated/collaborative care models that emphasize providing culturally sensitive interventions (e.g., in-language services) like ICHS may be a logical fit for this underserved population.

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