THE PERSONAL RELEVANCE OF PSYCHOTHERAPY FOR ASIAN AMERICANS

by

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A DISSERTATION

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DISSERTATION ABSTRACT

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Title: The Personal Relevance of Psychotherapy for Asian Americans

Purpose: For at least 50 years, significant mental health disparities between people of color and White Americans have existed. There has been minimal movement in decreasing mental health disparities, particularly among Asian Americans, due to limitations in existing treatments. The personal relevance of evidence-based treatments and culturally-adapted treatments may be a crucial link in furthering intervention research, increasing client engagement with treatment, and addressing these disparities. The main objective of this study was to assess the personal relevance of Problem-Solving Therapy (PST) and Cognitive Behavioral Therapy (CBT) to Asian Americans (AAs), with data from neuroimaging methods (Study 1) and self-report measures (Study 2). I also investigated the moderating effect of acculturation on personal relevance. I hypothesized PST would be more personally relevant than CBT for low-acculturated AAs because its external problem-solving approach is less likely to conflict with Asian values.

Sample and Methods: In Study 1, using fMRI, I acquired whole-brain functional neuroimages from 28 AA participants as they completed a task assessing the self-relevance of treatment content from PST and CBT. I used a voxel-wise p-value of .005 and a cluster-extent threshold of 150 to adjust for multiple comparisons. After being

scanned, participants completed self-report questionnaires. In Study 2, 88 English-speaking AAs and 54 White American adults, recruited via Qualtrics Panels, viewed the same PST and CBT stimuli and completed online self-report questionnaires.

Results: In Study 1, there was significantly greater activation in self-processing regions (medial and ventromedial prefrontal cortex) when participants viewed PST vs. CBT content. First- and second-generation (or low-acculturated) AAs experienced greater activation in self-processing regions when viewing PST vs. CBT content than third-generation (or highly acculturated) AAs. Self-report questionnaires were not correlated with activation in self-processing regions. In Study 2, AAs reported a preference for PST vs. CBT, while White Americans did not report a preference for either treatment.

Conclusion: Evidence indicates AAs prefer PST over CBT, suggesting that PST may be more culturally and personally relevant for AAs. Low-acculturated AAs preferred PST over CBT more than highly acculturated AAs, signifying that individual differences in acculturation influence the perceived personal relevance of PST.

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Introduction

In 2017, the National Institute of Mental Health (NIMH) estimated that one in five U.S. adults experienced mental illness in any particular year. For serious mental disorders, which impact an individual's functioning on multiple levels, NIMH (2017) estimated that 1 in 25 adults experienced a serious mental disorder in any year. Unfortunately, despite how ubiquitous mental disorders are, less than 50% of U.S. adults who experienced a mental disorder received any mental health services within the past year. Among people of color, the rates of mental health services usage are lower. Whereas 48% of Whites who had a mental disorder received treatment, only 33% of Hispanics, 31% of Blacks, and 20% of Asian Americans who had a mental disorder received treatment (NIMH, 2017). These mental health disparities are defined by the Centers for Disease Control and Prevention (CDC) as inequalities between populations on their mental health and the quality, accessibility, and outcomes of mental health care (as cited in Safran et al., 2009, p. 1963).

In 1977, *American Psychologist* published Stanley Sue's seminal paper on treatment disparities between patients of color in the Seattle, Washington, area. Sue (1977) found some noteworthy differences in treatment utilization and treatment dropout rates. While Asian Americans and Chicanos were underrepresented at community mental health centers relative to the local population, Blacks and Native Americans were overrepresented at these centers. These findings suggest significant differences in treatment utilization rates. Blacks and Native Americans used mental health services at higher rates than Asian Americans and Chicanos, but at a lower rate than Whites. In

addition, there were disparities in treatment outcomes. Blacks, Native Americans, Asian Americans, and Chicanos were significantly more likely than Whites to drop out of treatment after one session. This is worrisome as clients who drop out of treatment early generally have worse outcomes than those who stay in treatment (Barrett et al., 2008), as clients who prematurely terminate treatment are not getting the help they need to cope with their mental illness.

Unfortunately, over 40 years later, these disparities continue to exist. For example, compared to Whites, there are significant differences in rates of mood disorders and suicide death, ideation, and attempts among people of color. Researchers aggregated data from four national surveys and found that Asian, Latinx, and Black adults all indicated higher 12-month prevalence of any mood disorder than Whites (Vilsaint et al., 2019). In 2014, the death rate from suicide of adolescent American Indian/Alaska Native females was about four times the rate of their White counterparts (Office of Minority Health [OMH], 2018a). For Asian Americans, suicide was the ninth leading cause of death, compared to the tenth leading cause of death for Whites (OMH, 2018b). Finally, for adolescent Hispanic girls, suicide attempts were 50% higher than for adolescent White girls (OMH, 2018c). Despite these higher suicide rates, mental health service usage rates for non-White adolescents were much lower than their White counterparts of the same age (e.g., 7% for Hispanics versus 17% for Whites) (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). This again reflects the treatment disparities that Sue (1977) documented decades ago.

These disparities are not limited to mood disorders and suicidal ideation and behaviors. Despite women of color experiencing eating disorders at the same rate as

White women (A. Cheng et al., 2019), clinicians and doctors are less likely to identify disordered eating behaviors in women of color than in White women (Becker et al., 2003; Gordon et al., 2006). When viewing these findings together, they suggest that healthcare providers are not identifying women of color who are experiencing symptoms of eating disorders, and these women therefore may not be receiving appropriate access to mental health treatments.

Factors that Contribute to Minority Mental Health Disparities

Several factors contribute to disparities in ethnic minority mental health. Research methodology, assessment of constructs and measures, and treatment for psychopathology are all factors that have been shown to influence mental health disparities. Research methodology, specifically sampling issues, may contribute to mental health disparities because ethnic minorities are often excluded from or underrepresented in study samples. Sampling issues include difficulties in locating ethnic minority participants, small sample sizes (which lead to the aggregating of multiple racial and ethnic groups), a reliance on college samples, and difficulties recruiting ethnic minority participants (Okazaki & Sue, 1995; Safren et al., 2000). Historical research trauma, such as the 1932 Tuskegee experiment where African American men were intentionally infected with syphilis, may explain why some people of color are hesitant to participate in research studies. In a meta-analysis, George et al. (2014) found that a mistrust of research was a commonly reported barrier for African Americans, Latinx, Asian Americans, and Pacific Islanders. However, if studies had research staff who were representative of the participants' racial/ethnic groups, people of color were more likely to participate (George et al., 2014). Although it is unknown if the majority of studies included in the meta-analysis were

conducted by White researchers or researchers of color, the majority, 84%, of the psychology workforce is White (American Psychological Association [APA], 2016). Until the psychology workforce becomes more racially and ethnically diverse, recruiting racially and ethnically diverse participants may continue to be challenging.

In addition to sampling issues, non-equivalent assessment measures of constructs and measures may also contribute to mental health disparities (Okazaki & Sue, 1995; Padilla & Borsato, 2008). Measures that do not equivalently measure the same constructs across groups may indicate that there is no psychopathology where there is, or that there is psychopathology where there is not. Measures of psychopathology and other constructs must consider linguistic, metric, conceptual, and functional equivalencies (Padilla & Borsato, 2008). Ensuring the equivalency of measures takes time, effort, and money. For example, linguistic equivalency consists of translating a measure from English into another language, then translating it back into English (Padilla & Borsato, 2008). The individuals doing the translating should be both fluent in the two languages and knowledgeable about both cultures (i.e., bilingual and bicultural) (Okazaki & Sue, 1995; Padilla & Borsato, 2008). Bilingual and bicultural psychologists may be challenging to find, especially considering the majority of the psychology workforce is White (APA, 2016).

Another example of a labor-intensive task is establishing conceptual equivalence. Conceptual equivalence consists of creating or adapting measures to measure culture-specific constructs, such as *face concern* among Asian Americans (Zane & Mak, 2003). Most current measures of psychopathology were developed by and for Whites and Western cultures, and thus they may not accurately measure other culture-specific

constructs (Sue et al., 2012). Given the difficulties in establishing measurement equivalency, it is understandable why the majority of psychology studies have WEIRD (White, Educated, Industrialized, Rich, and Democratic) samples (Henrich et al., 2010).

Finally, psychotherapy itself may contribute to mental health disparities through the lack of cultural sensitivity in many established psychotherapies or the lack of therapists of color. The lack of therapists of color and cultural sensitivity in White clinicians may cause people of color to find psychotherapy unhelpful. For example, Chang and Yoon (2011) investigated the experiences of ethnic minority clients with White therapists. Many participants in this study believed that their White therapists could not understand some crucial aspects of their racial and cultural identities and experiences. Racial and cultural issues were often avoided in therapy, which may have impacted client outcomes (Chang & Yoon, 2011). When clients and therapists are racially and ethnically matched, relevant cultural issues are brought up (e.g., substance use for African American clients and academic concerns for Asian American clients) (Ibaraki & Hall, 2014). However, racial/ethnic matching sometimes prompted clients to hide issues from their therapist (e.g., suicide for Latinx clients) (Ibaraki & Hall, 2014). Regardless of session content, a client's mental health cannot improve if they do not attend therapy sessions (Barrett et al., 2008). Especially for Asian Americans, racial/ethnic and language matching between clients and therapists have proven to be effective in reducing dropout rates and increasing the number of sessions attended (Presley & Day, 2019). Consequently, research has shown that Asian American clients experience better mental health outcomes when they receive a full course of treatment than when they drop out of treatment (Barrett et al., 2008; Presley & Day, 2019). Unfortunately, it is not always

feasible to match clients and therapists based on race/ethnicity and language (Presley & Day, 2019). Thus, racial/ethnic matching between clients and therapists is helpful, but not the answer. More adaptations besides racial/ethnic matching are needed to improve mental health service usage.

Summary

Research methodology may contribute to ethnic minority mental health disparities because ethnic minorities are often excluded from or underrepresented in study samples. Non-equivalent measures and constructs may also contribute to mental health disparities because the measures may not be culturally sensitive. In addition, psychotherapy may contribute to mental health disparities because people of color may find it unhelpful due to a lack of cultural sensitivity in established psychotherapies and a dearth of therapists of color. Surface-level adaptations such as racial/ethnic matching have been shown to decrease dropout rates, but more comprehensive adaptations to psychotherapy are needed.

Asian American Mental Health Disparities

Asian Americans warrant specific attention because of group-specific mental health disparities that are culturally influenced. Asian Americans consistently are the least likely ethnic group in the United States to use mental health services (SAMHSA, 2015). One common explanation is that Asian Americans may not be using mental health services because they do not experience high rates of mental distress or disorders (Hall & Yee, 2012). There have been multiple epidemiological studies that have found a lower prevalence rate of mental disorders among Asian Americans. For example, findings from the National Latino and Asian American Study (NLAAS) indicated that the overall

lifetime prevalence rate of any psychiatric disorder for Asian Americans was 17%. This rate was significantly lower than the lifetime prevalence rate of 20% to 28% for Latinx Americans (Takeuchi et al., 2007). The 2010 National Survey of Drug Use and Health (NSDUH) revealed that Asian Americans had the lowest prevalence rate of past-year mental disorder (16%) compared to other groups such as Hispanics (18%), African Americans (20%), and Whites (21%) (SAMHSA, 2012). Finally, SAMHSA (2014) also indicated that the prevalence rate of any mental illness for Asian Americans (12%) was lower than White Americans (19%). Thus, at first glance, Asian Americans appear to experience low rates of mental disorders.

However, these prevalence rates may be an underestimation of mental disorders in Asian Americans. In addition to English, the NLAAS only included four Asian languages (Mandarin, Cantonese, Tagalog, and Vietnamese). The NSDUH was conducted in only English. The limited language availability of these surveys in additional languages mean the findings may not account for other Asian subgroups or individuals with limited English ability. When these groups are included, the prevalence rates often increase. In a study of 2,609 Asian American participants, almost half of the participants completed questionnaires in a language other than English (i.e., Chinese, Vietnamese, Korean, Hindi, Gujarati, or Tagalog) (Jang et al., 2019). In this sample, there was a much higher prevalence rate of mental disorders (44%) than in other studies, including the NLAAS (17%) and the NSDUH (16%) (Jang et al., 2019). The vast difference in prevalence rates again may be explained by the limited language abilities of participants in previous studies. Asian Americans may, therefore, experience mental health problems at much

higher rates than previously thought, or at least experience them at rates almost equal to other groups of color.

Factors that Impact Prevalence and Service Utilization Rates

When Asian American do experience mental health disorders, they use mental health services at low rates (SAMHSA, 2015). The reasons for low prevalence and service utilization rates are not clear. However, researchers have identified several possible factors: (a) the influence of nativity and immigration; (b) gender; (c) sub-ethnic group; and (d) acculturation.

Nativity and immigration. Nativity, which refers to where an individual was born, has consistently been shown to impact prevalence rates and mental health service utilization rates. Multiple studies have found that U.S.-born Asians have higher prevalence rates of specific mental disorders (e.g., depression and anxiety) compared to Asians born outside of the United States (Georgiades et al., 2018; Hong et al., 2014; Jackson et al., 2011). For example, Georgiades et al. (2018) found that second-generation Asian American adolescents (i.e., at least one parent is an immigrant, but the individual was born in the United States) had higher odds of a lifetime mood/anxiety disorder than first-generation Asian American adolescents (i.e., immigrant). In a NLAAS Asian American sample, Hong et al. (2014) found that U.S.-born Asians had higher rates of lifetime prevalence of any mental disorder (26%) compared to Asians born outside of the United States (16%). For U.S.-born Asians, that lifetime prevalence rate (26%) is higher than rates found among non-Hispanic Whites (21%) in the NSDUH survey (Sue et al., 2012). Jackson et al. (2011) found that while Asian Americans had the lowest rate of a major depressive episode compared to other groups, there were generational differences.

U.S-born Chinese Americans had significantly higher rates of major depressive episode prevalence (22%) than foreign-born Chinese Americans (8%) (Jackson et al., 2011). Finally, U.S.-born Asian American college students were at higher risk for binge drinking than international students (Iwamoto et al., 2019).

U.S.-born Asian Americans who have a psychiatric disorder are significantly more likely (40%) to utilize mental health services than their non-U.S.-born counterparts (23%) (Le Meyer et al., 2009). Later generations of Asian Americans are assumed to have acculturated to U.S society, where mental illness is not as stigmatized, and this acculturation may explain why some Asian Americans are more willing to seek treatment. Indeed, using NLAAS data, Lee et al. (2017) found that second-generation Asian Americans used mental health services at slightly higher rates than first-generation Asian Americans. Abe-Kim et al. (2007) found that third or later generations were significantly more likely to seek mental health services (63%) than first (30%) or second generations (29%). Georgiades et al. (2018) found that Asian immigrant adolescents were significantly less likely than third-generation adolescents to use any mental health services.

The timing of immigration to the United States also may impact the likelihood of using mental health services. The 1.5 generation of Asian Americans, those who immigrated to the United States as children or adolescents, do not use mental health services at significantly higher rates than first-generation Asian Americans (5% versus 4%) (Lee et al., 2017). Nonetheless, the 1.5 generation differs from first-generation Asian Americans. For members of the 1.5 generation who reported strong social support and perceived a need for mental health services, significantly more were likely to use services

than those who did not have strong social support (Lee et al., 2017). For first-generation Asian Americans, however, social support was not significantly associated with the likelihood of using mental health services. This difference highlights a help-seeking behavior specific to the 1.5 generation. Members of the 1.5 generation often report being "cultural brokers" (i.e., translating English or American norms and practices) for their families and experiencing family conflicts (Kim et al., 2003; Rivera et al, 2019). Thus, family may be a source of stress rather than comfort. As a result, the 1.5 generation of Asian Americans may rely on their friends for social support. In turn, their friends may encourage them to seek mental health services.

Gender. Gender is another variable that that researchers have consistently identified as a moderator of rates of mental disorders. Across several studies that used NLAAS data, Asian women who were born in the United States were more likely to have any lifetime depressive, anxiety, or substance disorders than Asian women who were born outside of the United States (Hong et al., 2014; Lau et al., 2013; Takeuchi et al., 2007). U.S.-born Asian women were also more likely to have a lifetime prevalence of any mental disorder than Asian women born outside of the United States (28% versus 16%) (Hong et al., 2014). Additionally, although the suicide rates for Asian Americans are low (6.7 completed suicides per 100,000) compared to Whites (17.0 per 100,000), Asian American female adolescents had comparable rates of completed suicide as their White counterparts (5.2 per 100,000 and 5.8 per 100,000, respectively) (CDC, 2018). For men, there are fewer differences between those born in the United States and those born outside of the United States. For example, immigrant Asian men and U.S.-born Asian men had similar rates of any anxiety (9% vs. 10%, respectively) and any mood disorder

(8% vs. 9%, respectively) (Hong et al., 2014). However, U.S.-born Asian men were at higher risk for a substance-use disorder than men not born in the United States (14% vs. 4%) (Hong et al., 2014).

Finally, there are gender differences between Asian men and women. Hong et al. (2014) found that Asian men had higher rates of substance-use disorder than Asian women (7% vs. 2%). Wu et al. (2018) also conducted a study of 16,418 Asian Americans and found that Asian men were at higher risk for mental health disorders than Asian women (Wu et al., 2018). However, this increased risk was not explained by an increased risk for substance abuse disorder, as other findings had suggested (Hong et al., 2014; Wu et al., 2018). The researchers did not offer an explanation other than the presence of an unknown factor. Wu et al.'s (2018) study included more Asian ethnic groups and religious groups (e.g., Cambodians and Hindus), which may have contributed to the different findings.

Specific ethnic subgroups. Some Asian American subgroups are at higher risk for particular mental disorders than others. This within-group variability may contribute to some of the inconsistent findings between Asian Americans and non-Asian Americans. For example, Kim, Kim, Han et al. (2015) found the prevalence rate of depression among elderly Korean Americans to be 30%, which is higher than the prevalence rate Yeung et al. (2004) found in a Chinese American sample (21%). Filipino American youth also reported more depression symptoms than Chinese American youth throughout adolescent and young adulthood (Park, 2017). Finally, compared to Chinese, Japanese, Korean, and Vietnamese Americans, Cambodian Americans were more likely to have mental disorder diagnoses (Wu et al., 2018).

Compared to African American and Hispanic adolescents, Asian and Pacific Islander adolescents were twice as likely to experience consistent suicidal thoughts and almost four times more likely to attempt suicide (Erausquin et al., 2019). Specific ethnic groups are at even higher risk. For example, Bhutanese refugees were twice as likely to die by suicide than the general U.S. population (Meyerhoff et al., 2018). Elderly Korean Americans have the highest rate of suicide across all racial and ethnic groups (33 per 100,000 for men and 15 per 100,000 for women) (Kung et al., 2018).

Looking at these studies together, it is clear that specific subgroups of Asian Americans may be at higher risk for mental disorders, particularly suicidal behaviors. These prevalence findings show that mental disorders among some Asian American subgroups may be eclipsed when viewing Asian Americans as a whole.

Acculturation. Finally, acculturation has generally been shown to moderate prevalence rates in Asian Americans. Individuals who are more acculturated were at higher risk for mental health disorders (31%) than low-acculturated individuals (20%) (Salas-Wright et al., 2015). However, there have been conflicting findings on how much impact acculturation has on prevalence rates. Overall, researchers have found that immigrant Asians (i.e., low-acculturated) experience lower prevalence rates of mental health disorders (Georgiades et al., 2018; Lau et al., 2013; Leong et al., 2013; Salas-Wright et al., 2015). The immigrant paradox, a phenomenon where more acculturated individuals experience worse health than less acculturated individuals, may explain immigrant Asian Americans' lower prevalence rates (Marks et al., 2014). Acculturation to mainstream U.S. society involves adopting mainstream American values, beliefs, and ideas of gender and gender roles. Despite this observed paradox, there is evidence that

contradicts it. Takeuchi et al. (2007), using an Asian American sample from NLAAS data, found that Asian American men who had higher levels of English proficiency (i.e., more acculturated) generally had lower rates of depressive, anxiety, or substance disorders than men who had lower levels of English proficiency (i.e., less acculturated). The authors speculated the lower rates of mental health disorders were due to their English-speaking sample having a higher socioeconomic status (Takeuchi et al., 2007).

Leong et al. (2013) addressed the contradicting evidence in the NLAAS data. They found that, in general, immigrant Asian Americans had lower prevalence rates of mental health disorders (Leong et al., 2013). Protective factors (e.g., higher levels of ethnic identity and family support) explained the lower prevalence rates. However, some subgroups of Asian Americans were at higher risk than others. Bilingual Asian immigrants (i.e., higher English proficiency) were at lower risk for depressive disorders than Asians who spoke English only or had limited English proficiency. In addition, Asian immigrants with low socioeconomic status were also at higher risk for depressive disorders. These findings partially confirmed Takeuchi et al.'s (2007) findings and conclusions on the influence of socioeconomic status, but Leong et al. (2013) did not analyze gender differences.

In conclusion, current prevalence rates for Asian Americans as a group may not be reflective of actual rates of mental disorders within different subgroups of Asian Americans. The intersectionality of the moderating effects of nativity, immigration, gender, ethnic groups, and acculturation need to be considered instead of viewing Asian Americans as a homogeneous group based only on racial grouping.

Impact of Mental Health Prevalence Rates on Treatments for Asian Americans

Because of the belief that Asian Americans do not experience mental health issues at high rates, Asian Americans have historically been neglected by federal mental health policies and in research on evidence-based treatments (Hall & Yee, 2012). More information is therefore needed on what treatments are effective for Asian Americans, including evidence-based treatments and culturally adapted treatments. In addition, the expression of mental health problems is culturally determined in this group. Conventional evidence-based treatments for mental disorders are designed for Whites and members of Western cultures who tend to express symptoms via emotions (Ryder et al., 2008). In contrast, Asian cultural norms dictate emotional suppression, which does not necessarily have deleterious consequences (e.g., depression) for Asian Americans as it does for White Americans (Tsai et al., 2017). Consequently, Asian Americans have been less likely than White Americans to perceive conventional treatments as beneficial (Kim & Zane, 2016). However, other research has indicated that focusing on social problems (e.g., at school) facilitated treatment engagement for Asian Americans (Ibaraki & Hall, 2014). Best treatment outcomes may occur when a treatment approach and individual patient characteristics fit together. This fit may also be influenced by the patient's cultural background (Hall & Ibaraki, 2016).

Cultural Factors that Contribute to Mental Health Disparities

As stated earlier, there are several systemic factors such as research methodology and equivalent conceptualizations of constructs and measures that may be contributing to mental health disparities between different racial and ethnic groups. Among Asian Americans, cultural factors are a consistent barrier to mental health (Lee et al., 2009).

Stigma and face concern are two cultural factors that may contribute to the low prevalence of mental health service usage in this population.

Stigma. Stigma, specifically stigma toward mental illness, can be defined as "a set of negative attitudes toward people with a psychological disorder" (Masuda & Boone, 2011). Although stigma toward mental illness is prevalent across all cultures, more intense stigma may exist in Asian cultures than in other cultures (Sue & Sue, 1987). In many Asian cultures, mental health is seen as something a person has control over. Thus, the general perception is that mental health problems are due to the weaknesses of individuals (Lee et al., 2009). For example, suicide is often considered a sin or seen as disgraceful in many cultures (Chu et al., 2010). Asian Americans and Pacific Islanders may not disclose that they are experiencing suicidal ideation out of fear of judgement or shame. Chu et al. (2018) surveyed 73 actively suicidal Asian American and Pacific Islander adults and found that 60% of them hid their suicidal intent from others. Additionally, they found that the more individuals adhered to cultural beliefs about suicide (e.g., suicide would bring shame to the family), the more likely they hid their suicidal intent.

The fear of bringing shame to families is a common explanation for the prevalence of stigma around mental illness among Asians. Many Asian cultures are collectivistic, which means that individuals are viewed relative to their relationships with others, such as friends and family (Le & Stockdale, 2005). Within a collectivistic culture, the self is considered not as important as the groups or communities to which individuals belong. Consequently, if individuals of Asian descent are experiencing mental health issues, then it is the fault not only of the individuals, but also of their families (Chaudry

& Chen, 2019; Lee et al., 2009; Sue & Sue, 1987). Indeed, among South Asian Americans, Chaudry and Chen (2019) found more stigma toward family members of individuals with mental illness than toward the individuals themselves. This finding suggests that Asians, to avoid bringing shame to themselves and their families, may be reluctant to bring attention to the fact that they are experiencing mental illness.

Stigma has consistently been shown to impact individuals' help-seeking behavior (Clement et al., 2015). Among Asian Americans, stigma is often cited as a deterrent or barrier to seeking treatment for mental health issues (H. Cheng et al., 2018; Choi & Miller, 2014; Wu et al., 2017). Multiple studies have suggested that the more stigma towards mental illness Asian American individuals endorsed, the less likely they were to seek help or the less favorable their attitudes were toward seeking help (H. Cheng et al., 2018; Choi & Miller, 2014; Masuda & Boone, 2011). Stigma beyond the individual, such as stigma from Asian American individuals' families and communities, was also cited as a deterrent in seeking mental health treatment (Augsberger et al., 2015; Choi & Miller, 2014).

This hesitancy or unwillingness to seek help when they are aware of psychological problems can result in Asian Americans exhibiting severe psychopathology when they do finally seek help (Leong et al., 2011; Nguyen & Anderson, 2005; Sue & Sue, 1987). Indeed, Kim, Saw, Zane et al. (2014) found that a greater proportion of Asian American psychiatric patients (29%) were hospitalized for more severe disorders (i.e., schizophrenia) than White psychiatric patients (11%). Although there were no racial/ethnic differences in levels of functional impairment at admission, all patients were in acute treatment, and many were involuntarily hospitalized.

Thus, Kim Saw, Zane et al.'s (2014) Asian American sample appeared to have sought help when (1) they felt like they could no longer properly function in society; or (2) they were forced to receive services by friends, family, or another health professional.

Low-acculturated Asian Americans who seek mental health treatment may be more likely to receive psychotropic medication than psychotherapy (Wu et al., 2018) because stigma around mental illness may decrease when mental health issues are presented as physical (somatic) symptoms and because medication is standard treatment for physical symptoms. In addition, issues with physical health are generally less stigmatized in Asian cultures, which may explain why Asian Americans report somatic symptoms more than psychological symptoms and may prefer medication (Kalibastseva et al., 2014). In a general hospital setting, Wu et al. (2018) investigated differences in use of psychotropic medication among Whites and various Asian ethnic subgroups. They found that primarily Chinese and Japanese speakers (a proxy for low acculturation) with mental disorder diagnoses were more likely to receive medication than primary English-speaking Asian Americans (Wu et al., 2018). It is not reported in Wu et al.'s (2018) study if the primarily English-speaking Asian Americans received any psychotherapy. However, because high levels of English proficiency are a proxy for high acculturation, primarily English-speaking Asian Americans may have sought psychotherapy services in addition to or instead of medication.

Unfortunately, Asian Americans who only receive medication may not be receiving optimal treatment. Combined treatment (i.e., therapy and medication) is often superior to medication alone in reducing mental health issues (Cuijpers et al., 2014). Psychotherapy alone is also shown to be just as effective as or even more so than

medication alone (Lee et al., 2016). Thus, stigma around mental illness may prevent Asian Americans from seeking psychotherapy, and they may only receive medication to treat their mental disorders.

Apart from medical or mental health providers, Asian Americans may rely on friends and family or seek alternative treatments (e.g., from a religious advisor or Eastern medicine) to cope with mental illness (Choi & Kim, 2010; Lee et al., 2009; Le Meyer et al., 2009; Leung et al., 2012). The stigma surrounding mental illness may be lower when seeking help from close friends and family or alternative treatments. Indeed, Leung et al. (2012) found that 35% of Chinese Americans with depression wanted advice on how to deal with mental health problems from friends or relatives. The other 65% of their sample reported a mix of support preferences (medical and mental health providers, alternative treatments) or not wanting any support (Leung et al., 2012). Thirty percent of participants reported no preference for utilizing any service (e.g., medical provider, friends, or family) when seeking advice about mental health problems. Leung et al. (2012) did not explain what "no preferences for services" meant. Thus, it is unclear if "no preference" meant these participants did not seek help or were equally likely to seek help from difference sources when they experienced mental health problems. Sixteen percent reported a preference to consult with physicians on mental health problems, and 8% believed their depression would resolve itself (Leung et al., 2012). The least cited service preferences were alternative treatments (e.g., from religious leaders or herbal doctors) (6%) and mental health professionals (5%) (Leung et al., 2012).

It is notable that Leung et al. (2012) found that alternative treatments were one of the least preferred services. This finding contradicts previous explanations that low

prevalence rates in Asian Americans may not account for individuals seeking help from alternative settings, where the stigma around mental illness may be less. The high acculturation levels of the participants in Leung et al.'s (2012) study may explain the low preference for alternative treatments. The majority of the participants (96%) had been in the U.S. for almost 20 years, were college-educated (either in the U.S. or international) and had high SES. The number of years spent in the U.S., education level, and SES are all proxies for acculturation. The higher each of these three variables are, the more acculturated to U.S. values and customs an individual may be.

Conversely, in a study using NLAAS data that included 368 Asian Americans with mental health disorders, 10% of their sample reported using alternative services (Le Meyer et al., 2009). Choi and Kim (2010), using a larger NLAAS Asian American sample of 2,095 participants, found that 28% of their sample with a probable DSM-IV diagnosis used alternative services. Choi and Kim's (2010) sample were less acculturated than Le Meyer et al.'s (2009) and Leung et al.'s (2012) sample. Low acculturated Asians are more likely to use alternative services than highly acculturated Asians, which may explain why a larger percentage of Choi and Kim's (2010) sample used alternative services.

Thus, although Asian Americans use alternative services, it does not fully explain their low service utilization rates. Other factors, such as acculturation or barriers to service, may better explain low prevalence and mental health services utilization rates.

Face concern. Closely associated with stigma, *face* is a key variable found in interpersonal relationships in Asian cultures, especially East Asian cultures (Zane & Yeh, 2002). As Asian cultures are generally collectivistic and individuals' actions reflect both

on themselves and others around them, concerns with face are very prominent. Hwang (1997-1998) defined face concern as an individual's "desire to preserve and maintain his/her social image and social worth that is based on one's specific role within the interpersonal context." Face concern, or loss of face, has been well-established as a barrier to treatment for many Asian Americans (Zane & Yeh, 2002). An example illustrating loss of face is a Chinese husband losing his job and being unable to provide for his family. As a man and husband in Chinese culture, this individual is expected to take care of his family financially. The fact that he cannot violates the expectations of his role as a man and husband.

Similar to stigma, concern about face negatively impacts help-seeking. Leong et al. (2011) found that Asian Americans who endorsed more concerns with face held more negative attitudes about help-seeking. In other words, they were less likely to seek treatment if they were more concerned with losing face. When Asian American individuals seek treatment, face concerns inhibit their self-disclosure (Zane & Ku, 2014). As therapy relies heavily on self-disclosure, the therapy process itself may elicit a great deal of face loss and may contribute to Asian American clients prematurely terminating therapy to prevent further loss of face. Even with friends and family, Asian Americans have been found to be reluctant to disclose mental health issues (Chang, 2015). Fearing judgment and criticism, they believed they should be self-reliant and deal with their problems themselves. Thus, loss of face impacts prevalence rates because Asian Americans may not disclose they are experiencing mental health issues to anyone.

Summary. In Asian cultures that are predominantly collectivistic, mental health involves not only individuals but others around them as well. Two cultural factors, stigma

and face, are closely associated and influence Asian American mental health. Stigma and face concerns are barriers to treatment-seeking and may limit self-disclosure for those who enter treatment.

Other Barriers that Contribute to Mental Health Disparities

For Asian Americans, structural and practical barriers (e.g., insurance, time, and money), and relational barriers (e.g., a lack of trust of providers and trouble finding providers) are common barriers to mental health services. These barriers contribute to mental health disparities as they prohibit Asian Americans from accessing mental health care.

Structural and practical barriers are the most cited obstacles to using mental health services (Kung, 2003; Sorkin et al., 2016; Wang et al., 2019; Wong et al., 2006). Chinese Americans and Cambodian refugees have both indicated that structural and practical barriers (e.g., cost and time) limited their access to mental health services (Kung, 2003; Wong et al., 2006). Sorkin et al. (2016) found that compared to other ethnic groups, Asian Americans and Pacific Islanders were more likely to report the lack of insurance (i.e., high out-of-pocket costs) as a barrier to receiving mental health care.

Recent policies have reduced some structural barriers to mental health services. In 2008, the Mental Health Parity and Addiction Equity Act required insurance companies to cover mental health treatment. In 2010, the Affordable Care Act (ACA) required small-group and individual health plans to cover mental health treatment, which has resulted in rates of uninsured adults with a mental illness decreasing by 5% (Mental Health America [MHA], 2018). Finally, in 2016, the ACA expanded coverage to Medicaid. For U.S. states that adopted and increased Medicaid coverage for mental

health treatment, rates of uninsured adults with a mental illness decreased (MHA, 2018). For example, Louisiana expanded Medicare coverage in 2016 and their rate of uninsured adults with a mental illness decreased from 20% to 15% (MHA, 2019).

Although these policies have made mental health services more accessible, Asian Americans are still not utilizing services (SAMHSA, 2015). Wang et al. (2019) found that low service use may be due to relational barriers such as previous negative relationships with providers (42%), providers' lack of cultural competence (21%), and trouble finding and connecting with providers (16%). These relational barriers can have lasting adverse effects. For example, providers' lack of cultural competence or sensitivity was associated with lower treatment adherence among Asian Americans. However, when Asian Americans perceived their providers to be culturally sensitive, they had more trust in their providers and were more likely to adhere to the recommended treatment (Kang et al., 2016). Thus, ensuring that a provider is culturally competent is a significant component in engaging Asian Americans in treatment. Mental health treatments need to be culturally adapted, which may include increasing providers' cultural competence, to make them accessible, relevant, and useful for Asian Americans.

Summary. Structural and practical barriers, such as insurance and money, are common obstacles in accessing treatment. Relational barriers, particularly providers' lack of cultural competence, are increasingly cited as a significant deterrent in seeking treatment. Efforts are needed to improve accessibility to mental health services for Asian Americans.

General Summary

Over 40 years ago, Stanley Sue brought to light significant mental health disparities between people of color and Whites. Unfortunately, these disparities continue to exist. People of color continue to experience higher rates of mental health disorders yet have low rates of mental health service use. Ethnic minorities are often excluded from or underrepresented in treatment research study samples, which limits the generalizability of treatment outcomes. Non-equivalent measures and constructs, and psychotherapy practitioners and procedures may contribute to mental health disparities because they lack cultural sensitivity.

Asian Americans have historically been underrepresented in research on mental health issues and treatment because of the belief they do not experience mental health issues. However, there is a growing body of literature that suggests there are many moderating factors that influence these low rates. Nativity, gender, and sub-ethnic group differences are all factors that impact prevalence rates of mental disorders and mental health service utilization rates.

Other barriers, such as cultural factors, structural barriers, and relational barriers, influence Asian Americans' mental health service utilization rates. Two cultural factors, stigma and face concern, keep Asian Americans from disclosing mental health issues and seeking treatment. Structural barriers, such as lack of insurance, prohibit Asian Americans from accessing mental health care. Although mental health services have become more accessible due to policy and regulatory changes, Asian Americans continue to underutilize services. This persistent underutilization may be associated with relational

barriers, such as lack of culturally competent providers, to seeking mental health treatment.

CHAPTER II: CULTURAL ADAPTATIONS OF INTERVENTIONS

This chapter provides a review of evidence-based treatments (EBTs) and culturally-adapted treatments (CATs). The chapter begins with a review of the definitions, history, efficacy, strengths, and limitations of EBTs. It also includes a review of the definition and history of CATs. Next, it provides material on frameworks and guidelines for how to culturally adapt EBTs. Finally, it includes a discussion of the strengths, efficacy, and limitations of CATs. The chapter concludes with a discussion on future directions for EBTs and CATs.

Evidence-Based Treatments

What are Evidence-Based Treatments?

Evidence-based treatments (EBTs) are defined as psychological treatments, therapies, or interventions that randomized controlled trials (RCTs) have found to be efficacious with a specific clinical population (Chambless & Hollon, 1998). RCTs show that if an evidence-based treatment produces a significant reduction in psychopathology relative to another established treatment or no treatment, researchers can be confident that this specific evidence-based treatment is unique, compared to other treatments. Thus, RCTs are considered the "gold standard" in research and follow the efficacy model. The efficacy model is based on the premise that research is carefully controlled and time-limited (Nathan, 2004). RCTs include several key elements: 1) randomized blind assignment of subjects to a treatment and a comparison group to ensure internal validity; 2) including an active comparison group (e.g., another treatment); 3) manualized therapy to ensure a standardized delivery of treatment; 4) utilizing multiple outcome measures to

assess different relevant behavioral changes; and 5) following-up on treatment to ensure its continuing efficacy (Nathan, 2004).

The terms evidence-based treatments, empirically supported treatments, and evidence-based practices are often used interchangeably. Although empirically supported treatments (ESTs) and EBTs are generally considered the same, EBTs and evidence-based practices (EBPs) are very different. EBPs are defined as the integration of the best available research with the expertise of the clinician about the patient (American Psychological Association [APA], 2006). While EBPs emphasize the role of clinical judgment, an established EBT is almost exclusively based on research. In contrast to EBPs, EBTs entail a higher degree of emphasis on the *content* of the intervention or treatment and comparatively less focus on *who* is delivering the intervention or treatment. As such, EBPs contain variables that are challenging to measure, such as client and therapist factors (e.g., warmth, empathy) (Duncan & Reese, 2013). Thus, although EBPs represent an important bridge between research and clinical practice, for the purposes of this dissertation, I focus on EBTs.

History of Evidence-Based Treatments

Since the late 19th century, the idea that clinical practice can be limited by research has been influential in the clinical psychology field (Duncan & Reese, 2013). In 1949, the Boulder Conference created training programs to produce scientist-practitioners (Duncan & Reese, 2013), formally establishing clinical psychology's commitment to empirical research. Along with the establishment of training programs that illustrate clinical psychology's commitment to research, mental health policies began to emphasize research in the 1980s. During that time, policies on mental health care in the United

States shifted from improving people's access to care to improving the quality of treatment (Kiesler, 1992). This shift from a need-based policy to a quality-of-treatment policy reflected efforts to mimic medical policies (i.e., evidence-based medicine [EBM]) and create standardized treatments (Kiesler, 1992). EBM evolved into an all-encompassing force during the 1990s, as medical researchers addressed the medical field's lack of standardized, empirical medical applications (Duncan & Reese, 2013). In this push for EBM, psychiatrists began to produce guidelines on how to treat mental health disorders; however, these guidelines generally focused on biological treatments, such as psychoactive drugs (Duncan & Reese, 2013). In opposition to psychiatrists' focus on biological treatments, psychologists established empirically supported treatments (e.g., behavioral or cognitive treatments) to treat mental health disorders (Duncan & Reese, 2013).

The push for EBTs in clinical psychology was critical in advancing the field's understanding of what constitutes a well-established treatment (Chambless & Hollon, 1998). Because of the EBT movement, the National Institute of Mental Health (NIMH) has continuously identified EBTs as a top funding priority (NIMH, 2019), as evidenced by the plethora of research into EBTs. Using RCTs, researchers have found that psychological interventions and treatments perform better compared to no treatment or nonspecific treatments (DeRubeis et al., 2005; Lee et al., 2016). For some disorders, EBTs are also as effective as medication (DeRubeis et al., 2005; Lee et al., 2016).

Efficacy of Evidence-Based Treatments

Since the rise of the EBT movement and the push for high quality care, there has been substantial research on creating, establishing, and implementing EBTs for specific

populations (e.g., individuals with depression). Several meta-analyses and reviews have suggested that EBTs generally improve outcomes across a range of mental health disorders (Butler et al., 2005; Hofmann et al., 2012). For example, Hofmann et al. (2012) reviewed 106 meta-analyses on cognitive behavioral therapy (CBT), one of the most commonly used EBTs, and found that CBT was significantly more effective in reducing symptoms or symptom severity in comparison to no treatment or alternative treatments for certain mental health disorders (e.g., anxiety and bulimia) (Hofmann et al., 2012).

A separate meta-analysis of 64 studies also supported the efficacy of several EBTs, such as exposure therapy and cognitive processing therapy, for post-traumatic stress disorder (PTSD) (Cusack et al., 2016). These EBTs were found to decrease PTSD symptomology above and beyond other established treatments (e.g., CBT) or no treatment (Cusack et al., 2016). In addition to these two reviews, several meta-analyses and RCTs have evidenced the efficacy of EBTs (e.g., CBT, interpersonal therapy, group therapy, exposure therapy) for multiple psychological disorders, such as depression (Hans & Hiller, 2013), anxiety (Barkowski et al., 2016), panic disorder (Schwartze et al., 2017), PTSD (Kline et al., 2018), borderline personality disorder (Cristea et al, 2017), and bulimia nervosa (Linardon et al., 2017). Overall, extant meta-analyses and RCTs report similar outcomes: EBTs are effective for treating mental health disorders within a specific population (e.g., individuals with PTSD).

Efficacy of Evidence-Based Treatments for People of Color

Preliminary evidence has shown that EBTs are effective for people of color with mental health disorders. For example, Cuijpers et al. (2018) conducted a meta-analysis of 256 RCT studies that investigated the efficacy of depression treatments and found that

participants' ethnicities did not moderate treatment effects. In other words, EBTs may be equally effective for all participants, regardless of ethnicity (Cuijpers et al., 2018). In another review of research on ethnic minority adults (African Americans, Asian Americans, Latinx Americans, and Native American) with anxiety disorders, Carter, Mitchell, and Sbrocco (2012) found that, compared to White Americans, ethnic minority adults generally benefitted more from EBTs, as compared to a placebo or another active treatment. However, due to studies' small sample sizes, generalizing the efficacy of these treatments should be undertaken with caution. In the meta-analysis conducted by Cuijpers et al. (2018), they noted that across 256 RCTs reviewed, the size of the ethnic minority sample was unknown.

Despite the two mentioned meta-analyses, there are very few studies that have explicitly addressed the efficacy of EBTs for ethnic minority adults with mental health disorders. The lack of research on the efficacy of EBTs for ethnic minorities is worrying given the mental health disparities people of color experience (NIMH, 2017). In their meta-analysis on treatment outcome studies for people of color diagnosed with anxiety disorders, Carter et al. (2012) reported that African Americans were the group (n = 14) that most treatment outcome studies had addressed. Treatment outcome studies on Asian Americans, Latinx Americans, and Native Americans numbered less than 10 (n = 9, n = 3, and n = 2, respectively; Carter et al., 2012). Additionally, not all treatment studies in Carter et al. 's (2012) meta-analysis were RCTs. The sample sizes across studies were also small, which can contribute to low statistical power, limiting interpretability and generalizability of results. Out of 28 studies, 18 were based on a sample size smaller than

50 (Carter et al., 2012). Therefore, more research is necessary to accurately determine if EBTs are effective for people of color.

Among ethnic minority youth, evidence of EBTs' efficacy in reducing mental health issues is more robust. Multiple meta-analyses have indicated that ethnicity did not affect treatment outcomes in youth (Huey & Jones, 2013; Huey & Polo, 2008; Huey et al., 2014; Weisz et al., 2017). Ethnic minority youth generally benefitted from EBTs as much as White youths. One theory as to why EBTs may be more effective for ethnic minority youth than adults is that ethnic minority youth are generally more acculturated than their parents (Pyke, 2005). Research has suggested that acculturation influences help-seeking behavior: the more acculturated an individual is, the more likely s/he will seek mental health services (Georgiades et al., 2018; Lee et al., 2017). Acculturated ethnic minority youth may feel less stigma about mental illness than their parents do.

Efficacy of Evidence-Based Treatments for Asian Americans

As stated in Chapter I, this dissertation focuses on Asian Americans as they have been underrepresented in treatment outcome studies because of the belief they do not experience mental health issues. Additionally, they are the least likely ethnic group in the United States to use mental health services (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). Asian Americans may underutilize mental health services because they may not find mental health treatments useful. More research is needed on how to make mental health treatments more effective for Asian Americans.

Few studies have investigated whether Asian Americans benefit from EBTs. Studies on treatment outcomes have shown that Asian Americans benefit from EBTs to the same degree as White Americans. For example, Kubany, Hill, and Owens (2003)

conducted an RCT on cognitive trauma therapy (CTT-BW) for battered women. Half of their sample (n = 16) self-identified as Asian American and Pacific Islanders (AAPIs). Kubany et al. (2003) found that all women achieved remission from PTSD at post-treatment and three months after treatment. In other words, CTT-BW, an unadapted intervention, was efficacious across ethnic groups. In another study, Geisner, Neighbors, and Larimer (2006) conducted an RCT of a brief intervention for depression, and almost 50% of their sample were Asian American college students (85 students out of 177 students). Geisner et al. (2006) found that, regardless of ethnicity, participants in the EBT condition experienced more significant reduction of depressive symptoms than participants in the control condition. In another study investigating a cognitive-behavioral based depression prevention program, Marchand et al. (2010) found that the positive effects of the program did not differ between White (n = 98), Asian (n = 37), and Latina (n = 32) young women.

In three recent RCTs, while ethnicity was not included as a moderator, Asian Americans made up at least a quarter of the sample. All three studies found that participants in the intervention group experienced a significant reduction in adverse mental health problems. For example, Taylor et al. (2016) investigated the efficacy of an online eating disorder (ED) intervention and found that it reduced ED behaviors. Although ethnicity's moderating effect was not directly tested, it can be assumed that the Asian American participants (n = 44; 21% of the sample) benefited from the ED intervention. Similarly, Goldin et al. (2016) found group CBT and mindfulness-based stress reduction to be efficacious in reducing social anxiety symptoms for a diverse group of patients (39% of the study's sample self-identified as Asian American; n = 42).

Finally, Fung et al. (2016) reported that a 12-week mindfulness intervention was efficacious in reducing behavioral problems in ethnic minority youth (50% of their sample were Asian Americans; n = 19). Again, the researchers did not investigate ethnicity as a moderator in these studies, but their findings suggest that Asian Americans benefitted from unadapted EBTs as much as other groups of color.

It is a positive development that Asian Americans are included in clinical trials and appear to benefit from EBTs. However, there are limitations, and important factors have been neglected in extant research. First, the majority of the above studies had fewer than 50 participants in their Asian American sample. Only one study had more than 50 Asian Americans in their sample (Geisner et al., 2006). Small sample sizes may cause low statistical power, limiting the interpretability and generalizability of results. Other factors, such as acculturation, may also impact Asian Americans' views on mental health problems and help-seeking. Highly acculturated Asian Americans endorse more positive attitudes toward mental illness and mental health services than low-acculturated (encultured) Asian Americans (Sun et al., 2016). Compared to Asian cultural beliefs and attitudes toward mental illness, Western cultural beliefs and attitudes are generally more sympathetic about mental illness, such as a willingness to seek mental health treatment (Joshanloo, 2014).

In the aforementioned studies, the Asian American participants were predominately adolescents and college students. They may have been highly acculturated, and thus more receptive to mental health treatment. In one study, which compared the efficacy of a culturally-adapted treatment and standard treatment for a specific phobia, the authors found that highly acculturated Asian Americans benefited equally from both

treatments, while low acculturated Asian Americans benefited more from the CAT than the standard treatment (Pan et al., 2011). The findings of the study by Pan et al. (2011) provide evidence that there is heterogeneity within an ethnic group, and that acculturation may play a role in the effectiveness of EBTs. For highly acculturated Asian Americans, who may not feel the same stigma concerning mental illness as low acculturated Asian Americans, any psychotherapy may have been effective in treating their mental illness. The fact that any psychotherapy may be effective for highly acculturated Asian Americans suggest that EBTs may not need to be culturally adapted for them. However, for low acculturated Asian Americans, EBTs may need to be culturally adapted to be effective and seen as personally relevant.

Despite significant evidence that EBTs are effective in addressing mental health disorders for specific populations (e.g., White Americans and highly acculturated ethnic minorities), mental health disparities in Asian Americans have not decreased in the past 40 years. The lack of a reduction in mental health disparities may be because almost 60% of all Asian Americans are immigrants, and thus may not be highly acculturated (Pew Research Center [PRC], 2019). For immigrants and low-acculturated Asian Americans, EBTs are not sufficient. Several crucial weaknesses in EBTs may contribute to their restricted influence, which are reviewed in the next section.

Limitations of Evidence-Based Treatments

Criticisms of EBTs have been discussed extensively over the past decade, due to the divide between research and practice within the clinical psychology field (Kazdin, 2008). One foundational argument against the generalizability of EBTs is the "dodo bird verdict," which suggests that all psychotherapies experience equivalent success

(Luborsky et al., 1975; Rosenzweig, 1936). In other words, no matter what psychotherapy treatment is used, significant decreases in mental health symptoms are often observed. For example, a recent meta-analysis on PTSD found that, when comparing established treatments for PTSD (e.g., exposure therapy, EMDR, cognitive therapy), there was insufficient evidence to indicate that one EBT was more efficacious than another (Cusack et al., 2016). The fact that all EBTs were effective in reducing mental health issues suggests that *any* therapy may be useful when treating patients in a real-world setting and that the "uniqueness" of each EBT may not matter.

Another argument against EBTs is that the actual therapeutic technique of any psychotherapy has a minimal effect on treatment outcomes (Bell et al., 2013; Wampold, 2015). Other factors, such as the collaboration between client and therapist and therapist qualities (e.g., genuineness) have larger effects on treatment outcomes than specific therapeutic techniques (Wampold, 2015). Common factors (e.g., empathy, warmth, and client-therapist alliance) have been shown to be the most significant factors in promoting positive patient outcomes, and significantly more important than therapeutic techniques (Wampold, 2015). Multiple meta-analyses on the working alliance between therapist and client further support the suggestion that the higher the quality of therapist contribution to the working alliance, the better treatment outcomes clients experience (Baldwin et al., 2007; Del Re et al., 2012; Dinger et al., 2008; Zuroff et al., 2010).

Finally, results from RCTs are often criticized for not being generalizable to real world settings and other populations. Patients who participate in RCTs usually have less severe psychopathology and fewer comorbid disorders than patients who seek treatment in real world settings (e.g., community mental health centers and VAs) (Kazdin, 2008).

Additionally, Kazdin (2008) described the treatment itself as too rigid, as treatments in RCTs are manualized and standardized. EBTs in RCTS are usually manualized to help establish the fidelity of the RCT. Because fidelity is prioritized over fit in manualized EBTs, clinicians who deliver treatment in RCTs are required to follow treatment manuals and discouraged from deviating from manuals (Duncan & Reese, 2013). This treatment delivery is very different from what clinicians do when they see clients in non-controlled settings. Therapy requires clinicians to quickly adapt their treatment to the symptomology with which their client is presenting at a specific moment. Clients in non-controlled settings (i.e., real world settings) are also diverse in terms of their SES, education, and race/ethnicity. The "one size fits all" approach of EBTs may not be as effective with diverse clients. Indeed, over the last five decades, EBTs have not made a significant impact on decreasing mental health disparities in ethnic minorities (NIMH, 2017). EBTs may lack impact because they are not as effective for diverse clients, such as immigrants and low acculturated ethnic minorities, as evidenced by multiple meta-analyses' findings that culturally adapted interventions are more effective than EBTs in reducing negative mental health symptoms (e.g., Hall et al., 2016; Huey & Tilley, 2018). However, meta-analyses on the effectiveness of EBTs for people of color have noted the limited number treatment outcome studies and small sample sizes across RCTs (Carter et al., 2012; Cuijpers et al., 2018). The lack of a significant impact may also be due to the fact EBTs are underutilized amongst people of color (SAMHSA, 2015).

Mental health disparities for ethnic minorities may continue to occur because EBTs have not been designed to address ethnic and cultural differences in ethnic minority communities. The majority of psychology researchers have utilized WEIRD (White,

Educated, Industrialized, Rich, and Democratic) samples and assumed that results are representative across all populations (e.g., people of color; Henrich et al., 2010). As WEIRD samples are the norm, EBTs have been developed nearly exclusively for White and Westernized communities. The treatment effects of EBTs within White communities are assumed to generalize to other groups of color (Hall, 2001). The results of meta-analyses suggest that cultural adaptations are more effective than non-adapted EBTs in reducing negative mental health outcomes in people of color (Hall et al., 2016; Huey & Tilley, 2018). Interest and research in incorporating culture and relevant variables into EBTs have grown.

Summary

Evidence-based treatments (EBTs) have consistently been shown to be efficacious in reducing adverse mental health outcomes among clinical populations. Preliminary evidence has shown EBTs to be efficacious for people of color and highly acculturated Asian Americans. However, mental health disparities between White individuals and people of color continue to exist, because of notable weaknesses in EBTs. Most important to the present study, results from EBTs have limited generalizability to other populations, such as immigrants and low acculturated ethnic minorities. Many ethnic minority samples in RCTs consist of college-aged students, who are generally highly acculturated and may not be representative of their group. More research is needed to investigate how effective EBTs are for different groups of people of color, and if not, how to make EBTs more effective. Adaptations to EBTs may be required to make them more relevant and effective for various groups of people of color.

Culturally Adapted Treatments

What are Culturally Adapted Treatments?

Culturally adapted treatments (CATs) are "the systematic modification of an EBT…to consider language, culture, and context in such a way that it is compatible with the client's cultural patterns, meanings, and values" (Bernal et al., 2009, p. 362). CATs are often tested via RCTs to determine their efficacy with a specific clinical and ethnic minority population.

Similar to the interchangeable terms of evidence-based treatment and evidence-based practice, in the field of multicultural psychology, the terms cultural competence and cultural adaptation are also used interchangeably. However, there is a distinction between the two terms. Cultural competence is linked to provider practices, whereas cultural adaptations are linked to treatments (Bernal et al., 2009). Thus, cultural competence reflects clinician factors and effects, such as the clinician's ability to understand their client's cultural context. Cultural adaptations modify a specific therapy or therapeutic technique, such as CBT or cognitive restructuring. For this dissertation, I will focus on cultural adaptations.

History of Culturally Adapted Treatments

The idea of cultural adaptations is not new. All psychotherapy, to a certain extent, can be described as culturally adapted, in the sense that each client is unique (Benish et al., 2011). Clinicians may be adapting EBTs (either consciously or unconsciously) in sessions to provide the best treatment for their clients. Even in a research setting, clinicians delivering interventions in RCTs may also be subtlety adapting EBTs to ensure that a participant does not drop out of the study. Other changes, such as the transformation from psychoanalytic therapy to behavioral therapy to humanistic therapy,

can be viewed as a cultural adaptation, as therapy has changed to fit with changing values and beliefs in mainstream U.S. society (Bernal & Domenech Rodríguez, 2012).

However, psychotherapy originated in Europe and the United States, and these adaptations above have taken place within Western society (Wampold, 2001). Additionally, the idea of "therapy" is not common in other cultures and societies, making it challenging to generalize Western adaptations of therapy (e.g., behavioral therapy) to other cultures (Bernal & Domenech Rodríguez, 2012; Wampold, 2001). Due to this Westernized view, and the threat of assimilation to Western values inherent in EBTs, deliberate cultural adaptations of EBTs must be performed in order to provide ethical, empowering, and effective treatment to diverse communities and cultures.

Sue's (1977) seminal paper on mental health disparities noted a pressing need for culturally appropriate treatments for people of color. Over the past four decades, researchers have acknowledged that culture and context are essential factors in the psychological assessment and treatment process (Bernal & Domenech Rodríguez, 2012; Huey & Tilley, 2018). EBTs cannot be generalized to other groups if those groups are not included in research samples. The acknowledgement of culture's influence on therapy is most clearly reflected in the 1994 NIH policy, which mandated that ethnic minorities must be included in NIH-funded research. Since this mandate, the enrollment of ethnic minorities in NIH research increased to 37% in 2016 (Office of Research on Women's Health, 2017). Now that more ethnic minorities are included in research, researchers must determine how to measure culture in a treatment protocol and how to culturally adapt a treatment (Bernal et al., 2009). Several frameworks and guides on cultural adaptations have been offered to address this issue.

How to Culturally Adapt an Intervention: Guides and Frameworks

The earliest framework on cultural adaptions was the Ecological Validity Model (EVM), developed by Bernal et al. (1995). The EVM consisted of eight dimensions across which interventions can be adapted for specific groups of people of color, with changes to language, persons, metaphors, content, concepts, goals, methods, and context (Bernal et al., 1995). Another model, the Cultural Adaptation Process Model, expanded on the EVM by including three phases (collaborate with communities, adapt evaluation measures, and integrate observations and data into CAT) and ten specific target areas (e.g., language, metaphors) (Domenech Rodríguez & Wieling, 2004). Hwang (2009) developed the Formative Method for Adapting Psychotherapy (FMAP), which is a community-based developmental approach in culturally adapting treatments. The FMAP consists of five phases: 1) locating and collaborating with stakeholders (e.g., mainstream health and mental health care providers and community-based organizations); 2) integrating generated knowledge with empirical and clinical knowledge to create CAT; 3) collaborating with stakeholders to review and revise CAT; 4) pilot testing CAT, and 5) synthesizing stakeholder (e.g., participants' and therapists') feedback to finalize CAT.

Similar to the FMAP, Okazaki et al. (2014) proposed using the community-based participatory research (CBPR) framework to address mental health disparities in an Asian American population. CBPR is a collaborative approach that engages researchers and community partners as equal allies in the research process. The CBPR approach requires researchers to involve the community in all areas of research, from recruiting participants to disseminating findings. Okazaki et al. (2014) suggested that CBPR can address mental health disparities by a) teasing out the aggregated portrayal of Asian American

communities and understanding their different needs; b) increasing mental health professionals' cultural competence; and c) decreasing stigma about mental illness through increasing awareness and acceptability of mental health care in communities.

Across these frameworks, there are repeated themes and some degree of agreement on how to culturally adapt an intervention. These themes include creating a match between client and therapist (e.g., race/ethnicity, language, beliefs, goals) and incorporating salient cultural values into the treatment. There is also an evolution across these frameworks, which included a progression from categories of surface adaptations, defined as adapting interventions based on social or behavioral characteristics such as language or racial/ethnic matching (Chu & Leino, 2017), to a more community-based, holistic approach.

In general, these guiding cultural adaptation frameworks lie between two extremes. One extreme is the universalistic, or top-down approach, which suggests that EBTs do not need to be culturally adapted and can be applied to all groups (e.g., Acceptance and Commitment Therapy; Falicov, 2009). The other extreme is culture-specific therapies, or a bottom-up approach, which is based on the premise that different cultures have their own healing approaches, and therapies should use that approach (e.g., *cuento* therapy; Falicov, 2009). The modifications these frameworks offer can be seen as either surface adaptations (e.g., translating research material from English to Spanish) or deep adaptations (e.g., incorporating Asian values into an intervention) (Falicov, 2009). Falicov (2009) created three categories of adaptations: 1) cultural attunement; 2) culturally adapted; and 3) culturally informed (Falicov, 2009). EBTs that are the most minimally adapted to focus on retention and engagement (e.g., language) are considered

culturally attuned or surface adaptations. Culturally adapted EBTs incorporate cultural content and material to increase participant engagement with the treatment (e.g., metaphors and concepts). Finally, culturally informed adaptations involve the most modification to an EBT. In addition to cultural adaptations that incorporate cultural content and material, culturally informed adaptations include key cultural themes or theories relevant to a culture that may impact an individual's mental health. An example of a key cultural theme could be generational differences between Asian parents and children and how these differences impact children's development. These cultural themes are often revealed through feedback from community stakeholders on what is important to a specific community (e.g., the FMAP). Both culturally adapted and culturally informed categories can be considered deep adaptations of varying levels.

Strengths of Culturally-Adapted Treatments

The main strength of CATs is the incorporation of culture and context into intervention techniques. Systematic approaches to how an EBT is adapted to consider culture have been proposed, such Hwang's (2009) FMAP (Bernal & Adames, 2017). When researchers adapt an EBT to be more relevant—by incorporating cultural beliefs and practices such as language matching—to a specific ethnic minority group, psychotherapy may be more accessible to people of color (Saw et al., 2013).

Chu et al. (2012) cultural adaptation process of problem-solving therapy for Chinese older adults (PST-COA) provides a specific example of how cultural adaptations function to engage clients of color and improve treatment outcomes. Using the FMAP framework, Chu et al. (2012) developed PST-COA in three phases. In Phase 1, the researchers received stakeholder input from community members. They conducted focus

groups and interviews with community providers and an elderly Chinese client with depression to determine the feasibility of PST-COA. In these focus groups and interviews, Chu et al. (2012) presented the rationale, techniques, and therapy structure of PST, then solicited feedback from participants on what to keep or culturally adapt in PST. In Phase 2, the authors integrated stakeholder input with empirical literature, creating a manual for PST-COA. Finally, in Phase 3, the authors pilot tested PST-COA with a clinical case: an elderly Chinese woman who was diagnosed with depression. Once the client completed treatment, her feedback and her therapist's feedback on the treatment were incorporated into revisions of the PST-COA manual. With these adaptations, PST-COA proved to be a good cultural fit for the Chinese client (Chu et al., 2012). The increased cultural fit may have enabled the client to engage more effectively in treatment and feel like the treatment was personally relevant. At the end of treatment, the client achieved remission, suggesting that PST-COA was effective in treating depression for elderly Chinese clients.

Efficacy of Culturally-Adapted Treatments for People of Color

The results of 14 meta-analyses indicate that CATs are efficacious in reducing mental health problems in people of color (Benish et al., 2011; Cabral & Smith, 2011; Chowdhary et al., 2014; Griner & Smith, 2006; Hall et al., 2016; Hodge et al., 2010; Hodge et al., 2012; Huey & Polo, 2008; Huey & Tilly, 2018; Jackson et al., 2010; Smith et al., 2011; Smith & Trimble, 2016; Soto et al., 2018; van Loon et al., 2013). However, there is inconsistency in the strength of these findings, with average effect sizes ranging from 0.22 (small) (Huey & Polo, 2008) to 1.06 (large) (van Loon et al., 2013). Variables that may be contributing to the heterogeneity in effect sizes include comparison

conditions (no treatment or active treatment), client/therapist ethnic match, the language of the intervention, participants' acculturation levels, and psychopathology outcomes. For example, earlier meta-analyses indicate that client/therapist ethnic match significantly moderated the overall effect (Griner & Smith, 2006), but recent meta-analyses did not support this finding (Cabral & Smith, 2011; Hall et al., 2016). Across meta-analyses, the different moderating effects of these variables may be due to the different sample populations in previous meta-analyses (e.g., youths, adults, or Asian Americans only) and study designs (e.g., CAT vs. no comparison, prevention vs. treatment studies). Despite the differing effect sizes, these fourteen meta-analyses consistently suggest that CATs overall do reduce adverse mental health outcomes in people of color more than non-adapted treatments.

Efficacy of Culturally-Adapted Treatments for Asian Americans

The evidence on the efficacy of culturally-adapted treatments for Asian Americans with mental health problems is more mixed. Huey and Tilley (2018) conducted a meta-analysis on 18 RCTs that investigated the efficacy of various CATs on mental health outcomes in Asian Americans. The authors found that, overall, Asian Americans who received CATs experienced better outcomes posttreatment than Asian Americans in the control group. However, within specific RCTs, the findings are less clear. For example, out of five studies on depression, the results of three studies indicated no group differences in depression symptoms between Asian Americans who received an adapted intervention and Asian Americans who received an unadapted intervention (Kwong et al., 2013; Yeung et al., 2010; 2012). In the other two studies, the results indicated a decrease in depressive symptoms for Asian American participants who

received a CAT than Asian participants who received a non-adapted intervention (Hwang et al., 2015; Pan et al., 2019). The variability of findings could be due to the degree to which the EBTs were culturally adapted. The studies conducted by Hwang et al. (2015) and Pan et al. (2019) both involved significant cultural tailoring, and the researchers adapted their interventions for a particular group. Hwang et al. (2015) adapted their interventions for Chinese American adults and Pan et al. (2019) adapted their interventions predominantly for English-speaking Asian Americans. Members of these groups may have found the intervention more personally relevant, and thus participated more.

Other CATs developed for a particular group (e.g., Cambodian refugees) exhibited significant treatment group differences in PTSD symptom reduction at posttreatment and follow-up. For example, Cambodian refugees who received a CAT experienced significant PTSD symptom reduction than those in the waitlist condition (Hinton et al., 2005; Hinton et al., 2009). Compared to participants in a waitlist control group, a culturally-specific and trauma-informed group psychotherapy intervention (AWARE) for young 1.5- and 2nd- generation Asian American women was efficacious in reducing PTSD symptoms at baseline and 3-month follow-up (Hahm et al., 2018). In two smoking cessation studies that targeted specific groups (Korean immigrants and East Asian immigrants), CATs proved to be efficacious in promoting abstinence in participants posttreatment and at a 6-month follow-up, compared to a non-adapted intervention (Kim, Kim, Fang et al., 2015; Zhu et al., 2012). Two RCTs establishing the efficacy of culturally-adapted parent training interventions for Chinese and Korean immigrant parents found significant decreases in children's externalizing and

internalizing behavioral problems at posttreatment than participants in a waitlist control group (Kim, Cain, Boutain et al., 2014; Lau et al., 2011). The common thread among these studies is that the CATs were adapted for a specific subgroup within the Asian American population (e.g., 2nd generation Asian American women) instead of the general Asian population. Indeed, in their meta-analysis, Huey and Tilley (2018) found that treatments tailored to a particular Asian group (e.g., Chinese immigrants) had the largest effect sizes. Thus, within the Asian American population, there is growing support that culturally tailoring EBTs to a specific subgroup is the most effective approach.

Summary

CATs are defined as the systematic modification of an EBT to include cultural variables. Most adaptations are surface adaptations (e.g., language). The results of the effectiveness of CBTs vs. EBTs are mixed. Adaptations tailored for a specific group, such as 2nd generation Asian American women, are the most efficacious in reducing adverse mental health outcomes.

Limitations and Future Directions of Culturally-Adapted Treatments

It is clear that CATs expand upon EBTs and are efficacious in reducing adverse mental health outcomes in people of color. Despite this evidence, mental health disparities between Asian Americans and other groups of color and White populations persist. CATs appear to have a limited impact on decreasing mental health disparities (SAMHSA, 2015). Their limited impact may be due to the accessibility of CATs rather than their effectiveness. Culturally adapting interventions is time-consuming and expensive, and often requires the expertise of bilingual and bicultural individuals (Padilla & Borsato, 2008). Individuals who are bilingual and bicultural tend to be people of color.

Because the majority of the psychology workforce is White (APA, 2016), there may be few bilingual and bicultural individuals to culturally adapt interventions. Frameworks are needed to help guide individuals on how to culturally adapt an intervention.

In a review of culture's impact on mental health, Huang and Zane (2016) found that CATs often lack a common framework. Compounding this problem, when a systematic framework (e.g., FMAP) was used, studies on CATs did not report on specifics of how the guidelines or frameworks directed the adaptation process of an EBT. Multiple meta-analyses on cultural adaptations indicated that few studies followed specific guidelines or frameworks when adapting an EBT (Chowdhary et al., 2014; Chu & Leino, 2017; Smith & Trimble, 2016). Additionally, few studies report on their adaptation process (Chowdhary et al., 2014; Smith & Trimble, 2016). In studies that did include information on the adaptation process, adaptations were overwhelmingly surface adaptations (e.g., racial/ethnic matching and language) (Chowdhary et al., 2014; Chu & Leino, 2017; Smith & Trimble, 2016). Surface adaptations, which often modify a *top-down* approach, are useful in engaging and keeping participants and clients in therapy (Presley & Day, 2019). However, a major limitation of surface adaptations is that they usually do not address specific cultural issues or subtleties (Hall et al., 2016). When adaptions included the modification of core therapeutic components (e.g., thought records from CBT interventions) and the incorporation of specific cultural values and issues (e.g., adapting PTSD treatment to focus on culturally-specific trauma symptoms in Cambodian refugees), participant engagement and positive treatment outcomes increased (e.g., reduced PTSD symptoms) (Chu & Leino, 2017; Huey & Tilley, 2018). Unfortunately, the modification of core therapeutic components is uncommon (Chu & Leino, 2017).

The Cultural Treatment Adaptation Framework (CTAF), a framework developed by Chu and Leino (2017), allows the systematic application of specific, culturally-salient variables and allows clinical latitude on how much core treatment components need to be changed. Specifically, Chu and Leino (2017) stated that core treatment components can be culturally modified on a continuum of four levels: no changes to core, core modification, core addition, and complete change. On the *no changes to core* level, the original components of a treatment are not changed (e.g., leaving in Thought Records in CBT). On the *core modification* level, a treatment component may be changed or removed to make the treatment more culturally relevant (e.g., removing Thought Records in CBT for an Asian American client). On the *core addition* level, an extra treatment component is added to make a treatment more culturally relevant (e.g, case management for an older Latinx immigrant). Finally, on the *complete change* level, an EBT may be extensively adapted to the extent that it is a new treatment (e.g., *cuento* therapy). In addition to these levels of cultural adaptations, the CTAF focuses on the provider/client relationship, therapeutic framework, cultural themes, and acculturation.

However, despite the thorough description on how group-level differences impact the effectiveness of a treatment, the CTAF and other CATs have not yet accorded sufficient attention to individual differences within cultural groups. Within the CTAF, individual differences are categorized as peripheral to the core treatment components (Chu & Leino, 2017). Despite evidence that CATs are most effective when adapted to a very specific group within a cultural group (e.g., 2nd generation Chinese American women) (Huey & Tilley, 2018), CATs are often developed for and broadly applied to a particular cultural group (e.g., Chinese Americans). Nevertheless, cultural groups are

heterogenous in that individuals may differ in several variables (e.g., acculturation level; Salas-Wright et al., 2015) and may not find a particular cultural feature (e.g., somatic symptoms) personally relevant. Thus, CATs may not be as beneficial for these individuals, and future frameworks must account for individual differences in these variables.

For example, in the study by Pan et al. (2011), both non-adapted and adapted treatments were found to be comparatively effective among highly acculturated Asian Americans. For low acculturated Asian Americans, the adapted treatment was found to be more effective than the non-adapted treatment (Pan et al., 2011). Because CATs adapted for a subgroup within the Asian population are the most effective (Huey & Tilley, 2018), low acculturated Asian American participants in Pan et al.'s (2011) study may have found the CAT to be both culturally and personally relevant. The adapted CAT may have encouraged low acculturated Asian American participants fully engage with the treatment. For highly acculturated Asian Americans, although the adapted CAT may have been culturally relevant, they may not have found the CAT personally relevant to themselves and may not have engaged with the treatment as much. Thus, the next step for CATs may be ensuring they are both culturally and personally relevant.

General Summary

Although EBTs are generally efficacious for people of color, acculturation levels may explain their differing degrees of efficacy. Acculturated adolescents and college students may respond better to EBTs than low-acculturated individuals.

Culturally-adapted treatments (CATs) have expanded upon EBTs. Multiple meta-analyses have shown that CATs are more effective than EBTs in reducing adverse mental

health outcomes among people of color. However, CATs have not reduced mental health disparities, which may be due to multiple reasons. One reason may be the limited accessibility of CATs. Adapting EBT takes an extensive amount of time and finances and requires significant expertise. Having a shared framework or guidelines on how to culturally adapt an intervention is crucial and may alleviate some burden. However, many CATs lack a shared framework. The adaptation process of an EBT is also not transparent and often limited to surface adaptations. The personal relevance of CATs may be a crucial link in intervention research.

CHAPTER III: PERSONAL RELEVANCE OF INTERVENTIONS

As stated in Chapter I, this dissertation is focused on Asian Americans because they are the ethnic group in the United States least likely to use mental health services. Asian Americans may underutilize mental health services because they may not find mental health treatments personally relevant or helpful. This may be because cultural adaptations (CATs) are often developed for and broadly applied to a particular cultural group (e.g., Chinese Americans), even though cultural groups are heterogeneous in that individuals may differ on several variables (e.g., acculturation level, racial/ethnic identity) and may not find a particular cultural feature or treatment relevant to themselves. Thus, the personal relevance of interventions may be the missing connection between mental illness, evidence-based treatments (EBTs), CATs, and engaging people of color, particularly Asian Americans, with psychotherapy.

This chapter includes a review of two foundational models: (1) the Proximal-Distal Model (PDM), which addresses issues that contribute to mental health disparities for people of color, and (2) the Elaboration Likelihood Model of Persuasion (ELM), which discusses why some content is more persuasive than other content. These two models provide an initial framework on how an intervention's personal relevance may affect clients' treatment outcomes. I then present the Personal Relevance of Psychotherapy (PROP) model, which extends upon the PDM and ELM by providing guidance on how to determine an intervention is personally relevant for a client.

Proximal-Distal Model: An Explanation

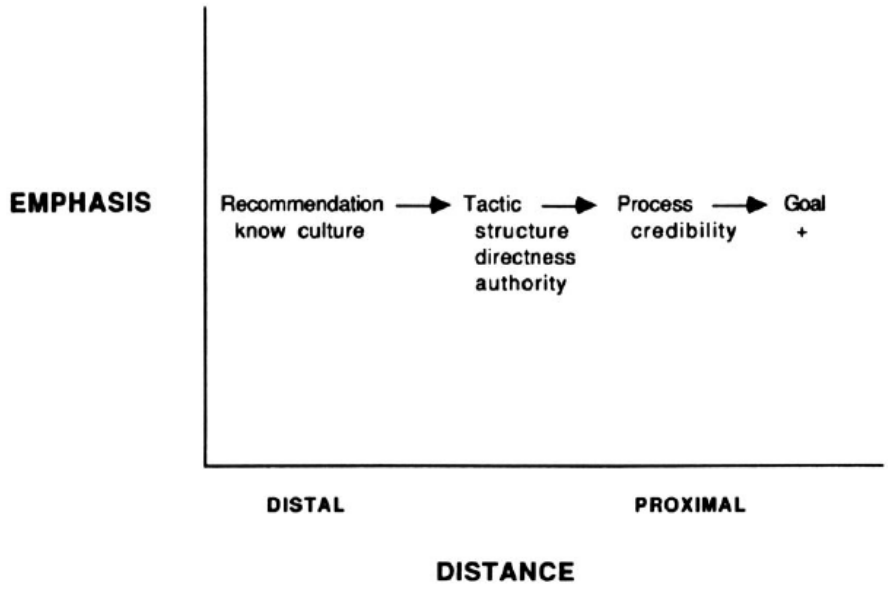

Figure 1. The Proximal-Distal Model (Sue & Zane, 1987)

Sue and Zane's (1987) Proximal-Distal Model (PDM; Figure 1) is described in their landmark *American Psychologist* article. Sue and Zane created the PDM to address multiple issues that contributed to mental health disparities for people of color. These issues included a lack of culturally responsive treatments and a lack of understanding of the role of culture and cultural techniques in therapy. Previously, even when there was a focus on culture and cultural techniques, these interventions were generally based on technique-oriented recommendations (e.g., problem-solving) rather than therapist-oriented recommendations (e.g., cultural competence; Sue & Zane, 1987). Sue and Zane (1987) argued that focusing on culturally specific therapeutic techniques (e.g., problem-solving) or cultural knowledge (e.g., cultural values) instead of therapist-oriented recommendations were *distal* to, or situated away from, treatment outcomes. In the PDM, cultural knowledge and culturally-specific techniques are considered distal because they are not linked to processes that facilitate effective therapy. Therapists may assume that

having cultural knowledge about a client makes them more effective; however, therapists must also transform this cultural knowledge into specific therapeutic techniques. Still, these techniques alone do not lead to effective therapy (Sue & Zane, 1987). Instead, these culturally specific techniques lead to two *proximal*, or nearest, processes that then lead to positive therapeutic outcomes: (a) establishing therapist credibility to clients of color; and (b) gift-giving (Sue & Zane, 1987). Credibility and gift-giving are helpful when working with culturally diverse clients, because they may make therapy feel more personable, and thus more personally relevant, to culturally diverse clients (Sue & Zane, 1987).

In the PDM, credibility is defined as the client's "perception of the therapist as an effective and trustworthy helper" (pg. 7; Sue & Zane, 1987). Therapist credibility can be either ascribed (e.g., attributed by a client) or achieved (e.g., through the therapist's training). To establish credibility, therapists may conceptualize the client's problem in a way that is palatable to the client, use culturally relevant techniques, or create treatment goals with which the client agrees (Sue & Zane, 1987). Furthermore, a client may view a treatment approach or therapist as credible if it is congruent with the client's conceptualization of the problem and incorporates culturally relevant knowledge and techniques.

Although cultural knowledge and culturally specific techniques are distal to the therapeutic process, they are essential in the establishment of credibility (Sue & Zane, 1987). Notably, a meta-analysis by Smith and Trimble (2016) revealed that clients' perceptions of their therapists' cultural competence were only mildly associated with symptom reduction. Their findings suggest that there may be other factors or variables that influence clients' progress in therapy (Smith & Trimble, 2016). Regardless, even

though therapists' cultural competence is not the final answer in addressing mental health disparities amongst people of color, having cultural knowledge and being a culturally competent therapist is still a crucial part of the answer. Cultural knowledge is a foundational base of cultural values, upon which therapists can draw when working with clients of color (Sue & Zane, 1987). Therapists do not have to "start from scratch" when establishing their credibility with each client. For example, if a therapist is working with an Asian client, they may at first adopt a more structured or directive therapeutic approach to ensure the client feels comfortable with therapy because research has shown the Asian clients prefer a more directive approach from their therapist. However, having cultural knowledge also allows therapists to avoid confounding the overall cultural values of a client's racial/ethnic group with the individual client's values (Sue & Zane, 1987). Thus, whether the client is more aligned with other cultural values or more acculturated to mainstream U.S. values, therapists can adjust treatment to be personally relevant to a client. More specifically, this enables therapists to decide whether to use a culturally-specific technique. In the previous example, a therapist working with an Asian client may at first adopt a more directive therapeutic approach. As the therapist works with the client and finds out that the client has more acculturated U.S. values, then the therapist may switch to a less directive approach.

Giving is defined as the client's "perception that something was received from the therapeutic encounter" (pg. 9; Sue & Zane, 1987). In other words, gift-giving occurs when the client perceives that the therapist has given them a "gift," such as normalization of feelings, a coping skill (e.g., breathing technique), or reassurance. Sue and Zane (1987) stated that gift-giving must be done almost immediately after starting treatment, as

Asian clients must feel like they are benefiting from therapy and may drop out of treatment early if they perceive no benefits (Presley & Day, 2019). If a therapist gives a client a gift in some form, the client may feel invested in therapy because they have received immediate benefits. Indeed, if a client is invested in therapy, they may find therapy more personally relevant, be more inclined to stay in therapy, and thus receive the benefits of full treatment. Although gift-giving can initially be difficult, as the first few sessions of therapy are often educational or information-based, gift-giving does not need to be a specific solution and can include broader benefits.

Research on the Proximal-Distal Model

Researchers using the PDM framework have generally found that, compared to racial/ethnic matching, the practice of matching clients and therapists based on non-racial or ethnic factors (e.g., attitude) resulted in a stronger increase in therapist credibility as perceived by clients and client service usage intent (Meyer et al., 2011; Wong et al., 2007; Zane et al., 2005). Zane et al. (2005) and Meyer et al. (2011) attempted to parse the strengths and limitations of racial/ethnic matching between clients and therapists. In their findings, a cognitive match—defined as a situation in which both client and therapist endorse the same conceptualization of a client's problems—or attitudinal similarity (e.g., coping orientation, personality) between clients and therapists was strongly related to increased therapist credibility (Meyer et al., 2011; Zane et al., 2005). The findings from these two studies suggest that, irrespective of the race/ethnicity match between therapist and client, those who share similar views and attitudes tend to report the best outcomes. Nevertheless, the authors also found that racially/ethnically matching clients and therapists did correlate with an increase in clients' initial comfort with therapy (Zane et

al., 2005) and therapist credibility (Meyer et al., 2011). Thus, therapists who are of the same race or ethnicity as their clients may be perceived as effective because they may express attitudes and views similar to those of their clients. Because these therapists are aware of their shared cultural attitudes and views, they may be presenting therapy in a way that feels personally relevant and helpful to the client. However, it is not always possible to racially/ethnically match clients and therapists. The findings reported by Zane et al. (2005) and Meyer et al. (2011) suggest that matching clients and therapists on other factors besides race/ethnicity, such as attitudes or increasing therapist credibility, may be just as effective in reducing premature attrition in therapy and improving outcomes.

Indeed, in a qualitative study examining culturally adapted psychotherapies for Asian clients, therapists consistently reported that increasing clients' confidence in therapy was a crucial aspect of achieving credibility (Hall et al., 2019). White and Asian American therapists stated that their Asian clients often lacked trust or confidence in psychotherapy, resulting in a belief that psychotherapy would not be helpful for them (Hall et al., 2019). Therapists reported that they made sure to instill confidence immediately in the therapeutic process, by providing information on therapy or creating realistic expectations about results, which encouraged their Asian clients to return for another therapy session (Hall et al., 2019). Additionally, two therapists in the study reported making sure their Asian clients left the first session with a "gift," such as relief from their symptoms. The purpose of providing the client with a gift was to guarantee that the client found therapy beneficial and to increase their likelihood of returning for the next session (Hall et al., 2019). Based on these findings, it is evident that therapists adapt their approach to ensure their Asian clients find therapy personally helpful. If therapy is

personally relevant to a client, they are more likely to stay in therapy and receive relief from mental illness.

The client-therapist relationship is unique and intimate. Clients who feel that their therapist is empathetic and supported by their therapist in this relationship are more likely to continue therapy (Roos & Werbart, 2013). The client must perceive both his or her therapist, and therapy itself, to be personally relevant and beneficial. The PDM offers insight into the multiple processes in which therapists can engage to increase the personal relevance of therapy for clients. However, the PDM is limited in that it categorizes culturally specific techniques as distal and not as conducive to an effective therapy process (Sue & Zane, 1987). This is not to say that the PDM categorizes culturally specific techniques as unnecessary, but that solely relying on culturally specific techniques is not sufficient to lead to effective therapy with a client.

Relying only on therapist credibility is also not enough in conducting effective therapy. It is necessary to include an emphasis on cultural techniques because these techniques serve to enhance client confidence and therapist credibility. Multiple meta-analyses on cultural adaptations have shown that culturally specific techniques are just as crucial to the therapeutic process as therapist-specific variables (Chowdhary et al., 2014; Hall et al., 2016; Huey & Tilley, 2018; Smith & Trimble, 2015; Soto et al., 2018). Both therapist-specific and culturally-specific techniques are equally important to the therapeutic process. Because the PDM focuses predominantly on therapist-specific techniques, future frameworks or models will need to incorporate both therapist recommendations and technique recommendations. First, it is necessary to develop a theoretical framework to describe what it is about cultural adaptations that engage clients

of color. The Elaboration Likelihood Model of Persuasion may offer insight into how cultural adaptations engage clients of color.

Elaboration Likelihood Model of Persuasion: An Explanation

Psychotherapy is a process of persuasion. When viewing the relationship between a therapist and client, the therapist is trying to encourage change in a client's emotional state, such as persuading the client to try a therapeutic skill (Alarcón et al., 2011). A theoretical framework is needed to understand what makes a therapeutic message persuasive to a client. In response to inconsistencies in previous research on attitudes and persuasion, Petty and Cacioppo (1986) developed the Elaboration Likelihood Model of Persuasion (ELM; Figure 2). The ELM explains why some content persuades individuals to change their attitudes more effectively than other content. The model also provides information on factors that make content persuasive enough to resonate with an individual, prompting behavioral change. In the ELM, various processes of persuasion are categorized into two routes that explain attitude change: (1) central route and (2) peripheral route (Petty & Cacioppo, 1986). According to the ELM, attitude change is more likely when engagement with a message is high (central processing) than when it is low (peripheral processing).

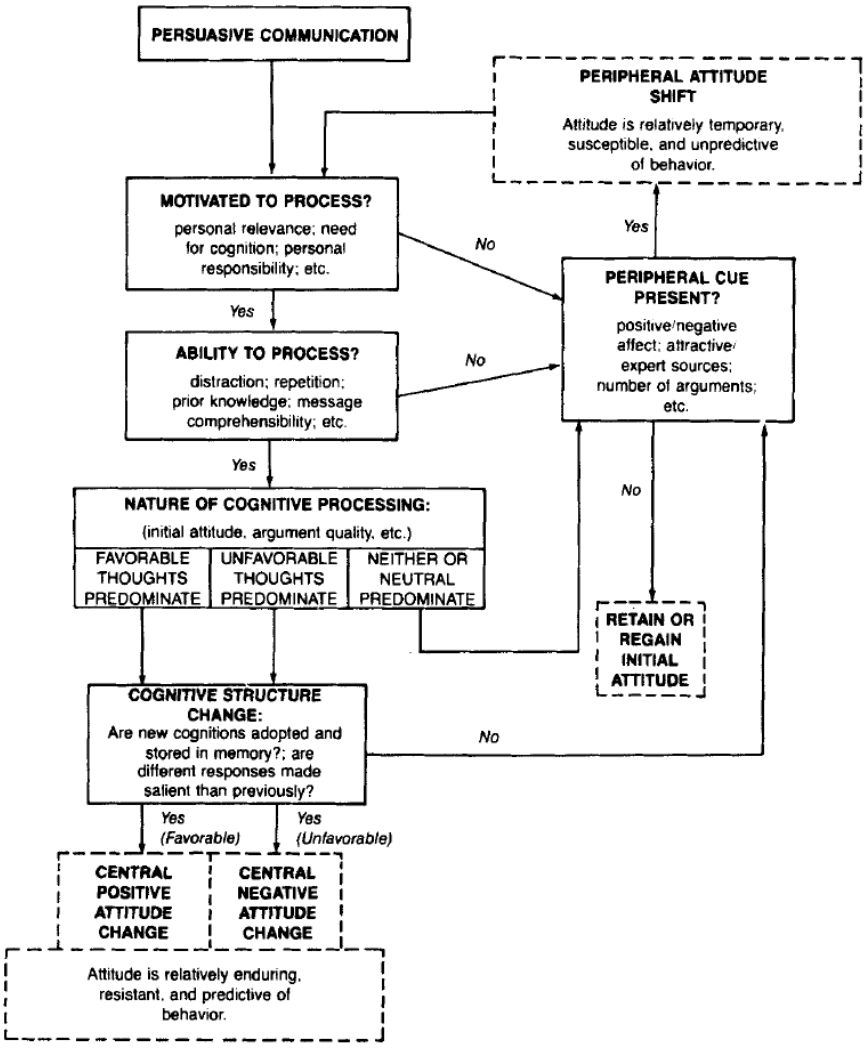

Figure 2. The Elaboration Likelihood Model of Persuasion (Petty & Cacioppo, 1986)

Furthermore, to change an individual's attitude, high engagement with a message (central processing) requires an individual to effortfully process the content of a message (Petty & Cacioppo, 1986). When processing a message, the message must prompt an individual to generate positive or negative thoughts about a specific position (e.g., for or against a tax increase). The position of these thoughts (positive or negative), which are also influenced by an individual's previous thoughts (e.g., was this individual against tax increases before viewing this message), are linked to the direction of the persuasive effect (Petty & Cacioppo, 1986). The interaction between these factors determines how likely it

is that an individual's attitude towards a position will change. Additionally, Petty and Cacioppo (1986) stated that two individual conditions are necessary for central processing to occur. First, the individual must be motivated to consider the message; second, the individual must be able to think carefully. Both conditions are influenced by multiple variables, including how personally relevant the individual finds the message, the number of distractions in the environment, and how many times the message is repeated to the individual (Petty et al., 2009). If an individual is motivated, able to think clearly, and the message is well-received, then attitude change is likely.

The ELM categorizes all other persuasion processes, such as relying on context cues (e.g., who is presenting the message) or mental shortcuts, under the peripheral processing route. The ELM categorizes these processes under the peripheral route because, on a day-to-day basis, people often do not have the time, motivation, or ability to effortfully process every single message they encounter to determine its persuasiveness (Petty et al., 2009). Even though the peripheral route does not require effortful processing, content processed using this route can still be persuasive, depending on an individual's response to it. For example, Petty et al. (2009) stated that, if a celebrity shared a message about a physical illness, people viewing the message could process it under the peripheral route or the central route. If the message recipient uses the "famous = good" shortcut, then the persuasion process will follow the peripheral route. However, if the message recipient finds the message personally relevant (e.g., the recipient has the same physical illness) or finds the celebrity credible, then the persuasion process may follow the central route. When applying the ELM in a treatment context, the content of a

specific therapeutic approach needs to follow the central route to encourage attitude change in a client.

The perceived personal relevance of a therapy approach and its specific therapeutic techniques may be proximal to treatment outcomes because it increases a client's engagement with the therapy approach. In turn, increased engagement with therapy content may encourage individuals to process information under the central route. Processing information using the central route may result in attitude or behavioral changes, such as attempting a new coping skill. However, cultural adaptations often broadly apply therapeutic techniques to everyone in a specific racial or ethnic group, despite individual differences. The broad application of therapeutic techniques may be distal to treatment outcomes for clients because clients may not find all therapeutic techniques personally relevant. The lack of personal relevance may lead a client to experience low engagement with the therapeutic message. In turn, low engagement may cause the client to process therapy content peripherally, if at all, resulting in little to no beneficial therapeutic outcomes such as attitude or behavioral changes.

Research on the Elaboration Likelihood Model

The ELM is based on theories rooted in the cognitive and social psychology fields. However, a few scholars in the clinical psychology field have employed ELM as a theoretical framework. Of the extant clinical literature that does use the ELM, one study revealed that participants who were more engaged with the therapeutic vignette, or message, were more likely to be influenced by it. High-quality messages (e.g., when the therapist was portrayed to be competent and empathetic) were more influential than low-quality messages (e.g., when the therapist was portrayed as inexperienced) in terms of

increasing participants' positive thoughts about the therapist, agreement with the therapist, and the likelihood of meeting with the therapist again (McNeill & Stoltenberg, 1988). This finding suggests that the participants of the study were processing therapeutic messages under the central route of the ELM (McNeill & Stoltenberg, 1988). Using the central route, the participants may have perceived therapy to be more personally relevant or helpful, which may have increased the likelihood of participants' willingness to seek counseling.

More recently and peripherally related to clinical intervention research, researchers have applied the ELM to the field of health intervention research, with a focus on message tailoring: increasing the personal relevance of the message to an individual to encourage behavioral change. This type of message tailoring may activate central route processing (Petty et al., 2009). Multiple studies concerned with changing individuals' health behaviors have suggested that tailoring messages for a specific kind of individual increases the likelihood that an individual will change their health behavior. For example, several smoking cessation studies have confirmed that tailored messages are more effective than non-tailored messages in decreasing smoking (Hoover et al., 2018; Skov-Ettrup et al., 2014; Vidrine et al., 2007). Hoover et al. (2018) found that smokers who reported high levels of health literacy were more likely to be influenced by factually-tailored messages, whereas smokers who reported low levels of health literacy were more likely to be influenced by emotionally-tailored messages (Hoover et al., 2018). In another sample of 15- to 25-year-old smokers, Skov-Ettrup et al. (2014) found that tailored messages that incorporated input from the participant (e.g., which theme they identified as being most important to them regarding quitting smoking) were more

effective in increasing smoking cessation than untailored messages. These two findings indicate that tailored messages that take into consideration an individual's characteristics and values are more effective in producing behavioral change.

In studies that investigated the mechanisms of message tailoring, researchers have identified perceived message relevance as a key factor in positive health behaviors, such as increased intention to participate in STD testing (Jensen et al., 2012; Lustria et al., 2016). Jensen et al. (2012) conducted a study on increasing breast cancer screenings and found that women who received a tailored illustrated pamphlet (personalized based on their responses to a survey) reported higher levels of intention to participate in screening than women who received an untailored pamphlet. Regarding the mechanisms behind message tailoring, the authors found that tailoring was significantly related to perceived message relevance, where tailored messages were associated with increased perceived relevance (Jensen et al., 2012). In turn, increased perceived personal relevance-- how personally relevant the women found the pamphlet—was significantly associated with increased intention to engage in screening (Jensen et al., 2012). Lustria et al. (2016) conducted a study on the mechanisms of tailoring in an STD screening intervention and found comparable results. Similar to Jensen et al. (2012), Lustria et al. (2016) found that tailoring served to increase the perceived personal relevance of messages, which correlated with increased intention to be tested for STDs. Tailoring a message for an individual can help change their behavior because it increases the personal relevance of the message, which in turn increases an individual's buy-in to the intervention.

For Asians, culturally tailored messages have also been found effective in changing attitudes and behaviors (Huang & Shen, 2016; Uskul et al., 2009). For example,

Uskul et al. (2009) compared White British and East Asian participants in terms of their self-regulatory focus and responses to gain- or loss-framed health messages. Uskul et al. (2009) found that East Asian participants reported a stronger prevention focus than White British participants, and thus were more likely to be persuaded by the loss-framed message (e.g., "not flossing causes bad breath") than the gain-framed message (e.g., "consistent flossing leads to healthy gums and teeth"). Uskul et al. (2009) also found that culturally congruent health messages were the most effective in influencing Asian participants' attitudes and intentions to change their health behaviors. In a meta-analysis examining the persuasive influence of culturally tailored messages on cancer, Huang and Shen (2016) found culturally tailored messages to be more effective than non-tailored messages in persuading patients on cancer-related issues (e.g., screening). For Asian Americans and Pacific Islanders (AAPIs), culturally-tailored messages were particularly effective, as the effect sizes for AAPIs were larger than those for Hispanics and African Americans (Huang & Shen, 2016). The degree of cultural tailoring also affected the level of persuasion to change behaviors. Deep cultural tailoring of messages, which is similar to deep cultural adaptations presented in Chapter II, incorporates specific cultural values, norms, and beliefs. For example, a study focused on Chinese breast cancer patients may use deep cultural tailoring by addressing the fatalistic view of cancer in Chinese culture. Huang and Shen (2016) found messages that employ deep cultural tailoring to be significantly more effective in persuading participants to adopt behavior change than surface cultural tailoring (e.g., translating a message from English to Mandarin). This finding indicates how deep adaptations of interventions are generally more effective in

reducing psychological distress than surface adaptations of interventions (Chu & Leino, 2017).

Culturally-tailored messages may be viewed as personally relevant, engage the central processing route, and can be effective in changing Asian Americans' health attitudes and behaviors. However, heterogeneity within ethnic groups—such as the strength of ethnic identity or level of acculturation (Salas-Wright et al., 2015)—means that one culturally tailored message or intervention may be personally relevant for one group (e.g., Chinese immigrants) but not for another (e.g., second-generation Chinese Americans). Culturally adapted treatments must also take into consideration the personal relevance of the intervention.

Summary: PDM and ELM

When viewing the PDM and ELM together, best treatment outcomes and engagement with the therapeutic process may occur when clients find both their therapist and the therapeutic approach and techniques to be personally relevant. Interventions need to be culturally tailored and personally relevant to engage clients of color with therapy, especially Asian Americans, as they are less likely than other racial/ethnic groups to seek treatment. Unfortunately, as discussed in Chapter II, there is no theoretical framework on the personal relevance of an intervention. Thus, this dissertation presents a new theoretical model—the Personal Relevance of Psychotherapy (PROP) model—which integrates parts of the PDM and ELM to investigate the process of how psychological treatments may be perceived as personally relevant to clients. The PROP model may offer new insight into how to determine and increase the personal relevance of psychotherapy for clients.

The Personal Relevance of Psychotherapy Model

As addressed in both Chapter II and this chapter, the personal relevance of interventions may be an important component of clients' mental health outcomes. I present the PROP model to explain how and why treatments can be seen as credible or personally relevant to an individual (Hall et al., 2020).

Introduction to Personal Relevance

In the PROP model, personal relevance is conceptualized similarly to the precision medicine (or personalized medicine) approach in medical care: what treatment is the most effective for "this individual with that specific problem and under which set of circumstances" (pg 111; Paul, 1967). Personalized medicine also aims to investigate specific, individual characteristics that impact the outcome of treatment to ensure a good match between the individual and the treatment (Cuijpers et al., 2016). These include sociodemographic characteristics, clinical characteristics of the disease or disorder, biological characteristics of the disease or disorder (e.g., biomarkers), and patient preferences (Cuijpers et al., 2016).

Thus, similar to precision medicine, the personal relevance of an intervention can be defined as: (1) how helpful, applicable, and meaningful an individual finds this specific psychotherapy intervention; and (2) what personally relevant and individual characteristics influence the personal relevance of a treatment approach. Different from individual or client characteristics that may impact treatment outcomes (e.g., gender, race/ethnicity, sexual orientation), the personally relevant characteristics of an individual extend past individual characteristics to include other characteristics such as societal or cultural characteristics. Personally relevant characteristics may include sociodemographic

(e.g., education, gender), cultural (e.g., acculturation), and clinical characteristics (e.g., clinical severity), as well as client preferences (e.g., wanting structure in a therapy session; Hall et al., 2020).

Ensuring that an intervention is personally relevant to the client is important and may be the next step in addressing mental health disparities. As reported in Chapter II, people of color, particularly Asian Americans, may not seek conventional mental health treatments (EBTs) if they do not believe such treatments to personally beneficial or relevant (Kim & Zane, 2016). If Asian Americans find an intervention personally relevant, they may be encouraged to change attitudes and behaviors, such as becoming more likely to utilize health services (Huang & Shen, 2016).

Literature Review of Research on Personal Relevance and Individual Differences

In the medical field, it is well-established that precision medicine offers patients the best treatment outcomes (Bilkey et al., 2019). Unfortunately, there is limited research on personal relevance and precision medicine in the field of clinical psychology. Related to personal relevance and precision medicine, research on the effect of client characteristics—such as personality traits and treatment preferences—on treatment outcomes is more abundant. However, research findings have been mixed. The majority of studies have revealed that accommodating client characteristics in therapy is beneficial (Petronzi & Masciale, 2015; Simon & Perlis, 2010; Swift et al., 2013, 2018). For example, two meta-analyses revealed that, when studies accommodated client preferences (e.g., for a male or female therapist or for psychotherapy or medication), there were fewer dropouts from therapy and more positive treatment outcomes than when client preferences were not accommodated (Swift et al., 2013, 2018). When client

preferences are taken into account, clients may feel that treatment is more personally relevant, and be more likely to engage with the treatment. Simon and Perlis (2010) also found that individual differences, such as being diagnosed with a personality disorder or experiencing adverse life events, impacted clients' preferences for medication or psychotherapy, where clients diagnosed with a personality disorder preferred medication, while clients who had experienced adverse life events preferred psychotherapy (Simon & Perlis, 2010).

Similarly, Petronzi and Masiale (2015) found that individuals' personality traits and attachment style (e.g., secure, avoidant) were significant predictors in individuals' preference for different types of psychotherapy, including psychodynamic, humanistic, and cognitive-behavioral therapies. A secure attachment style significantly predicted a preference for psychodynamic therapy, while a fearful attachment style predicted a preference for cognitive-behavioral therapies (Petronzi & Masiale, 2015). When these studies incorporated client preferences into the treatment process, the personal relevance of treatment for participants may have increased. Thus, because the clients felt that the treatment was specific to them, they may have been more engaged with the treatment and experienced more positive treatment outcomes as a result. Unfortunately, neither study (Petronzi & Masiale, 2015; Simon & Perlis, 2010) investigated how client outcomes were impacted by individual differences and specific preferences for treatment.

Conversely, one meta-analysis on moderator variables that influenced psychotherapy treatment outcomes for school-aged youth suggested that individual differences (e.g., age, gender, diagnosis) did not significantly moderate therapeutic outcomes (Fedewa et al., 2016). Notably, the study by Fedewa et al. (2016) used a sample

of school-aged youth (under the age of 18), while other meta-analyses and studies' samples consisted of mostly adults (over age 18). For adolescents, perceiving that they belong with their group of peers is a top priority (Schall et al., 2016), while this priority may not be as strong amongst adults. There may be fewer individual differences amongst adolescents because they want to fit in with their peers. Therefore, the age difference between adolescents and adults may have affected the influence of individual differences on therapeutic outcomes in Fedewa et al.'s (2016) meta-analysis. Regardless of the mixed findings from these studies, in general, taking client characteristics and treatment preferences into account is beneficial for the therapeutic process. However, the definition of individual differences is limiting in that it often ignores broader group differences (e.g., identifying as Taiwanese or Chinese) or societal influences (e.g., being an Asian woman in a White-dominated career field). Personally relevant characteristics incorporate these broad broader group differences to help determine the personal relevance of psychotherapy treatment. Identifying personally relevant treatments—which incorporate individual differences, group differences, and societal influences—may be more advantageous than focusing on individual predictors of change.

The Personal Relevance of Psychotherapy (PROP) Model

Culturally adapted treatments (CATs) are generally more personally relevant to people of color than unadapted evidenced-based treatments (EBTs), as CATs are often developed with a specific ethnic or cultural group in mind (Castro et al., 2010; Kim & Zane, 2016). As the ELM suggests, CATs may be more personally relevant for people of color than EBTs because CATs engage a client's central processing route and are more likely to encourage attitudinal change (Petty & Cacioppo, 1986). However, as proposed

by the PDM, treatment outcomes are driven primarily by factors, such as clients' values and attitudes, that are more proximal to outcomes than culture-specific techniques, which are considered distal to treatment outcomes because they do not lead to effective therapy (Sue & Zane, 1987). A model that incorporates the strengths of both the ELM and PDM, specifically how culturally-specific techniques (CATs) and therapist-specific techniques are equally important, is needed.

Researchers who develop CATs also incorporate adaptations based on group characteristics individuals in a specific ethnic group are assumed to share, such as interdependence or expressing psychological symptoms somatically. These group characteristics may still be distal to an individual client's treatment progress, as individuals in a specific ethnic group vary in terms of various personal characteristics (Sue & Zane, 1987). For example, the level of acculturation to US society varies greatly among the population of Asian Americans. An Asian American's acculturation level may moderate how personally relevant they find a CAT, in that an Asian American with a low level of cultural acculturation may find a CAT very personally relevant while a highly acculturated Asian American may not find a CAT personally relevant. Thus, I propose the PROP model, which provides a framework for understanding the personal relevance and credibility of a treatment intervention for an individual (Figure 3). As depicted in Figure 3, the PROP model consists of three components that help determine the personal relevance of an intervention to an individual: (1) evidence-based treatments, (2) cultural adaptations, and (3) individual differences. Each component is reviewed in the following sections.

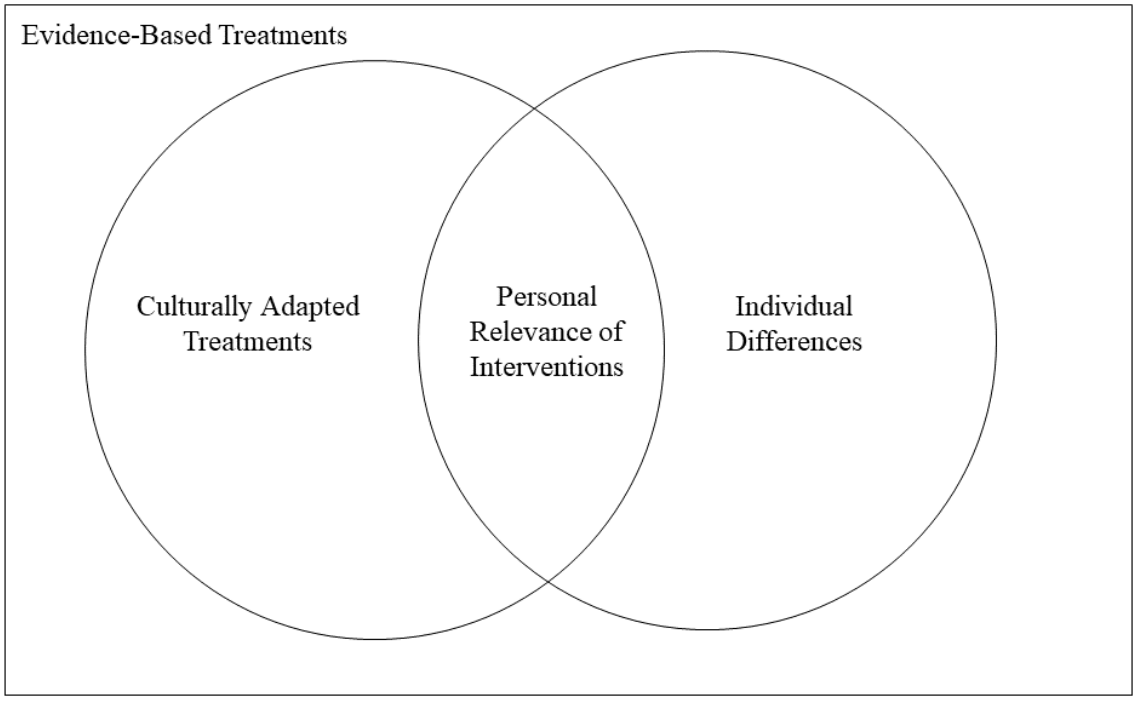

Figure 3. The Personal Relevance of Psychotherapy (PROP) Model

Evidence-based treatments. The more comprehensive literature review in Chapter II on the history and efficacy of evidence-based treatments (EBTs) is summarized here. There is ample evidence that EBTs are effective for multiple psychological disorders, such as depression (Hans & Hiller, 2013), anxiety (Barkowski et al., 2016), panic disorder (Schwartze et al., 2017), PTSD (Kline et al., 2018), borderline personality disorder (Cristea et al., 2017), and bulimia nervosa (Linardon et al., 2017). Examples of established EBTs include cognitive-behavioral therapy (Beck, 2011), problem-solving therapy (Nezu et al., 2012), dialectical behavioral therapy (Linehan, 2014), and psychodynamic therapy (Shedler, 2010).

Although extant research on the topic is limited, there is also evidence that EBTs are effective for people of color with psychological disorders, such as depression (Cuijpers et al., 2018) and anxiety (Carter et al., 2012). In the PROP model, EBTs,

defined as psychological interventions or treatments that are efficacious with a specific clinical population (Chambless & Hollon, 1998), are conceptualized as the foundation and "starting point" for clinicians. Most culturally adapted therapies adapt EBTs to be culturally appropriate for a specific racial/ethnic group (almost 95%; Hall et al., 2016) and research on individual differences in psychotherapy preferences asks clients about their preferences for specific EBTs (Petronzi & Masiale, 2015). For example, a meta-analysis of 78 cultural adaptation studies conducted by Hall et al. (2016) revealed that 74 studies (almost 95%) utilized a top-down adaptation approach, where an existing EBT, such as CBT, was culturally modified for a specific racial/ethnic group. Petronzi and Masiale (2015) provided participants with detailed vignettes of a description of specific psychotherapy (psychodynamic, person-centered, and CBT) and asked participants to rate their preference for each one. As seen in the meta-analysis and study, EBTs were the starting point for researchers in determining what psychotherapy to use with clients.

Cultural adaptations. A thorough literature review on the history and efficacy of culturally adapted treatments (CATs), defined as "the systematic modification of an EBT…to consider language, culture, and context in such a way that it is compatible with the client's cultural patterns, meanings, and values" (Bernal et al., 2009, p. 362), was presented and discussed in Chapter II and is summarized here. CATs are essential in determining the personal relevance of psychotherapy because they may be more relevant for many people of color than EBTs, as CATs include culturally relevant modifications such as the inclusion of cultural values (Huang & Sheng, 2016; Saw et al., 2013). CATs may engage an individual's central processing, which in turn encourages attitude and behavioral change (Huang & Shen, 2016; Petty & Cacioppo, 1986).

Although CATs extend EBTs' reach to people of color, mental health disparities between people of color and Whites have not decreased over the past few decades (SAMHSA, 2015). The limited impact of CATs on mental health disparities may be due to their limited availability rather than limitations of CATs themselves. Nevertheless, there are still limitations found in CATs. When developing a CAT, there may be an implicit assumption that all individuals from a specific group of color hold similar cultural values and attitudes. However, there is heterogeneity among individuals in an ethnic group in terms of cultural values and attitudes, such as acculturation or ethnic identity. For example, Pan, Huey, and Hernandez (2011) conducted a study comparing the efficacy of a culturally-adapted treatment and standard treatment for specific phobia in an Asian American sample. The authors found that highly acculturated Asian Americans benefited equally from both treatments, whereas Asian Americans with low levels of acculturation benefited more from the CAT than the standard treatment (Pan et al., 2011). Highly acculturated Asian Americans, who may not feel the same stigma concerning mental illness as less acculturated Asian Americans, may benefit from any psychotherapy and thus may not need a CAT. However, for less acculturated Asian Americans, EBTs may need to be culturally adapted to be effective and seen as personally relevant. From Pan et al.'s (2011) findings, it is clear that there is heterogeneity amongst individuals from the same ethnic group. Broadly applying a CAT to an ethnic group without accounting for individual differences may not adequately address clients' mental health outcomes.

Individual differences. As addressed in the previous section, incorporating client characteristics (e.g., age, personality) and preferences in treatment (e.g., wanting more

structure) generally results in positive treatment outcomes. Under the PROP model, individual characteristics and preferences are conceptualized as individual differences. Specific to the PROP model, individual differences are defined as differences in multiple cultural, social, personal variables, and attitudes among individuals within a racial/ethnic group. Cultural variables and attitudes are conceptualized as values, customs, beliefs, and attitudes commonly found in an individual's culture (e.g., Asian cultures). Examples of cultural variables and attitudes include acculturation to US society and the level of stigma associated with mental health diagnoses. Social variables and attitudes are conceptualized as societal expectations or how individuals' place in society interacts with themselves, others around them, and society at large. Examples of social variables and attitudes include generation status (e.g., first or second-generation), citizenship, socioeconomic level, gender, and occupation. Finally, personal variables and attitudes are conceptualized as how individuals identify or describe themselves. Examples of personal variables and attitudes include religion, gender, sexual orientation, and ethnicity. As these examples indicate, there may be large amounts of overlap between personal variables with cultural and social variables. However, the overlap is to be expected because many cultural and social variables (e.g., ethnicity, gender) are also important parts of an individual's identity. The overlap also highlights the importance of incorporating multiple dimensions of an individual's identity (i.e., cultural, societal, and personal) and not only focusing on one aspect of identity (e.g., personal only).

How the components work together: Personal relevance. The goal of the PROP model is to provide guidance on how to determine the personal relevance of an intervention to an individual. Three components—EBTs, CATs, and individual

differences—interact to help determine how personally relevant an intervention may be (Figure 3). In the PROP model, the personal relevance of an intervention is conceptualized as the intersection between EBTs, cultural adaptations, and individual differences. More specifically, as discussed in Chapter II, EBTs have been proven effective in improving negative mental health symptoms in people with mental health diagnoses (Carter et al., 2012; Cuijpers et al., 2018). CATs, which culturally adapted EBTs, are inherently more relevant than unadapted EBTs for many people of color (Huang & Sheng, 2016; Saw et al., 2013). However, the relevance of CATs for a person of color may be moderated by individual differences, such as acculturation level, gender identity, or belief in cultural values. The clinician should consider the client's individual and personally relevant characteristics—such as acculturation level, gender, and belief in Asian values—to make treatment more personally relevant to the client. If the client is highly acculturated, the clinician may choose to incorporate more EBT techniques and decrease the use of culturally relevant therapeutic techniques.

It should be noted that my purpose in using the PROP model is not to suggest that CATs do not work nor that personal relevance is the only factor in determining whether an intervention will be effective for a person of color. There is substantial evidence that both EBTs and CATs are effective in reducing negative mental health symptoms for people of color (Carter et al., 2012; Cuijpers et al., 2018; Hall et al., 2016; Huey & Tilley, 2018). However, CATs and EBTs rely heavily on group variables, such as race or ethnicity, and often ignore individual differences. Similar to dynamic sizing—which involves a clinician knowing when to generalize and when to individualize based on a client's cultural, social, and individual contexts (Sue, 1998)—the PROP model

encourages clinicians and researchers to consider when to generalize and when to individualize when delivering EBTs or CATs.

Future Directions

In addition to the use of the PROP model, it is necessary to determine how the personal relevance of an intervention can be measured for clients in terms of both client outcomes and client perception. Many outcome measures used in CAT studies are not culturally or individually tailored (Hall et al., 2016). The lack of tailored outcome measures may cause researchers to underestimate the actual effectiveness of cultural adaptations. There are also many challenges in only relying on self-report measures, such as bias in reporting and social desirability effects, especially when assessing sensitive issues, including mental illness (Krumpal, 2013). Other methods that do not solely rely on self-report measures are needed to measure the personal relevance of a psychotherapy intervention.

Social neuroscience approaches, such as functional magnetic resonance imaging (fMRI), may offer an effective, alternative way to measure the personal relevance and meaning of an intervention to a client (Hall et al., 2020). Neural measures may offer advantages beyond self-report, such as being less susceptible to social desirability and allowing researchers to examine underlying neural processes (e.g., those associated with self-relevance) without a response from a participant. Extant research has shown that neuroimaging methods, such as fMRI, can predict future behavior changes that self-reports do not (Berns & Moore, 2012; Falk et al., 2010). Additionally, preliminary fMRI studies focused on persuasion and the ELM model have revealed that attention (superior frontal gyrus, lateral parietal cortex) and self-processing networks (medial prefrontal and

posterior cingulate cortices) are implicated in the central processing of persuasive messages (Cacioppo et al., 2018). In other words, there is an increase of neural activation across attention and self-processing networks when an individual finds a message persuasive. As addressed earlier in this chapter, the more personally persuasive an individual finds a message, the more likely they will be to make an attitude or behavioral change (Petty & Cacioppo, 1986). Indeed, a growing body of fMRI literature has shown that the self-relevance of an intervention may predict its effectiveness for participants (Cooper et al., 2015; Falk et al., 2012). Thus, fMRI may offer a means to evaluate the personal relevance of psychological treatment for an individual.

Summary

The personal relevance of an intervention may provide a point of connection between clients, CATs, and mental health outcomes. The PROP model consists of three components (evidence-based treatments, cultural adaptations, and individual differences) that work together to determine the personal relevance of a treatment approach. Current self-report measures of mental health outcomes may not fully capture the effectiveness of a CAT. Neuroimaging may offer a more precise measurement of how personally relevant an individual finds a treatment approach.

General Summary

The Proximal-Distal Model (PDM) and the Elaboration Likelihood Model of Persuasion (ELM) are two foundational frameworks that provide preliminary explanations for how the personal relevance of interventions may affect treatment outcomes for clients. In the PDM, approaches that focus on cultural knowledge or culturally specific therapeutic techniques are viewed as distal to treatment outcomes. Two

processes, establishing therapist credibility and gift-giving, are considered more proximal to treatment outcomes. These two proximal processes may increase the personal relevance of an intervention (e.g., Asian clients' "buy-in" to the therapeutic approach). Research using the PDM as a framework has revealed that focusing on attaining the client's "buy-in" regarding therapy increases the likelihood of clients staying in therapy. According to the ELM, attitude change is more likely when an individual's engagement with a message is high (central processing), than when engagement is low (peripheral processing). The results of ELM research focusing on health messages have indicated that culturally-tailored messages are effective in changing the health attitudes and behaviors of people of color. CATs are thought to engage people of color more because they incorporate cultural modifications that are relevant to people of color. However, individual differences, and by implication personal relevance, are often overlooked in CATs.

The PROP model provides a framework to determine the personal relevance of a specific therapeutic approach for a client. The PROP model consists of three components: evidence-based treatments, cultural adaptations, and individual differences. These components work together to determine the personal relevance of a treatment approach; both group-level characteristics (e.g., culture, ethnicity) and individual differences (e.g., acculturation level) should be taken into account to maximize the effectiveness of a psychological intervention. Future research should establish ways of measuring personal relevance because current self-report measures of mental health outcomes may not fully capture the effectiveness of interventions. Neuroimaging may offer a more precise,

unbiased measurement of the personal relevance of a treatment approach for an individual.

CHAPTER IV: NEUROSCIENCE AND PERSONAL RELEVANCE

Social neuroscience approaches, such as using functional magnetic resonance imaging (fMRI), may offer an alternative way to measure how personally relevant and meaningful an intervention is to a client. Neural measures may offer advantages over self-report, such as being less susceptible to social desirability and allowing researchers to examine underlying processes (e.g., self-relevance) without a response from a participant. In Chapter III, I discussed the importance of personal relevance, or self-relevance, in psychotherapy treatment. In this chapter, I extend upon the importance of personal and self-relevance by reviewing fMRI research that investigated specific brain regions, such as the medial prefrontal cortex (mPFC). I focus on the mPFC because more than any other brain region, the mPFC has been consistently implicated in neural processes that are associated with self-relevance. Cultural differences in brain regions associated with self-relevance will also be discussed.

Brain Regions Associated with Self (Personal) Relevance

Klein et al. (1996) published an article that presented an experimental case study on a young female college student who experienced retrograde amnesia after a head injury. Klein et al. (1996) were interested in different types of self-knowledge, specifically whether trait knowledge was separable from autobiographical memories. The authors found that the student's episodic memory, which consisted of memories of specific events that involved the individual, was severely impaired (Klein et al., 1996). Conversely, the student's semantic memory, which consisted of trait knowledge about herself (e.g., kind, smart, lazy), was not impaired at all (Klein et al., 1996). The results of this case study, that only the student's episodic memory was affected by her head injury

while her semantic memory about how she was as a person was not, provided evidence that these two types of self-knowledge were different from each other and may be mediated by different neurological systems (Klein et al., 1996). With these findings, Klein et al. (1996) urged other social psychologists to consider the role of neuroscience in the research of self and self-knowledge.

Since Klein et al.'s (1996) study, social cognitive neuroscience research has boomed (Amodio & Frith, 2006; Denny et al., 2012; Van Overwalle, 2009). Social cognitive neuroscience research focuses on the representations of self (e.g., self-relevance), perceptions of social groups (e.g., race, gender), and the ability to differentiate between self and others (e.g., theory of mind). Multiple functional magnetic resonance imaging (fMRI) meta-analyses on social cognition have consistently implicated the medial prefrontal cortex's (mPFC) role in social cognition (Amodio & Frith, 2006; Denny et al., 2012; Van Overwalle, 2009). Abnormal patterns of mPFC activity or structure has also been implicated in multiple mental health disorders that are associated with social cognition difficulties, such as autism spectrum disorder (Kaiser et al., 2010; Valk et al., 2015), depression (Savitz & Drevets, 2009), ADHD (Salavert et al., 2018), bipolar disorder (Savitz et al., 2014), post-traumatic stress disorder (Liberzon & Sripada, 2008), and schizophrenia (Chai et al., 2011; Whitfield-Gabrieli et al., 2009). Thus, it is clear that the mPFC is a crucial brain region that impacts one's sense of self.

Research on the Medial Prefrontal Cortex (mPFC) and Self-Relevance.

A few of the earliest neuroimaging studies on self-referential thinking**,** which linked the mPFC region to self and other self-related processes, were published in 2000 (Keenan et al., 2000; Kircher et al., 2000). In the past two decades, many studies and

meta-analyses supported these original findings: self-relevance was associated with increased activity in the mPFC (D'Argembeau et al., 2007; Denny et al., 2012; Heatherton et al., 2006; Northoff et al., 2006; Rameson et al., 2010; van der Meer et al., 2010). For example, using fMRI, Heatherton et al. (2006) had participants make trait adjective judgments about themselves (self condition), an intimate other (e.g., romantic partner; other condition), and whether the adjective was in all uppercase (neutral condition). The authors found that only self judgments were associated with increased activation in the mPFC region, while the other and neutral judgments were not associated with any activation in the mPFC region (Heatherton et al., 2006). D'Argembeau et al. (2007) provided further support to Heatherton et al.'s (2006) findings: there was more activation in the mPFC, specifically in the ventromedial prefrontal cortex (vmPFC) and dorsal anterior mPFC, when participants engaged in self-referential processing versus when participants engaged in other-perspective taking.

Rameson et al. (2010) expanded on these two studies by including implicit self-relevant processes, as past studies have only focused on explicit self-relevant processes (e.g., trait adjective task). For the implicit self-relevance task, participants who self-identified as scientific or athletic were asked to view athletic and scientific images, and then judge each image on whether the image contained a person (Rameson et al., 2010). For the explicit self-relevance task, participants viewed scientific and athletic adjectives and responded that it was "me" or "not me" (Rameson et al., 2010). The authors found that both implicit and explicit self-relevant processing were associated with increased activity in the mPFC and vmPFC (Rameson et al., 2010). It is clear from these studies that the mPFC, and potentially the vmPFC, are strongly associated with self-relevance.

Denny et al. (2012) conducted the most recent and comprehensive meta-analysis of 107 published fMRI studies, which included over 300 contrasts (self vs. other), that investigated the association between increased activity in the mPFC and self-relevance. The authors found that there was significantly more activation in the mPFC, specifically the vmPFC, during the self condition compared to the other condition (Denny et al., 2012). Denny et al.'s (2012) findings provided more support for previous findings from two other meta-analyses (Northoff et al., 2006; van der Meer et al., 2010). Northoff et al.'s (2006) meta-analysis, which included 20 fMRI studies, revealed that the cortical midline structures (e.g., mPFC and vmPFC) were more activated when participants processed self-related tasks compared to other-related tasks. From 17 fMRI studies, van der Meer et al. (2010) found that the vmPFC was activated when participants processed self-relevant stimuli, but not when they processed other-relevant stimuli. These three meta-analyses reveal that there is robust and consistent evidence that the mPFC, and particularly the vmPFC, is associated with the self and self-relevance.

The mPFC is not the only brain region associated with self-relevance, nor is the mPFC exclusively associated with neural processes associated with the self and self-referential processes. The mPFC region is part of the cortical midline structures (CMS), which includes the posterior cingulate cortex (PCC) and anterior cingulate cortex (ACC) (van der Meer et al., 2010). All these brain regions are associated with self-processing, as the CMS showed increased activation in self vs. at rest contrasts (van der Meer et al., 2010). Other brain regions that were activated in self vs. at rest contrasts included the anterior paralimbic regions, such as the temporal pole and inferior frontal cortex (IFC) orbital part (van der Meer et al., 2010). The mPFC has also been implicated in memory

and decision making (Euston et al., 2012), indirect communication (e.g., social gaze; Cavallo et al., 2015), and reward processing (Rogers et al., 2004). However, as evidenced by the plethora of studies and meta-analyses, the mPFC has been consistently identified as being involved in identifying the self and other self-related processes.

As stated, the mPFC is not the only brain region associated with self-relevance, but it may be more important than other regions in self-related neural processes. Specifically, damage to the mPFC region is associated with difficulties in identifying self-relevant stimuli (Philippi et al., 2011; Schmitz et al., 2006). Among patients who have experienced a traumatic brain injury (TBI; no specific injury to mPFC), Schmitz et al. (2006) found that in general, there was still a significant amount of mPFC activation when TBI patients completed a self-appraisal fMRI task where patients were asked to judge their own traits and abilities. However, when viewing different parts of the mPFC region, compared to patients with no TBI, TBI patients experienced similar activation in the vmPFC region, but less activation in the dorsal mPFC region (dmPFC) when completing the fMRI task (Schmitz et al., 2006). The authors stated that the vmPFC is associated with processing whether stimuli may be personally relevant, while the dorsal mPFC may be associated with the accuracy of self-referential evaluations (Schmitz et al., 2006). In other words, because TBI patients' level of insight into evaluating their own traits and abilities was impacted due to the limited activation of the dmPFC area, the dmPFC, and by extension the mPFC, is associated with self-referential evaluations (Schmitz et al., 2006). This finding contributes to the broader idea that different regions of the mPFC are associated with different self processes, damage to the mPFC region

may impact specific self-referential processes, and the importance of the mPFC region in the self and self-related processes.

Philippi et al. (2011) expanded on Schmitz et al.'s (2006) TBI study by focusing on six patients with mPFC damage. The mPFC patients were matched with patients with brain damage but no mPFC damage (BD group) and patients with no brain damage (control group). The authors asked all groups to complete a self-referential task where patients were asked to make personality trait judgments about their self (e.g., "Does this trait describe you?"), others (e.g., "Does this trait describe Obama?"), and a control case (e.g., "Is this trait capitalized?"). The authors found that the mPFC patients performed significantly worse on the self-referential task compared to the BD and control group (Philippi et al., 2011). Additionally, their performance could be attributed to deficits in the mPFC region as the mPFC patients' performance on the other-referential task and control case task were about equal to the other two groups. Unfortunately, fMRI was not used in Philippi et al.'s (2011) study to determine if the level of activation in the mPFC region differed between the three groups. However, structural MRI and CT scans were done on patients with mPFC damage and BD patients to investigate the contribution of lesion (brain damage) volume to their performance on the trait task (Philippi et al., 2011). The authors found that there was no significant contribution of lesion volume to patients' performance. Regardless of the lack of fMRI methods, these findings provide evidence that the mPFC is critical in allowing individuals to judge whether a stimulus is personally relevant to them (Philippi et al., 2011).

Recent Research on the mPFC and Self-Relevance

Recent research on the mPFC and self-relevance has expanded upon earlier research by: (a) focusing on the vmPFC as a more specific region associated with self-relevance and (b) investigating implicit self-relevance processes. Extant literature on the vmPFC has theorized that the vmPFC's function is to generate a sense of importance and attachment to stimuli (Roy et al., 2012) and to evaluate the personal relevance of stimuli (D'Argembeau, 2013). New studies have supported these hypotheses. For example, Kim and Johnson (2014) investigated whether imagined ownership over an item (mine contrast), which suggested implicit self-referencing, would encourage mPFC activation, compared to non-self associated items (i.e., items that are not believed to be owned by the individual; other contrast). The authors found that there was more activation in the mPFC region, specifically the vmPFC, during the mine vs. other contrast (Kim & Johnson, 2014). This finding shows that even implicitly self-referencing an item prompted activation in the vmPFC, which suggests that a participant had incorporated the item to their sense of self and attached importance to that imagined item.

Kim and Johnson (2015) later replicated and extended their findings. The authors found that the vmPFC was more active when participants imagined owning items that were associated with their ingroup (someone similar to self), than when they imagined owning items associated with an outgroup (someone not similar to self; Kim & Johnson, 2015). Furthermore, for ingroup associated items, there was more activation in the vmPFC region when participants stated they preferred the ingroup associated item than the outgroup associated item (Kim & Johnson, 2015). Again, these findings suggest that participants had incorporated the item into their sense of self and attached a sense of meaning and significance to that item. Finally, Moore et al. (2014) found more activity in

the vmPFC when participants made comparisons between themselves and similar peers (e.g., friend) than comparisons between self and dissimilar peers. Moore et al.'s (2014) findings provide evidence that an individual with a close relationship with a similar peer has attached significance to the relationship and peer, underlining the possibility an individual has incorporated their relationship with their peer as part of their identity (Moore et al., 2014). Clearly, from these three studies, the vmPFC is associated with the degree of attachment an individual places on a stimulus.

Recent research has also begun to investigate implicit self-relevance processes, such as whether implicit intentions could predict future behaviors. Investigating whether implicit intentions could predict future behaviors, Dong et al. (2016) presented short sentences to participants and asked them to agree or disagree with the complete sentence. The authors found that participants' decision to agree or disagree with the sentence was found via fMRI before the participants finished reading the sentence. Specifically, there was more activation in the mPFC when participants agreed with a statement vs. when they disagreed with a statement, and this activation was present before participants finished reading the sentence (Dong et al., 2016). The increased activation in the mPFC region during agreement suggests that the participant may have found the sentence to be relevant to themselves (i.e., personally relevant). Perhaps the personal relevance of the sentence, which increases agreement or "buy-in" from the participant, can influence behavioral change. A more extensive review of personal relevance and behavioral change will be discussed in the next chapter.

Summary

The medial prefrontal cortex (mPFC) has been implicated in playing a crucial role in social cognition, specifically self-referential thinking. Although other brain regions, such as the posterior cingulate cortex and anterior cingulate cortex, have also been implicated with neural processes associated with self-referential thinking, the mPFC has been shown to be one of the most consistent brain regions associated with self-relevance. Recent research has revealed that specific areas of the mPFC region, particularly the vmPFC, are associated with self-relevance.

Cultural Differences in Brain Regions Associated with Self and Self Relevance

In general, the mPFC is associated with the self and self-related processes for many different cultures (e.g., Western and Eastern; Chiao et al., 2009). However, a growing body of literature and one meta-analysis have shown that there are cultural differences in both what constitutes as "self" and brain regions associated with "self." Early studies showed that cultural values impact neural processes associated with the self. For example, Chiao et al. (2009) used the Self-Construal Scale, which measured participants' affiliation to individualism or collectivism, to sort 10 participants (7 Japanese and 3 Caucasian) into an individualistic group and 14 participants (5 Japanese and 9 Caucasian) into a collectivistic group. The authors found that there were differences in mPFC activation based on individualistic or collectivistic values (Chiao et al., 2009). Specifically, the individualistic group experienced greater mPFC activation when viewing general self-descriptions (e.g., "In general, does this sentence describe you?"), while the collectivistic group experienced greater mPFC activation when viewing contextual self-descriptions (e.g., "Does this sentence describe you when you are talking to your mother?"; Chiao et al., 2009). Interestingly, more Japanese participants endorsed

individualistic values than Caucasian participants (Chiao et al., 2009). This may be due to the globalization of the world and the fact that that cultural values are not static (Chiao et al., 2009). Regardless, it is clear that the cultural values of individualism and collectivism have an impact on one's sense of self.

More recent studies have provided further evidence for this original finding while expanding upon it by: (a) pinpointing more specific regions in the mPFC and other brain regions; and (b) including only Asian participants. Harada et al. (2010) primed 18 bicultural Asian Americans with an individualistic self-construal or collectivistic self-construal task. The self-construal task consisted of a short story. In both primes, participants were asked to count the number of target phrases: for the individualistic prime, target phrases consisted of "I," "my," and "me," and in the collectivistic prime, target phrases consisted of "we," "our," and "us" (Harada et al., 2010). After participants were primed, they completed an implicit self-recognition task in the fMRI. During the self-recognition task, participants saw either a word that was self-relevant to them (e.g., their name), their father (e.g., their father's name), or a stranger (e.g., a stranger's name; Harada et al., 2010). The authors found that regardless of the priming condition, there was more activation in the vmPFC during self- and father-relevant trials compared to the stranger- relevant trial. However, when participants were primed with individualism, there was more activation in the dorsal medial prefrontal cortex (dmPFC) during the father-relevant trials compared to self- and stranger-relevant trials (Harada et al., 2010). Harada et al.'s (2010) findings suggest cultural priming activates and engages different regions of the mPFC.

To better understand Harada et al.'s (2010) findings, as earlier stated, Schmitz et al. (2006) proposed that the vmPFC may be associated with processing if stimuli are personally relevant to an individual, while the dmPFC may be associated with evaluating the accuracy of self-referential stimuli. For Asians, the self and father may be closely related as in most Asian cultures, as the "self" is not an individualistic "self," but in the context of others (e.g., family; Le & Stockdale, 2005). Thus, the self and father relevant stimuli may both have been personally relevant to the participant and activated the vmPFC (Harada et al., 2010). To explain the activation in the dmPFC under the individualism prime, the "self" may have been viewed an individualistic "self." Thus, because their father is not part of the individualistic self, participants may have needed additional neural processing to determine the accuracy of father-relevant and self-relevant words, which increases activation in the dmPFC, to help them differentiate their father from self (Harada et al., 2010).

Huff et al. (2013) found further evidence that culture and cultural identity involves the dmPFC, rather than the vmPFC. Thirty-one Asian Americans, who identified as having a blended cultural identity (i.e., blended both Asian and American identities) or alternating cultural identity (i.e., switched between Asian and American identities depending on context), were placed in one of three conditions: (a) Asian prime (pictures of 100% Asian faces); (b) Caucasian prime (pictures of 100% Caucasian faces); (c) and neutral prime (pictures of blended Asian/Caucasian faces; Huff et al., 2013). Participants were then asked to complete an adjective trait judgment task, where they were asked to evaluate whether the adjective described themselves (self condition), their mother (mother condition), or Gandhi (other condition). After being scanned, participants

completed a surprise memory recognition task where participants were asked to identify if they saw the adjective in the previous task (Huff et al., 2013).

Huff et al. (2013) found that participants with a blended cultural identity experienced more activation in the dmPFC during the mother condition vs. the self condition, while participants with an alternating cultural identity experienced more activation in the dmPFC during the self condition vs. the mother condition. For Asian participants with a blended cultural identity, they again may not see their "self" as an individualistic self, but as a blended "self" with their mothers (Le & Stockdale, 2005). Therefore, when evaluating the accuracy of self- and mother-referential stimuli, there may be more activation in the dmPFC when evaluating mother-referential stimuli because Asian participants have incorporated their mother into their sense of self. Asian participants with an alternating cultural identity may view their self and their mother as two separate identities, thus experiencing more activation in the dmPFC when evaluating self-referential stimuli than mother-referential stimuli because they differentiated between the accuracy and relevance of the two stimuli. From Huff et al.'s (2013) findings, it is clear that when people are primed with different cultural orientations, there are cultural differences in the regions of the mPFC that are activated, specifically the dmPFC vs. vmPFC, when processing self-relevant stimuli.

Sul et al. (2012) revealed that in addition to the mPFC, vmPFC, and dmPFC, differences in cultural orientation (i.e., individualism or collectivism) activated other brain regions when viewing and processing self-relevant stimuli. Nineteen Korean participants completed a self-referential task (self-judgement vs. other-judgement) while being scanned for an fMRI study. After being scanned, the participants completed a

questionnaire that determined if they identified as more individualistic or collectivistic (Sul et al., 2012). The authors found that in addition to the mPFC, the anterior cingulate, bilateral temporoparietal regions, and precuneus were all other brain regions that were more activated when participants completed the self-referential task (Sul et al., 2012). Specifically, there was more activation in those brain regions when participants completed the self-judgement task than the other-judgement task (Sul et al., 2012). Additionally, participants' cultural orientation impacted different activation in these regions. Sul et al. (2012) found that participants who identified as collectivistic experienced more activation in the left temporoparietal regions, while participants who identified as individualistic experienced more activation in the mPFC region.

A meta-analysis by Han and Ma (2014) that examined cultural differences in brain activity supported Sul et al.'s (2012) findings. Han and Ma's (2014) meta-analysis consisted of 35 studies (28 fMRI studies) and 56 contrasts (28 contrasts of East Asian > Western cultures and 28 contrasts of Western > East Asian cultures). The 28 fMRI studies had their participants complete a paradigm or task (e.g., self-referential task or theory of mind task) while being scanned. The participants in these studies were presented with a cultural prime (e.g., interdependence vs. independence). Utilizing the Activation Likelihood Estimation (ALE) method, Han and Ma (2014) found that among East Asian > Western culture contrasts, there was more activation in these brain regions: dmPFC, inferior frontal cortex (LF), left IF, right inferior parietal cortex, and right temporoparietal junction. Among Western > East Asian cultures contrasts, there was more activation in these brain regions: vmPFC, anterior cingulate cortex, right superior frontal cortex, left precentral gyrus, and right claustrum (Han & Ma, 2014). From these

findings it is clear that different cultural orientations show differential neural network activation and activate different brain regions.

Most recently, research on culture, neuroscience, and self-relevant processes have investigated how acculturation impacts brain activity associated with self-relevance. Chen et al. (2015) scanned 27 recently immigrated Chinese participants at two time points: (a) within the first 2 months of their arrival in the U.S. and (b) 6 months after the first scan. During both scans, participants completed a trait-judgment task where they evaluated whether they thought traits applied to themselves (self condition) or their mothers (mother condition; Chen et al., 2015). At both time points (Time 1 and Time 2), participants also completed a scale that measured how much they identified with individualism and collectivism. Based on changes in the interdependence (collectivism) score between Time 1 and Time 2, participants were then split into the More-Eastern group or the Less-Eastern group (Chen et al., 2015). Participants who increased in their collectivism score were placed into the More-Eastern group while participants who decreased in the collectivism score were placed in the Less-Eastern group (Chen et al., 2015).

The authors found that at Time 1, there were no significant differences between the More- and Less-Eastern groups in activation in the mPFC region during self and mother trials (Chen et al., 2015). However, at Time 2, the Less-Eastern group showed more activation in the mPFC region during the self condition than the mother condition when compared to the More-Eastern group (Chen et al., 2015). For the More-Eastern group, there were no significant differences in mPFC activation between the self and mother conditions at Time 2 (Chen et al., 2015). In other words, the Less-Eastern group

at first most likely viewed their mother as part of their individual self. However, as they acculturated to the U.S. and became more individualistic, they may have begun to separate their individual self and their mother. Chen et al.'s (2015) results indicate that acculturation impacts brain regions (e.g., mPFC) implicated in self and self-referential processing.

Summary

In both Asian and Western cultures, the medial prefrontal cortex is implicated in the self and self-referential processes. However, research has revealed that cultural orientation (i.e., individualism or collectivism) utilizes different mPFC regions. Individuals who identify as more collectivistic experience more activation in the dorsal medial prefrontal cortex (dmPFC) when viewing self-relevant and close others-relevant (e.g., mother, father) stimuli. This suggests that there are differences in what constitutes as "self" in different cultures. For collectivistic individuals who incorporate close others into their sense of self, neural processes in the dmPFC rather than the vmPFC are activated. Other studies have also discovered that cultural orientation activates other brain regions besides the mPFC and acculturation impacts activation in various brain regions. More research into these areas and acculturation's influence on what stimuli activate the mPFC is needed.

Future Directions: The mPFC, Personal Relevance, and Behavioral Change

From the previous sections, it is well established through more than a decade of neuroimaging research that the mPFC, the vmPFC, and the dmPFC are strongly associated with neural processes involving the self and self-relevance. However, before discussing future directions, it is worth commenting that an ongoing problem for fMRI

research is that many studies often have small *N*s, which contributes to a lack of statistical power (Turner et al., 2018). A sample size of 30 participants in an fMRI study is about the standard sample size (Turner et al., 2018). However, many studies do not have a sample size of 30. Indeed, almost all the fMRI studies referenced in this chapter had a sample size of fewer than 30 participants. Only one fMRI study referenced in this chapter, Huff et al. (2013), had more than 30 participants ($N = 48$). Nevertheless, a decade of research and multiple meta-analyses have provided strong and consistent evidence that the mPFC is associated with the self and self-relevance (Amodio & Frith, 2006; Denny et al., 2012; Han & Ma, 2014; Van Overwalle, 2009).

In addition to confirming the role of the mPFC in self-referential thinking, research has also begun to reveal that the mPFC can predict future behavioral change. For example, multiple fMRI smoking cession studies had results that suggested that the level of activation in the mPFC when participants viewed anti-smoking messages predicted their cessation success at the individual level (Falk, Berkman, Whalen, & Lieberman, 2011) and population level (Falk et al., 2016). Falk et al. (2011, 2016) found that participants who were more successful in quitting had more mPFC activation when viewing anti-smoking messages, suggesting that they personally identified more with the anti-smoking messages than participants who were less successful in quitting. More recently, Baek et al. (2017) were able to predict participants' intent to share information (i.e., *New York Times* articles). The authors found that participants were more likely to choose to share *New York Times* articles with others on social media if they had more activation in the mPFC region when viewing *New York Times* articles than participants who had less activation in the mPFC region when viewing *New York Times* articles (Baek

et al., 2017). This finding suggests that participants who again personally identified more with the *New York Times* articles were more likely to share it with others (Baek et al., 2017). From these studies, there is a growing link between the mPFC, personal (or self) relevance, and behavior change. A comprehensive review of studies that investigate the relationship between the mPFC, personal and self-relevance, and behavioral change will be presented in the next chapter.

General Summary

Since Klein et al.'s (1996) study and in the past two decades, neuroimaging studies on social cognition, such as neural processes of self and self-referential thinking, have flourished. Extant research has consistently implicated the medial prefrontal cortex (mPFC) and other brain regions, such as the posterior cingulate cortex and anterior cingulate cortex, as essential brain regions in processing representations of self. However, the majority of studies have shown that the mPFC is one of the most crucial brain regions associated with the self and self-relevance. Recent research has expanded upon previous research on the mPFC by delving deeper into specific regions of the mPFC. From these studies, the vmPFC and dmPFC have been implicated as specific mPFC regions that are associated with the self and self-relevance. There are also cultural differences in what constitutes as "self" and the brain regions associated with "self." Among individuals with an individualistic orientation, their "self" may only be their individual self, while among individuals with a collectivist orientation, their "self" may include both their individual self and close others (e.g., parents). Multiple studies have implicated the dmPFC as the specific mPFC region associated with culture and cultural identity.

With previous research establishing the mPFC, vmPFC, and dmPFC as brain regions implicated in neural processes of the self and self-referential thinking, researchers recently have begun to study whether activation in these regions can predict future behavior or behavioral change. The next chapter will discuss these studies.

CHAPTER V: NEUROIMAGING AND INTERVENTION RESEARCH

In Chapter IV, I presented a comprehensive literature review highlighting the medial prefrontal cortex (mPFC) and specific regions within the mPFC, the ventromedial and the dorsal medial prefrontal cortex (vmPFC and dmPFC, respectively), as important brain regions implicated with the self and self-relevance. In this chapter, to extend this, I review the literature on neuroimaging, specifically functional magnetic resonance imaging (fMRI), in intervention research to predict behavioral change in individuals. I first discuss the utility of neuroimaging in predicting behavior, then assess the predictive ability of neural processes. Second, I present a review of neuroimaging and health intervention research (e.g., smoking) and then a review of neuroimaging and mental health intervention research (e.g., cognitive behavioral therapy). Finally, I discuss suggestions for future directions for the field of clinical neuroscience, with a focus on bridging cultural neuroscience with clinical work.

Introduction: Utility of Neuroimaging in Predicting Behavior

In Chapter III, the Personal Relevance of Psychotherapy (PROP) model was presented, and the necessity of determining the personal relevance of an intervention for a client was discussed. Further, the inherent limitations of self-report measures (e.g., social desirability effects, reporting bias) in assessing the personal relevance of psychotherapy were demonstrated (Krumpal, 2013). Finding another way to objectively measure participants' perceptions of the personal relevance of psychotherapy is needed. Neuroimaging approaches, specifically functional magnetic resonance imaging (fMRI), offer an alternative way to predict behavioral change through measuring the putative

neural activity associated with personal relevance and meaning of an intervention to a client (Hall et al., 2020).

Within the past few decades, neuroimaging approaches, particularly fMRI, have emerged as a novel method in predicting people's behaviors (Berkman, 2015). Berkman (2015) provided three main reasons as to why neuroimaging approaches may provide additional advantages over self-report in predicting people's behaviors: (a) neuroimaging is less susceptible to biases in self-reports and social desirability effects, as researchers can examine passive neural processes without any direct self-reports from a participant; (b) neuroimaging can directly assess small differences between participants in a mental process, whereas other methods cannot measure these small individual differences; and (c) through neuroimaging, researchers can measure multiple neural processes and the connectivity among them simultaneously. Indeed, several studies have demonstrated these points in practice (Berns & Moore, 2012; Falk et al., 2010).

Relatedly, there is a growing body of fMRI literature demonstrating that (a) the self-relevance of an intervention may predict its effectiveness for participants (Cooper et al., 2015) and (b) the medial prefrontal cortex (mPFC) and ventromedial prefrontal cortex (vmPFC) are two neural areas that have been putatively associated with self-relevance. Thus, as alluded to in Chapter IV, recent research has begun paring this novel method (fMRI) with self-relevance and predicting an individual's behavior. In the next section, I discuss (1) the predictive ability of neural processes in predicting behavior change and (2) present a comprehensive literature review of studies that have used fMRI to investigate the self-relevance of interventions for participants and how they have predicted behavior changes.

Neuroimaging, Self-Relevance, and Behavior Change in Health Interventions

As reviewed in Chapters III and IV, this dissertation is focused on the personal, or self, relevance of interventions because personal relevance is thought to be the missing connection between mental illness, evidence-based treatments (EBTs), culturally adapted therapies (CATs), and engaging people of color, particularly Asian Americans, with psychotherapy. The brain region that has been most consistently associated with self-relevance and self-referential thinking is the medial prefrontal cortex (mPFC) (Denny et al., 2012). Thus, the studies in this section will focus specifically on how fMRI has been used to investigate the relationship between the mPFC and self-relevance of interventions, and how neural processes in the mPFC can predict behavior change. Because there is a particular dearth of research on mental health interventions, this review will focus on physical health interventions, such as smoking cessation and sunscreen habits, which has a larger literature base at this time.

Establishing the Predictive Ability of Neural Processes in Predicting Behavior Change

The first fMRI study to demonstrate the predictive ability of neural processes in predicting later behavior change, specifically the mPFC region, was by Falk et al. (2010). Twenty participants, while being scanned, viewed persuasive text and images on the importance of sunscreen use. After being scanned, participants reported their attitudes towards and intentions to use sunscreen in the next week. Participants were also given a bag that included sunscreen towelettes. At one-week follow-up, participants reported the number of days they had used sunscreen in the past week (Falk et al., 2010). Falk et al. (2010) found that participants who experienced increased mPFC activation when viewing messages about the importance of sunscreen later reported an increase in their sunscreen

use, compared to participants who did not experience increased mPFC activation. After controlling for participants' self-reported attitudes and intentions about sunscreen use, increased activity in the mPFC region was still significantly associated with increased sunscreen use. This suggests that neural processes (i.e., increased mPFC activity) could predict behavior change beyond participants' self-report (Falk et al., 2010).

Falk et al. (2011) replicated their 2010 findings in a smoking cessation fMRI study and provided more evidence that fMRI may be more sensitive than self-report in predicting behavior change. In the scanner, 28 heavy smokers who intended to quit viewed ads that were developed to help smokers quit smoking. Participants rated each ad on the extent to which it increased their self-efficacy, increased their intentions to quit, and how relevant they found it (i.e., self-relevance). Participants who experienced increased activity in the mPFC region during ad exposure significantly decreased their smoking relative to participants who did not demonstrate increased mPFC activity. These findings imply that participants who may have found the ads more persuasive or self-relevant, as revealed through fMRI, were more likely to smoke fewer cigarettes compared to participants who did not find the ads as persuasive. The authors also found that neural activity and participants' self-reported personal relevance of each ad independently predicted the variability in later behavior change (Falk et al., 2011). Compared to self-report measures, neural activity (i.e., increased mPFC activity) during anti-smoking ad exposures doubled the variability in later behavior change. This again demonstrated that fMRI was able to predict behavior change above and beyond self-report measures alone (Falk et al., 2011).

Chua et al. (2011), interested in a similar research question as Falk et al. (2011), investigated whether neural processes to anti-smoking messages tailored to each participant could predict behavior change. Eighty-nine treatment-seeking smokers completed self-report questionnaires on their health, demographic, and psychosocial characteristics that were relevant to quitting smoking (Chua et al., 2011). The authors used these responses to create personally tailored anti-smoking messages for participants (e.g., "You feel like your sister will help you stay on track once you quit."). While being scanned, the participants listened to tailored messages, untailored messages, and neutral messages. Chua et al. (2011) found that, compared to untailored and neutral messages, when participants listened to tailored messages, there was increased activity in the dorsomedial prefrontal cortex (dmPFC), a specific region within the mPFC that has been associated with self-relevance. The authors also found that the increased activity in the dmPFC, when exposed to tailored messages, significantly predicted participants' odds of quitting smoking, suggesting that tailored messages, assumed to be more personally relevant, can promote behavioral change (Chua et al., 2011).

It should be noted that both studies by Falk et al. had samples sizes less than 30 (2010: $N = 20$; 2011: $N = 28$), which is less than the recommended sample size for fMRI studies (Turner et al., 2018), so inferences are limited. However, their findings provide initial evidence that fMRI may be a more sensitive tool than, and extend upon, self-report measures in predicting behavior change. Additionally, Chua et al.'s (2011) findings indicate that tailoring health interventions to participants, which can increase the personal relevance of the intervention, has the potential to impact behavioral change. To further the health neuroscience field, future fMRI studies need to include larger sample sizes and

investigate the relationship between neural processes, personally relevant interventions, and behavior change.

Neural Processes, Self-Relevance, and Predicting Behavior Change

Indeed, later studies expanded upon Chua et al.'s (2011) and Falk et al.'s (2010, 2011) studies by including larger samples and investigating the relationship between the mPFC, self-relevance of interventions, and behavioral change (Cooper et al., 2015; Pegors et al., 2017; Pei et al., 2019; Wang et al., 2013). These studies had consistently revealed that when participants were exposed to health interventions, increased activation in the mPFC, vmPFC, or dmPFC predicted later behavior change. I review studies on each neural correlate (i.e., mPFC, vmPFC, or dmPFC) below.

Research on Health Interventions, Neural Activity in the mPFC, and Behavior Change

Consistent evidence from multiple fMRI health intervention studies has revealed that the mPFC is a robust neural correlate for self-relevance, and that increased mPFC activity is predictive of later behavior change. For example, Pegors et al. (2017) investigated the relationship between mPFC activity and specific content of anti-smoking messages in three areas: (a) risk/negative consequences of smoking; (b) social norms and consequences around smoking, and (c) specific health outcomes and consequences of smoking. In the scanner, 50 nontreatment-seeking smokers viewed negative-valence images (e.g., social exclusion from family, yellow teeth) and neutral-valence images (e.g., spending time with family, physical activity), and then rated each image on how much the image made them want to quit smoking (Pegors et al., 2017). The authors found that participants who experienced increased mPFC activation when viewing anti-smoking messages that contained risk/negative consequences of smoking were more likely to

reduce the number of cigarettes smoked, compared to participants who did not experience increased mPFC activation (Pegors et al., 2017). The other two types of content (social norms and specific health outcomes) did not significantly predict a change in behavior (Pegors et al., 2017). Results highlight the importance of the personal relevance of a message and its persuasive power in affecting behavior.

Studies have also revealed that neural activity in the mPFC region, which has been consistently implicated in individual behavior change, may also predict population behavior change (Doré et al., 2019; Falk et al., 2012, 2016). For example, 30 heavy smokers who wanted to quit were scanned while viewing three ad campaigns (A, B, and C) and, after being scanned, completed self-reports on the effectiveness of each ad (Falk et al., 2012). To measure the population-level success of each campaign, the number of calls to a quit smoking helpline after each ad was aired was compared. Falk et al. (2012) found that increased neural activity in the mPFC region suggested the order of campaign effectiveness was C > B > A, while participants reported the B > A > C as the order of effectiveness. This finding reveals differences in what campaign participants thought they found effective, as reported via self-report, and in what participants actually found effective as found via fMRI. The population-level success of each campaign indicated that the order of effectiveness was C > B > A, which reflected the fMRI findings. Falk et al.'s (2012) findings suggest that (a) fMRI was more accurate than self-reports in determining the effectiveness of a quit smoking campaign at the population-level, and (b) increased activation in the mPFC region for a specific ad at the individual-level can predict behavior change at the population-level.

Falk et al. (2016) replicated and extended their above 2012 findings by investigating the impact of message content on self-relevance at the individual level and predictive ability at the population level. Specifically, Falk et al. (2016) were interested in the effectiveness of graphic warning labels (GWLs) on cigarette packaging in predicting behavior change. At the population-level, Falk et al. (2016) sent emails containing GWL images and neutral images to 400,000 likely smokers (duration and frequency unknown). At the individual level, 47 smokers, who were not intending to quit smoking, viewed 40 images of GWLs, ten negative images (e.g., yellowing teeth), ten neutral images (e.g., someone smiling with non-yellow teeth), and ten control images (e.g., a mouth) while being scanned (Falk et al., 2016). After viewing each GWL image, participants were asked to rate how much the image made them want to quit smoking. Among these 47 smokers, increased activity in the mPFC region when being exposed to anti-smoking ads predicted email campaign response at the population level (Falk et al., 2016). In other words, ads that prompted increased activation in an individual's mPFC region were also ads that were most effective in increasing intentions to quit smoking at the population level. Falk et al. (2016) also found an interaction between the message content and mPFC activity. Because increased mPFC activity is associated with increased self-relevance, compared to the other anti-smoking images, GWLs may be more self-relevant, and thus more persuasive, for individual smokers as there was increased mPFC activity when they viewed GWLs. GWLs were also shown to be more engaging at the population-level, as measured by the number of clicks from the email campaign. Falk et al.'s (2012, 2016) findings strongly suggest that neural activity in the mPFC region, which measures self-

relevance at the individual-level, may be extrapolated to self-relevance at the population-level.

In addition to message content and predicting behavior change at the population-level, intervention research has focused on different neural processes that may work in tandem with self-related processes to predict behavior change. Another study of 50 nontreatment-seeking smokers replicated prior findings on the mPFC predicting behavior change (Cooper et al., 2015). The study also examined the role of the vmPFC, which has been demonstrated to be an important neural correlate associated with the personal or subjective value individuals place on a stimulus during decision making. The authors were interested in the overlap of self-relevance and value participants placed on the message and how that impacted activation in the mPFC (Cooper et al., 2015). Cooper et al. (2015) found that in addition to increased activity in specific self-related processing regions in the mPFC, there was also increased activity in the vmPFC area associated with the value individuals placed on messages. Increased activities in both the mPFC and vmPFC also significantly predicted a decrease in the number of cigarettes participants smoked (Cooper et al., 2015). This finding suggested that both self and value neural correlates (i.e., mPFC, vmPFC) may work together to predict behavior change.

Recent studies have confirmed Cooper et al.'s (2015) findings and implicated other neural processes that may work in tandem with the mPFC in increasing the personal relevance and persuasive effect of message content. Cooper et al. (2018) found that the functional connectivity between the mPFC and ventral striatum (VS) was associated with a reduction in smoking. Forty-five smokers, who did not report a current intention to quit, viewed GWLs and control images while being scanned in this fMRI study. Interestingly,

the authors found no significant associations between activity in the mPFC or VS, alone, and behavior change (Cooper et al., 2018). However, there was a significant interaction among the functional connectivity between the mPFC, VS, and behavior change, suggesting that smokers who experienced more functional connectivity from the mPFC to the VS when viewing GWLs than control images were more likely to decrease their smoking. At first glance, the results from Cooper et al. (2018) seem to contradict previous literature on the mPFC's role in self-relevance processing and behavior change. However, as discussed in Chapter IV, the mPFC is not the only brain region involved in self-related processes but may be a crucial brain region in self-related processes. Cooper et al.'s (2018) findings suggest that along with the VS, the mPFC plays a role in determining the persuasion and relevance of an intervention.

Pei et al. (2019) replicated Cooper et al.'s (2015) findings among 37 non-smoking adolescents. Participants viewed ads from a smoking prevention campaign in the scanner and, to measure their level of engagement with the ads, were then asked to talk about the ads as if they were talking to their peers (Pei et al., 2019). Participants' beliefs about smoking were also assessed before and after their fMRI scan. The authors found that participants who experienced increased activity in the self and value-processing regions in the mPFC while viewing ads were more likely to elaborate on and engage with the ad information. Additionally, participants who were more engaged with the messages were more likely to change their beliefs on the social consequences of smoking than less engaged participants (i.e., less activation in the mPFC) (Pei et al., 2019). In addition to Cooper et al.'s (2015, 2018) findings, Pei et al.'s (2019) findings provide further support that the overlap between different neural correlates and areas may work together to

increase the personal relevance and persuasive effect of an intervention to promote behavior change.

Research on Health Interventions, Neural Activity in the vmPFC, and Behavior Change

As discussed in Chapter IV and suggested in the above section, in addition to its role in evaluating the personal relevance of stimuli (D'Argembeau, 2013), the vmPFC may be a neural correlate for the value individuals place on stimuli. In other words, the vmPFC may establish a sense of importance and attachment to stimuli (Roy et al., 2012), which could influence behavior change.

Falk et al. (2015) provided early evidence that the vmPFC is another important neural correlate in predicting behavior change. In an fMRI study on a self-affirmation intervention for increasing physical activity, 46 participants were randomized into two groups: (a) a self-affirmation condition and (b) a control condition. At baseline, participants were asked to rank eight values (i.e., creativity, friends and family, humor, independence, money, politics, religion, spontaneity). When being scanned a week later, all participants viewed messages about increasing their physical activity. However, participants in the self-affirmation condition were also asked to reflect on their values before viewing messages (e.g., "Think of a time when religious values might give you a purpose in life"), while control participants were asked to reflect on a series of situations (e.g., "Think of a situation when you might check the weather.") (Falk et al., 2015). As expected, Falk et al. (2015) found that participants who experienced more activity in the vmPFC when viewing health messages experienced a decrease in sedentary behavior at follow-up, indicating that participants who found the messages more closely related to

their values, and therefore more important and personally meaningful, were more likely to change their behavior. Furthermore, Falk et al. (2015) found that participants in the self-affirmation condition experienced the greatest amount of activity in the vmPFC, which was associated with decreased sedentary behavior. These findings provide early evidence that in addition to creating personally relevant interventions, incorporating and prompting individuals to think about their values, which may increase the importance of the messages and thus the self-relevance of interventions, could enhance the persuasive effect of those interventions.

Later studies again revealed that the vmPFC works with other brain regions (e.g., mPFC, amygdala) to predict behavior change. For example, in another fMRI study on decreasing sedentary behavior with similar methods as Falk et al. (2015) (e.g., self-affirmation vs. control condition), Cooper et al. (2017) scanned 44 participants and found that the connectivity between the vmPFC and ventral striatum (VS), two brain regions associated with value, predicted reductions in sedentary behavior. In other words, participants who had higher levels of connectivity between the vmPFC and VS when viewing health messages, experienced a significant decrease in sedentary behavior at follow-up (Cooper et al., 2017). These findings provide more support that adding factors that increase and tailor the personal relevance of an intervention for an individual, such as an individual's values, can enhance the intervention's persuasive effect.

Riddle et al. (2016) scanned 49 smokers (21 smokers reported an intention to quit, 29 smokers reported no intention to quit) and found increased activity in the vmPFC and amygdala when participants viewed GWLs compared to control images. Similar to previous findings, among smokers who wanted to quit, increased activation in the vmPFC

and amygdala when viewing GWLs predicted behavior change, in that there was a decrease in the number of cigarettes smoked (Riddle et al., 2016). The findings from Riddle et al. (2016) suggest that the overlap between increased activation in the vmPFC and the amygdala, a brain region associated with emotion reactivity (Phelps & LeDoux, 2005), significantly impacted behavior change. Indeed, these findings suggest that interventions that also evoke an intense emotional reaction from individuals may increase the importance of the messages, in turn increasing the personal relevance of the intervention, and thus augment the persuasive effect of those interventions.

Most recently, Doré et al. (2019), using the same sample as Falk et al. (2016), investigated how affect-, value-, and emotion regulation-related neural processes interact to predict the effects of GWLs for individual smokers and at the population-level. The authors were mainly interested in whether the amygdala would predict behavior change. Certainly, increased activity in the amygdala was predictive of greater intentions to quit at both the individual- and population-level (Doré et al., 2019). In other words, smokers who experienced increased amygdala activity when viewing GWLs were more likely to report wanting to quit than smokers who did not experience an increase in amygdala activity. This pattern was also seen at the population-level. However, Doré et al. (2019) found that increased activity in the vmPFC mediated the relationship between activation in the amygdala and the impact of GWLs, suggesting that the more self-value an individual placed on the GWL, the more likely an individual wanted to quit smoking. This mediation was also found at the population level. Doré et al.'s (2019) findings show that even if a persuasive message evokes an emotional reaction, it is not enough. The

message also needs to be personally relevant to be effective in encouraging behavior change.

Finally, a fMRI smoking cessation treatment study by Owen et al. (2017) revealed the critical role the vmPFC plays in predicting behavior change, above and beyond other brain regions. In a scanner, 48 treatment-seeking smokers were exposed to GWLs, text-only warning labels, and matched control stimuli (scrambled images that matched the color of GWL ads). The authors found that participants who experienced increased activation in the vmPFC when viewing GWLs, compared to text-only warnings and control images, were less likely to relapse in treatment than participants who did not experience increased vmPFC activation (Owen et al., 2017). However, increased activity in the amygdala did not predict later behavior change, which differs from previous findings. An explanation for the contradicting results may be due to the fact that the vmPFC is considered a pivotal region associated with the self (Denny et al., 2012), while the amygdala, a region most associated with emotion and emotion processing, is not associated with the self (Phelps & LeDoux, 2005). Thus, it is expected that there would be no association between the amygdala and behavior change. The association between increased activity in the vmPFC and behavior change remained significant, providing further confirmation of the vmPFC's crucial role in self-relevance.

Despite some conflicting evidence, from these studies, it is clear that the vmPFC is a robust neural correlate for self-relevance, specifically how much value or importance an individual may place on stimuli. Interventions that include content participants find important or strongly value may increase the personal relevance of the intervention,

which in turn makes the intervention more persuasive and engages participants more. When participants are more engaged, they may be more likely to change their behavior.

Research on Health Interventions, Neural Activity in the dmPFC, and Behavior Change

To date, only one study has found an association between increased activity in the dmPFC and predicting behavior change (Wang et al., 2013). As previously discussed, the dmPFC's primary role is believed to establish the accuracy of stimuli (Schmitz et al., 2006). Wang et al. (2013) were interested in the interaction between content (i.e., strong or weak arguments) and the format of anti-smoking messages and their effects on the brain and behavior. In this study, format was operationalized by the message sensation value (MSV), an aggregated measure of the audio and visual features of ads (Wang et al., 2013). These features included special effects, intense images, and music. Among 71 nontreatment-seeking smokers, anti-smoking messages that had stronger MSV and arguments increased activation in multiple brain regions, including the dmPFC (Wang et al., 2013). This finding suggests that participants who viewed these messages may have found them more accurate, which may have increased the messages' persuasive effect (and thus increased the personal relevance) as participants may have had more "buy-in." Out of the identified brain regions, only increased activation in the dmPFC predicted a significant reduction in smoking cessation. This offers additional evidence that the personal relevance of an intervention as measured through putative neural correlates (i.e., mPFC, vmPFC, or dmPFC) is important in changing behavior (Wang et al., 2013).

When viewing all study findings together, it is clear that increased activation in the mPFC and relevant areas within (i.e., vmPFC and dmPFC) is a strong predictor of

behavior change in response to an intervention. Given the robust associations between personal relevance and the mPFC, vmPFC, and dmPFC, it can be inferred that the more tailored interventions are to a participant's own sense of self, which includes beliefs and values, the more effective and engaging that intervention might be. In turn, the more engaged individuals are with the intervention, the more likely they will change their behavior. Of course, it is not possible to personally tailor every intervention to every single person. However, as shown through population-level smoking cessation studies, interventions at the individual level can be extrapolated to interventions at the group-level. I discuss these implications of the current dissertation in later sections.

Summary

Multitple fMRI health intervention studies have established the mPFC, vmPFC, and to a lesser degree, the dmPFC, as neural correlates for self-relevance. Findings have also consistently confirmed that these three neural correlates outperformed self-report measures in predicting change in health behaviors (e.g., exercise, smoking). The predictive ability of these neural correlates has also been confirmed at the population level, suggesting that it is possible to develop effective interventions for a large group based on a smaller group of individuals.

Neuroimaging, Self-Relevance, and Behavior Change in Mental Health Interventions

Research reviewed in the previous section has consistently established the mPFC region and regions within the mPFC, such as the vmPFC and dmPFC, as specific neural correlates in predicting behavior change. In this section, I review research on using the

mPFC and related regions as neural correlates in predicting treatment outcomes in psychotherapy.

The extant evidence on the mPFC region as a specific neural correlate to predict treatment outcomes is minimal, with few fMRI studies explicitly investigating the mPFC region as a predictor of behavior change or treatment response to psychotherapy. One of the earliest fMRI studies to establish the mPFC region as a potential neural correlate was by Ritchey et al. (2011). Ritchey et al. (2011) scanned 11 participants with major depressive disorder (MDD) and seven control participants with no MDD. All participants were scanned twice. For MDD participants, scan 1 was pre-treatment and scan 2 was post-treatment. Depressed participants underwent a full course of individual CBT in-between scans 1 and 2, and the majority of them (80%) experienced clinically significant improvement at the end of CBT (Ritchey et al., 2011). Control participants did not receive CBT, but also completed two scans at the same time-points as depressed participants. During each scan session, all participants completed an emotion evaluation task. In the emotion evaluation task, they were presented with three sets of 30 pictures designed to elicit emotion (10 positive, 10 negative, and 10 neutral) and asked to rate each picture on how pleasant it was (Ritchey et al., 2011). The participants repeated this task during the post-treatment scan but viewed 6 different sets of 30 pictures.

First, the authors found that at baseline, MDD patients had less activation in the vmPFC than control patients, replicating prior findings that have demonstrated an association between decreased vmPFC activation and MDD (Ritchey et al., 2011; Savitz & Drevets, 2009). Further, Ritchey et al. (2011) found that compared to MDD patients with lower vmPFC activity at baseline, MDD patients with higher levels of vmPFC

activity were more likely to respond to CBT. In other words, if an MDD patient had similar vmPFC activity to control patients' vmPFC activity, they were more likely to respond to CBT and experience a clinically significant improvement in depressive symptoms from pre- to post-treatment. Additionally, completing a full course of CBT impacted MDD patients' vmPFC activity. At post-treatment, MDD patients who completed a full course of CBT experienced an increase in vmPFC activation, suggesting an improvement as they now experienced similar vmPFC activation levels as non-depressed individuals (Ritchey et al., 2011). Results demonstrate that activity in the vmPFC may be a predictor of treatment outcomes.

Burkhouse et al. (2017) found similar results in a fMRI study on a larger sample of youth (ages 7 to 19) with a diagnosis of generalized anxiety disorder (GAD) or social anxiety disorder. Thirty-seven patients were randomized into CBT (N= 16) or anti-anxiety medication (N= 21) (Burkhouse et al., 2017). Patients were scanned, and the severity of anxiety symptoms was assessed via the Pediatric Anxiety Rating Scale. Participants then completed their respective treatments (i.e., 12 weeks of medication or 18-weekly sessions of CBT), and the severity of their anxiety symptoms was again assessed post-treatment. When being scanned, patients were asked to complete an emotion-matching task that consisted of an emotion condition and shape condition. In the emotion condition, patients were asked to identify which face matched the emotion of a target face (e.g., matching an angry face with another angry face), while in the shape condition, patients were asked to match shapes. Interestingly, when patients completed the emotion-matching task, Burkhouse et al. (2017) found that reduced activation in the dmPFC predicted better treatment outcomes across both medication and CBT conditions.

This effect was not moderated by the type of treatment, suggesting that medication and CBT were equally effective in reducing anxiety (Burkhouse et al., 2017).

To interpret these findings, I revisit a discussion in Chapter IV: the dmPFC is thought to play a role in establishing the accuracy of stimuli (Schmitz et al., 2006). In anxious individuals, there is often overactivation in various brain regions (Bishop, 2007). An overactivated dmPFC may cause anxious individuals to be hypervigilant for situations that could potentially make them anxious (e.g., if an individual is anxious around dogs, they may be continually evaluating their environment for dogs). Similar to Ritchey et al.'s (2011) findings, reduced activation in the dmPFC may suggest that these individuals experience comparable activation levels as non-anxious individuals (Burkhouse et al., 2017). Thus, for anxious youth and patients who are already more skilled in detaching and emotionally regulating themselves before treatment, they may benefit the most from CBT or medication. This is not to suggest that anxious patients who are less skilled in emotionally regulating themselves before treatment would not benefit from CBT or medication. Instead, for these patients, more intense interventions or different psychotherapies may be needed.

Two meta-analyses on predicting treatment outcomes provide further support that the mPFC may be a possible correlate to predict what type of patient will benefit most from specific treatment approaches (Fonseka et al., 2018; Seeberg et al., 2018). Both Fonseka et al.'s (2018) and Seeberg et al.'s (2018) meta-analyses focused on establishing specific neural correlates that could predict treatment outcomes from psychotherapy and pharmacotherapy for MDD. The meta-analyses revealed that activity in the prefrontal cortex area, including the vmPFC and dorsal lateral PFC, predicted better treatment

outcomes for individuals with MDD (Fonseka et al., 2018; Seeberg et al., 2018). However, the direction of these findings is inconsistent. Research has found that both an increase and decrease in PFC activation have predicted better treatment outcomes (Fonseka et al., 2018; Seeberg et al., 2018).

It should be noted that both Fonseka et al.'s (2018) and Seeberg et al.'s (2018) meta-analyses included only 5 and 6 fMRI studies, respectively, on psychotherapy outcomes. Additionally, both meta-analyses included the same fMRI studies, and the majority of these studies were underpowered as their samples were each less than 30 participants, which is less than the recommended sample size for fMRI studies (Turner et al., 2018). The other studies discussed in this section had small sample sizes as well (Burkhouse et al., 2017: $N = 37$, <30 in each condition; Ritchey et al., 2011: $N = 11$). More research and larger sample sizes are needed to investigate this relationship further. Regardless of the mixed findings from these two meta-analyses and small sample sizes, the prefrontal cortex region, which includes the mPFC, could be a potential neural correlate in predicting treatment outcomes for MDD. However, as shown through the reviewed studies, none investigated how personally relevant participants found psychotherapy or treatment. The next step for the clinical neuroscience field, discussed in the next section, is to examine the role self-relevance may play in treatment outcomes.

Summary

There is a small but growing literature that the mPFC region may be a specific neural correlate in predicting treatment outcomes for individuals receiving psychotherapy. A few studies and meta-analyses have suggested that individuals with depression or anxiety have different levels of activation in the mPFC region than

individuals who do not have a mental disorder. More research in larger samples is needed to confirm these findings. Future research also needs to examine the role of self-relevance, or how personally relevant a patient may find treatment, in treatment outcomes.

Future Directions: Culture, Self-Relevance, and Predicting Behavior

Throughout this chapter, I presented the benefits of using fMRI to predict behaviors in individuals (Berkman, 2015) and reviewed the evidence on the personal relevance of interventions, neural processes, and their abilities to predict behavior change or treatment outcomes in individuals. The emerging evidence on self-relevance and predicting behavior change and treatment outcomes is innovative and important. However, ultimately, the goal of this line of research is not to use fMRI to scan every single individual to see what treatment they would respond to (Ball et al., 2014). Instead, as described in the Personal Relevance of Psychotherapy (PROP) model in Chapter III, the goal of using fMRI in establishing the personal relevance of interventions is to leverage neuroscientific knowledge to help clinicians know when to generalize or individualize psychotherapy to a client (Sue, 1998). For clients of color, especially Asian Americans, the personal relevance of interventions is especially important. This is because Asian Americans may not use mental health services that are not personally relevant, as cultural adaptations (CATs) are often developed for and broadly applied to a particular cultural group (e.g., Chinese Americans). Individuals within a cultural group may differ in several variables (e.g., acculturation level) and may not find specific cultural features or treatment personally relevant (Hall et al., 2020; Kim & Zane, 2016). Thus, it is crucial to use fMRI research to help clinicians provide the best treatment to

clients by investigating what makes an intervention personally relevant for a specific client in a cultural group (e.g., second-generation Chinese American, immigrant Chinese American). Additionally, Falk et al. (2012, 2016) have shown that it is possible to extrapolate and apply findings at the individual-level to the group.

As previously discussed, neural activation in the mPFC, vmPFC, and dmPFC are potential predictors of what kind of client will experience behavior change or better treatment outcomes (Burkhouse et al., 2017; Falk et al., 2015, 2018; Ritchey et al., 2011). As reviewed in Chapter I, Asian Americans are the least likely to use mental health services (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). Results from the literature suggest that increased mPFC activity is a neural correlate for finding an intervention personally relevant. A next step for research in this area is to test whether these mPFC regions may be potential neural correlates of personal relevance of psychotherapy in an Asian American sample, as no neuroimaging study has yet focused solely on Asian Americans or on cultural values associated with the intervention.

Notwithstanding the small number of studies applying cultural neuroscience to clinical application, from existing literature in evidence-based treatments (EBTs) and CATs (Chapter II), the personal relevance of interventions (Chapter III), and cultural differences in brain activation (Chapter IV), I argued that there are meaningful differences in how culture shapes an individual's beliefs, goals, and values. These cultural differences may impact what kind of self-relevant stimuli interact with increased activation in various mPFC regions, and in turn, may increase the relevance and effectiveness of an intervention (Sasaki & Kim, 2017; Tompson et al., 2015). Indeed, an

initial model by Tompson et al. (2015) has synthesized these findings to show how the effect of message content on behavior change is both mediated by neural activation and moderated by sociocultural factors, such as culture. The authors focused specifically on increased neural activation in the vmPFC as there is growing evidence that the vmPFC may play a crucial role in promoting behavior change (Kim & Johnson, 2015; Moore et al., 2014; Owen et al., 2017). The model portrays neural activation in the vmPFC as mediating the relationship between message content and behavior change, in that messages that are perceived to be more personally relevant to an individual will cause an increase in vmPFC activation (Tompson et al., 2015). The authors also acknowledged that there are cultural differences in brain activation. As reviewed in Chapter IV, there are cultural differences in what brain regions are associated with "self" and self-relevance, as collectivistic individuals recruit the dmPFC more when evaluating message content while individualistic individuals recruit the vmPFC more (Chiao et al., 2009; Han & Ma, 2014).

Additionally, the Tompson (2015) model portrayed sociocultural factors as moderating the relationship between message content, vmPFC activation, and behavior change. Specifically, the model predicted that message content that reflects an individual's culture and attitudes will be more personally relevant to the individual, in turn increasing vmPFC activation, and thus increasing the likelihood of behavior change (see Figure 4) (Tompson et al., 2015). For example, as reviewed in Chapters II and III, CATs and culturally tailored messages are generally more effective in encouraging positive behavioral change in Asian Americans, such as reducing depression symptoms and increasing cancer screening rates (Huang & Shen, 2016; Huey & Tilley, 2018). This may be because adapting an intervention to a specific cultural group (e.g., Chinese

Americans) increases the personal relevance of the intervention, which engages the mPFC region, and thus encourages attitude or behavioral change in an Asian American client (Huang & Shen, 2016).

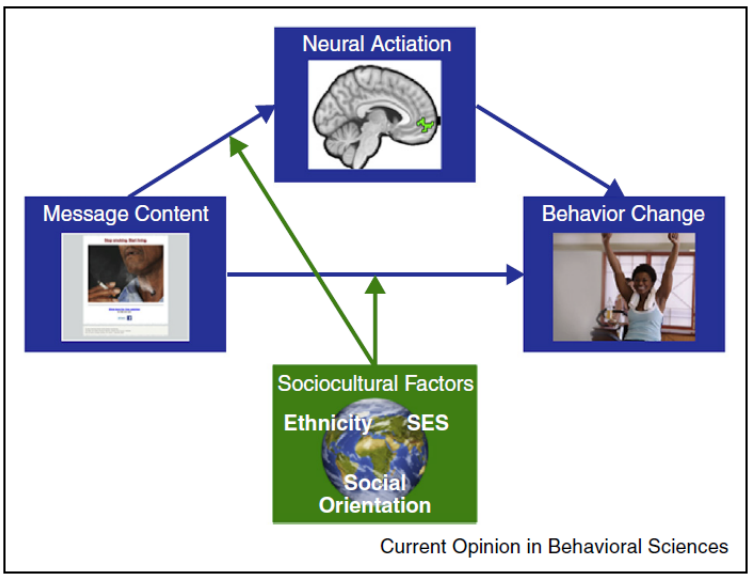

Figure 4. The Tompson et al. (2015) model (Tompson, Lieberman, & Falk, 2015).

However, a limitation of the Tompson (2015) model is that it does not provide a framework or guidance on how to ensure an intervention and its content is personally relevant to an individual. Additionally, the model appears focused at the broad group level (e.g., West vs. Eastern cultures), when, as I have argued here, there are individual differences within cultural groups. Individuals within the same cultural group may differ on several variables (e.g., acculturation, level of racial/ethnic identity) (Salas-Wright et al., 2015). Indeed, as evidenced by Huff et al.'s (2013) and Chen et al.'s (2015) studies (reviewed in Chapter IV), levels of racial/ethnic identity and acculturation to mainstream society impact Asian Americans' sense of self and self-relevance. Research that connects Tompson et al.'s (2015) persuasion and behavior change model with a clinical approach is needed. As stated at the beginning of this section, the goal of fMRI research is to help

clinicians determine when to generalize and when to individualize (Sue, 1998). Individual differences, such as acculturation levels, must be considered when presenting clients with psychotherapy options to ensure the client finds the treatment personally relevant. Doing so is hypothesized to increase the likelihood of clients engaging with treatment and may result in more favorable treatment outcomes for clients.

Current Study

This dissertation aims to fill the clinical relevance gap in the cultural neuroscience literature. To date, no known study has used fMRI to predict the personal relevance of psychotherapy for Asian Americans. Using both the PROP model as a guide in clinical application (see Chapter III for a comprehensive review) and the Tompson (2015) model as a guide in how persuasion, neural processes, and behavior change interact, this dissertation aims to use fMRI to establish and compare the personal relevance of two psychotherapies, social problem-focused Problem-Solving Therapy (PST) and Cognitive Behavioral Therapy (CBT), for Asian Americans. I will also investigate how acculturation moderates Asian Americans' preference for treatment.

Problem-Solving Therapy and CBT were chosen as the two psychotherapies for multiple reasons. First, PST focuses on external stimuli (e.g., a problem that needs to be solved) instead of internal stimuli (e.g., feelings and thoughts) (Nezu et al., 2012). Without any more cultural adaptations, the external focus of PST may make it inherently more culturally relevant for Asian Americans than CBT as Asian culture prioritizes emotion moderation rather than emotional expression (Kim et al., 2005). And second, CBT is one of the most used psychotherapy treatments and has been well established to be generally efficacious for many different disorders, such as depression, anxiety, eating

disorders, and insomnia (Beck, 2011; Carpenter et al., 2018; Linardon et al., 2017; Zachariae et al., 2016).

The goal of this dissertation is not to recommend one treatment over the other or provide a recommendation that any clinician working with an Asian American must use only PST or CBT. Rather, I aim to provide more insight and guidance for clinicians working with Asian Americans, such that if an Asian client identifies a certain way, PST or CBT may be a good starting point, and clinicians can then use their clinical judgment to adapt treatment accordingly. For example, if a highly acculturated Asian American finds both CBT and PST personally relevant and does not prefer either, a clinician could initially use CBT and adjust treatment accordingly to how the client responds.

General Summary

There is an emerging field of research using fMRI to investigate how neural activity in the mPFC may predict behavior change. Multiple studies in health interventions, mainly smoking cessation studies, have suggested that the more self-relevant an individual finds an intervention, as captured by increased activation in the mPFC region, the more likely they will change their behavior. Recent research in predicting behavior change has incorporated other factors to enhance the personal relevance of an intervention, such as values and beliefs. In the field of mental health interventions, evidence on the mPFC's ability to predict behavior change is more limited. There is growing literature that the mPFC region, specifically the vmPFC and dmPFC, may be specific neural correlates in predicting treatment outcomes for individuals receiving psychotherapy. Unfortunately, findings are often mixed, which may be due to the small sample sizes of these studies. More research with larger samples is needed.

Ultimately, the goal of using fMRI to predict behavior change is not to scan every individual client, but instead to leverage neuroscientific knowledge in order to guide clinicians more efficiently and effectively on what intervention a specific client in a cultural group (e.g., a second-generation Chinese American woman) might find personally relevant. This guidance serves as a starting point, as discussed in the PROP model in Chapter III, and clinicians can adjust treatment according to the client's individual differences. This dissertation strives to fill in a gap in the current literature where to my current knowledge, there is no fMRI research predicting treatment preferences, much less in an Asian American sample. Using both the PROP model and Tompson et al.'s (2015) persuasion and behavior change model, this dissertation aims to use fMRI to establish and compare the personal relevance of PST and CBT. Specific hypotheses and methods will be discussed in the next chapter.

CHAPTER VI: HYPOTHESES AND METHODS

Specific Aims and Hypotheses

Aim 1: Determine the Personal Relevance of Cognitive Behavioral Therapy (CBT) and Social Problem-Focused Problem-Solving Therapy (PST) for Asian Americans.

I compared the personal relevance of Cognitive Behavioral Therapy (CBT), which primarily focuses on individual thoughts and emotions, and is one of the most researched and effective treatments for a variety of mental health disorders (Hofmann et al., 2012), to social problem-focused Problem-Solving Therapy (PST) (Nezu et al., 2012) for Asian Americans. In a pilot study, PST adapted to address social problems (e.g., productivity) rather than emotions was found to be a good cultural fit for Asian Americans because its external problem-solving approach was pragmatic and less likely to conflict with Asian values. (Chu et al., 2012).

Hypothesis 1.1. For Asian Americans, PST will be associated with increased activation in self-processing networks (e.g., medial prefrontal cortex [mPFC]). This area has been consistently implicated in the central processing of persuasive messages (Cacioppo et al., 2018).

Hypothesis 1.2. Asian Americans' self-report data will not indicate a preference for PST over CBT, as (1) there may be bias in self-reporting and the social desirability effect, especially when assessing sensitive issues such as mental illness; and (2) self-report measures cannot assess small individual differences between participants in a mental process (e.g., preference for psychotherapy) (Berkman, 2015; Berns & Moore, 2012; Falk et al., 2010; Krumpal, 2013).

Hypothesis 1.3. Acculturation will moderate the association between PST and increased activation in the self-processing area, such that the less acculturated a participant is, the more activated the mPFC region will be when PST content is shown.

Aim 2. In a larger sample of Asian and White Americans, group differences between Asian Americans and Whites will be investigated to determine general vs. group specific patterns.

Hypothesis 2.1. In a larger and more adequately powered sample, Asian Americans will report a preference for PST over CBT. White Americans will not report a preference for PST or CBT, suggesting that the preference for PST over CBT is specific to Asian Americans.

Hypothesis 2.2. When accounting for relevant cultural variables, such as acculturation, content differences will emerge within PST and CBT vignettes, as both PST and CBT vignettes have internal and external foci. Specifically, vignettes containing content that focuses more on external or social interventions will be more personally relevant to lower acculturated participants, while vignettes containing content that focuses more on internal interventions will be more personally relevant to highly acculturated participants.

Study 1: Neuroimaging Study

Research Population and Recruitment Methods

Twenty-eight English-speaking Asian American adults (ages 22-70) were recruited from the greater Eugene/Springfield, Oregon area. Recruitment was done via posts on listservs, flyers posted around Eugene and Springfield, and word-of-mouth. Participants were excluded if they were not eligible for neuroimaging based on standard

contraindications: metal implants (e.g., braces, pins) or fragments, pacemakers or other electronic medical implants, claustrophobia, pregnancy, and weight greater than 550 lbs. Participants were also excluded if they had a current diagnosis of a mental health disorder or were taking psychotropic medication. This exclusion criterion was placed because there are baseline differences in activation in the mPFC region among individuals with a mental disorder (e.g., depression, anxiety) (Burkhouse et al., 2017; Ritchey et al., 2011). To investigate if there was a preference for PST over CBT, as evidenced by increased activation in the mPFC region, and to ensure reliability and homogeneity of the neuroimaging data, only Asian American adults with no current mental illness could participate. Participants were paid $30 for their time.

Neuroimaging Procedure

Participants eligible for the study underwent neuroimaging using functional magnetic resonance imaging (fMRI). In the scanner, functional scans measuring changes in cerebral blood flow (i.e., blood oxygenation level dependent, or BOLD signal) were collected as participants viewed actual stimuli (i.e., excerpts from the manuals) from the PST intervention (Nezu et al., 2012) and CBT intervention (Beck, 2011). When viewing the stimuli, participants were asked to rate how helpful they found each vignette, how much they liked each vignette, and how relevant they found each vignette on a 5-point scale (1 = Not at all to 5 = Extremely). After scanning, participants filled out self-report questionnaires. Participants completed the study in 1.5 hours: 1 hour for the scanning session (see below) and 30 minutes to fill out self-report questionnaires.

The fMRI scan took approximately 1 hour. This hour included 20 minutes of consenting and safety screening, 20 minutes of task practice outside the scanner, and 40

minutes of scanning (30 minutes for functional tasks, 6 minutes for a structural scan, 1 minute for an alignment scan, and 2 minutes for each of two field map scans). The scanning time included brief breaks between the tasks for rest and questions.

Neuroimaging Sequence Parameters

For the sample, a high-resolution anatomical T1-weighted MP-RAGE scan (TR/TE = 2500.00/3.43ms, 256 × 256matrix, 1mm thick, 176 sagittal slices, FOV = 208 × 208mm), functional images with a T2*-weighted echo-planar sequence (72 axial slices, TR/TE = 2000.00/27.00ms, 90-degree flip angle,100 × 100 matrix, 2mm thick, FOV = 208 × 208mm, multiband acceleration factor = 3), and opposite phase encoded echo-planar images to correct for magnetic field inhomogeneities (72axial slices, TR/TE = 6390.00/47.80ms, 90-degree flip angle, 104 ×104 matrix, 2mm thick, FOV= 208 × 208mm) were acquired.

Neuroimaging Data Acquisition and Preprocessing

Neuroimaging data were acquired on a 3T Siemens Skyra scanner at the University of Oregon Lewis Center for Neuroimaging. Neuroimaging data were preprocessed using fMRIPrep 1.1.4 (Esteban et al., 2020a, RRID:SCR_016216), which is based on Nipype 1.1.1 (Esteban et al., 2020b, Gorgolewski et al., 2011, RRID:SCR_002502). The T1-weighted (T1w) image was corrected for intensity non-uniformity (INU) using N4BiasFieldCorrection (Tustison et al., 2010, ANTs 2.2.0), and used as T1w-reference throughout the workflow. The T1w-reference was then skull-stripped using antsBrainExtraction.sh (ANTs 2.2.0), using OASIS as target template. Brain surfaces were reconstructed using recon-all (FreeSurfer 6.0.1, RRID:SCR_001847, Dale et al., 1999), and the brain mask estimated previously was refined with a custom

variation of the method to reconcile ANTs-derived and FreeSurfer-derived segmentations of the cortical gray-matter of Mindboggle (Klein et al., 2009, RRID:SCR_002438). Spatial normalization to the ICBM 152 Nonlinear Asymmetrical template version 2009c (Fonov et al., 2009), RRID:SCR_008796) was performed through nonlinear registration with antsRegistration (ANTs 2.2.0, RRID:SCR_004757, Avants et al., 2008), using brain-extracted versions of both T1w volume and template. Brain tissue segmentation of cerebrospinal fluid (CSF), white-matter (WM) and gray-matter (GM) was performed on the brain-extracted T1w using fast (FSL 5.0.9, RRID:SCR_002823, Zhang et al., 2001).

For each of the functional runs per subject (across all tasks), the following preprocessing was performed. First, a reference volume and its skull-stripped version were generated using a custom methodology of fMRIPrep. A deformation field to correct for susceptibility distortions was estimated based on two echo-planar imaging (EPI) references with opposing phase-encoding directions, using 3dQwarp (AFNI). Based on the estimated susceptibility distortion, an unwarped BOLD reference was calculated for a more accurate co-registration with the anatomical reference. Head-motion parameters with respect to the BOLD reference (transformation matrices and six corresponding rotation and translation parameters) are estimated before any spatiotemporal filtering using mcflirt (FSL 5.0.9, Jenkinson et al., 2002). The BOLD time-series were resampled onto their original, native space by applying a single, composite transform to correct for head-motion and susceptibility distortions. These resampled BOLD time-series will be referred to as preprocessed BOLD in original space, or just preprocessed BOLD. The BOLD reference was then co-registered to the T1w reference using bbregister (FreeSurfer) which implements boundary-based registration (Greve & Fischl, 2009). Co-

registration was configured with nine degrees of freedom to account for distortions remaining in the BOLD reference. The BOLD time-series were resampled to surfaces in fsnative space. The BOLD time-series were resampled to MNI152NLin2009cAsym standard space, generating a preprocessed BOLD run in MNI152NLin2009cAsym space.

A Priori Self-Referential and Reward Regions of Interest (ROIs)

A priori regions of interests (ROIs) on brain regions associated with self-referential and reward were downloaded from Neurosynth.org (https://neurosynth.org/), an online platform that automatically synthesizes the results of thousands of different neuroimaging studies and produces an image of a brain location. To find these a priori ROIs, the search terms "self-referential" and "reward" were used, and the resulting maps and coordinates of activated brain regions associated with these two terms were downloaded.

Materials: Personal Relevance Task

Participants completed a total of 60 trials across 4 runs (15 trials in each run) during scanning. The stimuli were 10 excerpts from PST and 10 from CBT (each viewed 3 times). Each trial began with a brief fixation period (M = 1.5 s, jittered), followed by a display of the stimulus featuring content displayed in text (10 s), and then a prompt (4.5 s) asking the participant to indicate how much they liked the vignette, how helpful they found that content, and how relevant they found that content to be. Participants answered on a 5-point scale where 1 = Not at all, 3 = Somewhat, and 5 = Extremely. Each trial lasted ~16 s. The trials were presented in a fully counterbalanced order across 4 runs of 15 trials each. Each run lasted ~4 m, and the entire task lasted ~16 m. The primary contrast of interest is the main effect of deep adaptation (PST > CBT trials). An example

of a CBT vignette and a PST vignette are presented in Table 1. All 20 vignettes can be found in Appendix A.

Table 1. Example of a CBT and PST vignette

CBT Vignette	PST Vignette
We will work to change thoughts and behaviors that are feeding the negative feelings you've been experiencing. For example, if you feel depressed, you will likely have many negative thoughts, possibly about yourself or others, or about your life in general. Also, when you're depressed, you're more likely to act in ways that feed your negative thoughts and sadness. These behaviors may include withdrawing socially, avoiding tasks, and poor self-care. In therapy, you will learn skills to change unhelpful thought and behavior patterns, which will help you feel better emotionally.	Effectively managing stressful life problems requires a planful approach. The set of skills required to do this requires both learning and practice and include four planful problem-solving skills. We teach you these skills and help you practice them in your everyday life by completing PST planful problem-solving worksheets. The four skills are *problem definition, generating alternatives, decision-making, and solution implementation and verification.*

Note. CBT = Cognitive Behavioral Therapy; PST = Problem-Solving Therapy.

Materials: Self-Report Questionnaires

Acculturation. Participants' acculturation was assessed via three variables (English proficiency, ethnic identity, and generational status) with three measures. *English use and proficiency* were measured with the PhenX Toolkit Acculturation Protocol (2018, Ver 22.2). The Acculturation Protocol includes questions on English proficiency and use, which are indicators of acculturation. Examples of English proficiency questions included "How well do you speak English?" and "How well do you read English?" Participants answered with a 4-point Likert scale, where responses ranged from 1 = poor to 4 = excellent. Examples of language use questions included "What language do you speak with most of your friends?" and "In what language do you think?" Participants answered with a 5-point Likert scale (1 = [language] all the time to 5 =

English all the time). Higher scores indicated a participant had stronger levels of English proficiency.

Participants' ethnic identity was measured by the Multigroup Ethnic Identity Measure (MEIM) (Phinney, 1992). The MEIM is the most commonly used ethnic identity measure (Yip et al., 2019) and has been found to have measurement invariance with Asian Americans and other racial/ethnic groups (e.g., African Americans, White Americans). This indicates that it can be used to measure and compare ethnic identity across several racial/ethnic groups (Brown et al., 2014). I had also planned to conduct another study that included White Americans (see Study 2). Measures of ethnic identity that are specific to Asian participants would not have been relevant for White participants. Therefore, because the MEIM had measurement invariance across both Asian and White Americans, it was the most appropriate measure for Study 1 and 2. Questions on the MEIM included "I have spent time trying to find out more about my ethnic group, such as its history, tradition, and customs" and "I feel good about my cultural or ethnic background." Participants responded using a 4-point Likert scale. Responses ranged from 1 = strongly disagree to 4 = strongly agree. Higher scores suggested strong identification with one's ethnic identity.

Finally, participants' generational status was measured with the birthplace of self, birthplace of parents and grandparents, and years in the United States. Birthplace of self, parents, grandparents, and years living in the U.S. provided additional information about the participant's background (i.e., generational status). Participants were coded first generation if they were born outside of the U.S. If the participant was first generation, they were asked to provide the number of years they lived in the U.S. Participants were

coded second generation if they and one or both of their parents were born outside of the U.S. Participants were coded third generation if they and both their parents were born in the U.S.

Demographics. Demographic information including age, race, and ethnicity was collected. Participants were asked what race or races they considered themselves to be (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, or White). Participants were then asked to select the specific Asian ethnic subgroup they felt best represented them (e.g., Cantonese, Chinese, Korean). To avoid unintended identity priming effects, acculturation and demographic measures were collected after participants completed the personal relevance task.

Problem-solving orientation. Participants' problem-solving orientation (positive, negative) and style (rational, impulsivity/carelessness, avoidance) was measured with the 25-item Social Problem-Solving Inventory-Revised Short Version (SPSI-RS) (D'Zurilla et al., 2002). The SPSI-RS included questions such as "I feel threatened and afraid when I have an important problem to solve" and "Whenever I have a problem, I believe that it can be solved." Participants answered questions on a 5-point Likert scale (0 = not at all true of me to 4 = extremely true of me). Cronbach's alpha in our sample was 0.69, suggesting acceptable reliability. Higher total SPSI-R scores indicated a participant had more positive social problem-solving abilities.

Attitudes towards help-seeking. The 10-item Attitudes Toward Seeking Professional Psychological Help-Short Form (ATTSPPH-SF) assessed participants' attitudes toward seeking help from mental health professionals (Fischer & Farina, 1995). The ATTSPPH-SF has shown adequate internal consistency (α = .70 to .78) with Asian

American samples (Kim et al., 2017; Saint Arnault et al., 2018). Cronbach's alpha in our sample was 0.84, suggesting good reliability. Examples of these questions included, "If I believed I was having a mental breakdown, my first inclination would be to get professional attention" and "Personal and emotional troubles, like many things, tend to work out by themselves." Participants responded using a 4-point Likert scale, ranging from 0 = disagree to 3 = agree. Higher scores on the ATTSPPH-SF suggested a participant exhibited more positive attitudes towards seeking mental health services.

Emotion regulation. Two measures were used to assess participants' ability to regulate their emotions. The first measure was the 10- item Emotional Regulation Questionnaire (ERQ) (Gross & John, 2003), which measured how often participants used the emotional regulation strategies of reappraisal and emotional suppression. ERQ emotional suppression (α = .76 to .80) and reappraisal (α = .89 to .90) had adequate to excellent levels of internal consistency in a community sample (Preece et al., 2019). Cronbach's alpha in our sample was 0.78, suggesting good reliability. Participants answered items using a 7-point Likert scale. Responses ranged from 1 = strongly disagree to 7 = strongly agree. Scores were calculated for each emotional regulation strategy (reappraisal and emotional suppression). Higher scores in a strategy suggested greater use of that ER strategy.

The second measure was the Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004). The DERS was a 36-item self-report questionnaire designed to assess multiple aspects of emotional dysregulation. It was shown to have excellent internal consistency in a sample of Asian Americans (α = .93) (Ritschel et al., 2015). Cronbach's alpha in our sample was 0.73, suggesting good reliability. Example questions

included “When I’m upset, I feel guilty for feeling that way” and “When I’m upset, I have difficulty getting work done.” Participants responded with a 5-point Likert scale (1 = almost never to 5 = almost always). Higher scores on the DERS suggested a participant had greater problems with emotion regulation.

Study 2: Online study

Research Population and Recruitment Methods

Eighty-eight English-speaking Asian American and 53 White American adults (ages 22-70) were recruited across the United States via Qualtrics Panels, an online company that specialized in reaching and surveying specific populations. Whites were recruited as a control group to determine if there were differences in the general relevance of PST vs. CBT between different racial groups in the U.S. A power analysis ($1\text{-}\beta = .80$, $p < .05$) was conducted and confirmed that a total sample of 136 participants (84 Asian Americans and 52 White Americans) would be sufficient to detect a medium effect size ($d = .50$). Asian American adults were oversampled due to the lack of research on them in this specific line of research. Participants were paid by Qualtrics with Qualtrics’ standard compensation rates.

Procedure

Participants responded online via Qualtrics. First, participants were asked to read an online consent form. If the participant agreed to continue with the survey, they viewed the same CBT and PST stimuli participants from the neuroimaging study viewed. After each CBT and PST vignette, participants were asked to rate how helpful they found each vignette, how much they liked each vignette, and how relevant they found each vignette on a 5-point scale (1 = Not at all to 5 = Extremely). After viewing all 20 vignettes (10

CBT vignettes and 10 PST vignettes), participants answered self-report questionnaires. Participants took approximately 30 minutes to complete the online survey.

Materials: Personal Relevance Task

See neuroimaging personal relevance task in Study 1. Participants viewed the same CBT and PST stimuli, but instead of presenting each sentence of each vignette one at a time, participants viewed the whole vignette at once. CBT and PST vignettes were presented to participants in random order.

Materials: Self-Report Questionnaires

See self-report questionnaires in Study 1. Study 2 used the same measures to measure acculturation (English proficiency, ethnic identity, and generational status), demographics, problem-solving orientation, and attitudes towards help-seeking. The ERQ and 36-item DERS were removed from the online survey to shorten it.

Emotion regulation. The 36-item DERS was replaced with the 18-item Difficulties in Emotion Regulation Scale (DERS-18) (Kaufman et al., 2015). The DERS-18 is a brief self-report questionnaire designed to assess multiple aspects of emotional dysregulation. The DERS-18 has shown good internal consistency in a sample of college students that included Asian Americans (α = .89) (Kaufman et al., 2015). Cronbach's alpha in our sample was 0.94, suggesting excellent reliability. Participants responded with a 5-point Likert scale (1 = almost never to 5 = almost always). Higher scores on the DERS suggested a participant had greater problems with emotional regulation.

Psychological distress. Participants' psychological distress was measured by the 5-item WHO-5 Well-Being Index (WHO-5) (WHO, 1998). Examples of questions on the WHO-5 included "I have felt cheerful and in good spirits" and "I woke up feeling fresh

and rested." The WHO-5 has been used in hundreds of studies across the world and has shown good validity as a screening tool for depression (Topp et al., 2015). Cronbach's alpha in our sample was 0.88, suggesting good reliability. Participants responded with a 6-point Likert scale, where answers ranged from 0 = at no time to 5 = all of the time. Lower scores suggested a participant was experiencing more psychological distress. Participants were considered to be at higher risk for depressive symptoms (i.e., more psychological distress) if they scored 50 points or less. The cutoff score of equal to or less than 50 is the recommended cutoff score when screening for clinical depression (Topp et al., 2015).

The WHO-5 was included to explore whether psychological distress would influence participants' preference for PST or CBT. Exploratory data analyses will be conducted if there is enough variance in psychological distress to determine whether self-relevance ratings differ among individuals with varying levels of distress.

Data Analyses

Data Analysis Plan for Aim 1

Differences in neural activation between the two conditions on a within-subjects basis were analyzed using planned contrast comparisons within a general linear model framework. This was done first within the a priori defined mPFC region-of-interest based on the Yeo et al. (2011) parcellation and then using an exploratory, whole-brain approach for completeness. There are two main hypotheses under examination. First, PST content will prompt greater activation than CBT in brain regions relating to central processing including self-processing (e.g., mPFC) and attentional control (e.g., lateral parietal) regions averaging across participants. Second, the overall difference in mPFC activation

between PST > CBT trials (Hypothesis 1.1) will be moderated by person-to-person differences in variables associated with cultural values such as acculturation. It is hypothesized that acculturation will moderate the association between PST and increased activation of the attention and self-processing networks such that the less acculturated one is, the more activation there will be when PST content is presented. A two-way ANOVA was run to test the moderating effect of acculturation between PST and increased activation of the attention and self-processing networks, as presented by the model below:

> PST>CBT contrast = intercept + generation + ethnic identity + English proficiency + generation*ethnic identity + generation*English proficiency + ethnic identity*English proficiency + generation*ethnic identity*English proficiency.

Data Analysis Plan for Aim 2

For the online study data, paired samples t-tests were run to compare if all participants (both Asian and White Americans) preferred PST or CBT. To investigate group differences in what psychotherapy was preferred, paired samples t-tests were run to compare the means of PST and CBT responses between Asian and White Americans. Finally, to test the level of influence of acculturation as a moderator on perceived relevance, two-way ANOVAs were run (examples below).

Model 1: CBT Relevance = intercept + generation + ethnic identity + English proficiency + generation*ethnic identity + generation*English proficiency + ethnic identity*English proficiency + generation*ethnic identity*English proficiency.

Model 2: PST Relevance = intercept + generation + ethnic identity + English proficiency + generation*ethnic identity + generation*English proficiency + ethnic identity*English proficiency + generation*ethnic identity*English proficiency.

To examine within-treatment content variation, two raters examined and rated the content in each PST and CBT vignettes. The raters were the author of this dissertation and another advanced clinical psychology doctoral student who was trained in CBT-based interventions. Each rater rated each vignette on whether: (1) the vignette content focused on a therapy technique that was more externally focused; examples of this included problem solving, solution focused thoughts and behaviors (e.g., action plan), or (2) focused on a therapy technique that was more internally focused; examples of this include examining thoughts about self and examining one's emotions. If the raters disagreed on a rating, the raters discussed the rating until they reached a consensus. The codebook can be found in Appendix B.

CHAPTER VII: RESULTS

Study 1

Aim 1: Determine the Personal Relevance of Cognitive Behavioral Therapy (CBT) and Social Problem-Focused Problem-Solving Therapy (PST) for Asian Americans

Twenty-eight participants (9 men and 19 women, M_{age} = 37.6 years, *SD* = 13.5) participated in the neuroimaging study. The majority of participants identified as East Asian (71%; e.g., Chinese, Japanese, Korean), then mixed Asian (22%; e.g., Chinese/Japanese, Chinese/Filipino), and finally South or Southeast Asian (7%; e.g., Indian, Nepalese). Most participants were born in the U.S. (64%). Thirty-six percent were first-generation Asian Americans (i.e., born outside of the U.S.), 43% were second-generation (i.e., one or both parents were born outside of the U.S., while the participant was born in the U.S.), and 21% were third-generation (i.e., both participant and parents were born in the U.S.).

Descriptive statistics for all measures are in Table 2. English proficiency scores defined by participants' reports of how well they could speak, read, and write English, ranged from 1 (poor) to 4 (excellent). 92% of participants had good to excellent English proficiency. The mean English proficiency score for first-generation participants was 3.33 (*SD* = 0.67), for second-generation participants was 3.83 (*SD* = 0.38), and for third-generation participants was 4.00, (*SD* = 0.00). A one-way ANOVA showed that there were significant differences in average English proficiency scores between generations, $F(2, 25) = 4.62$, $p = .02$. A post-hoc Tukey HSD test showed that third-generation participants had higher English proficiency than first-generation participants only (p =

.03). Nevertheless, first-generation participants' English proficiency scores were still in the good to excellent range.

Table 2. Study 1: Descriptive Statistics of Self-Report Measures (*N* = 28)

Measure	Mean	Standard Deviation
English proficiency	3.70	0.52
Multigroup Ethnic Identity Measure	3.07	0.51
Relevance of CBT	3.51	0.79
Helpfulness of CBT	3.40	0.75
Positivity towards CBT	3.48	0.71
Relevance of PST	3.51	0.77
Helpfulness of PST	3.45	0.78
Positivity towards PST	3.53	0.71
Emotion regulation: Cognitive reappraisal	29.32	6.89
Emotion regulation: Emotional suppression	13.68	5.06
Difficulties in emotion regulation	71.64	16.53
Attitudes towards help-seeking behavior	21.18	5.96
Social problem-solving inventory	13.61	2.42

The mean Multigroup Ethnic Identity Measure (MEIM) score, which ranged from 1 (weak ethnic identification) to 4 (strong ethnic identification), for the sample (M = 3.07, SD = 0.51) suggests that participants had moderately strong levels of identifying with and feeling like they belonged to their ethnic group. The MEIM score mean for first-generation participants was 3.04 (SD = 0.29), for second-generation participants was 2.85 (SD = 0.52), and for third-generation participants was 3.61 (SD = 0.39). A one-way ANOVA indicated that there were significant differences in the average MEIM scores between generations, $F(2, 25) = 6.48$, $p = .005$. A post-hoc Tukey HSD test showed that third-generation participants reported significantly stronger identification with their Asian ethnicity than first- ($p = .05$) or second-generation participants ($p = .004$). Third-

generation Asian American participants may identify with and feel like they belong more to their Asian ethnic group than first- or second-generation Asian American participants.

This finding is inconsistent with previous studies that investigated differences in mean MEIM scores between generations, where earlier generations reported higher levels of Asian identity than later generations (Homma et al., 2014). The inconsistency may be due to the different samples in Study 1 (adults, M_{age} = 37.6 years) and Homma et al. (2014) (adolescents, 12 to 19 years old). Adolescence and emerging adulthood (college-age) is a crucial period in ethnic identity development, where adolescents and young adults are exploring their identity (Yip et al., 2006). In contrast, ethnic identity in later adulthood tends to be more stable (Yip et al., 2006). Indeed, in Study 1, third-generation participants were significantly older (M = 55.5 years, SD= 11.98) than first- (M = 34.33 years, SD= 9.87) and second-generation participants (M = 31.54 years, SD= 8.94), $F(2, 25)= 12.70$, $p<.001$. Even though first- and second-generation participants were not college-aged, they were younger adults and may still be exploring their ethnic identity. On the other hand, the older third-generation participants may have a more stable ethnic identity than first- and second-generation participants.

Results of Hypothesis 1.1: PST will be Associated with Increased Activation in Self-Processing Networks (e.g., Medial Prefrontal Cortex)

Medial prefrontal cortex activation. In my first hypothesis, I stated that PST would be associated with increased activation in the medial prefrontal cortex (mPFC) area, as Asian Americans would find PST more personally relevant than CBT due to its external focus. Indeed, when participants viewed PST vignettes, there was significantly more activity in the mPFC and ventromedial prefrontal cortex (vmPFC) than when they

viewed CBT vignettes (Figure 5; [$t(27) = 4.33$, $p < .001$]), suggesting they found PST vignettes more relevant than CBT vignettes.

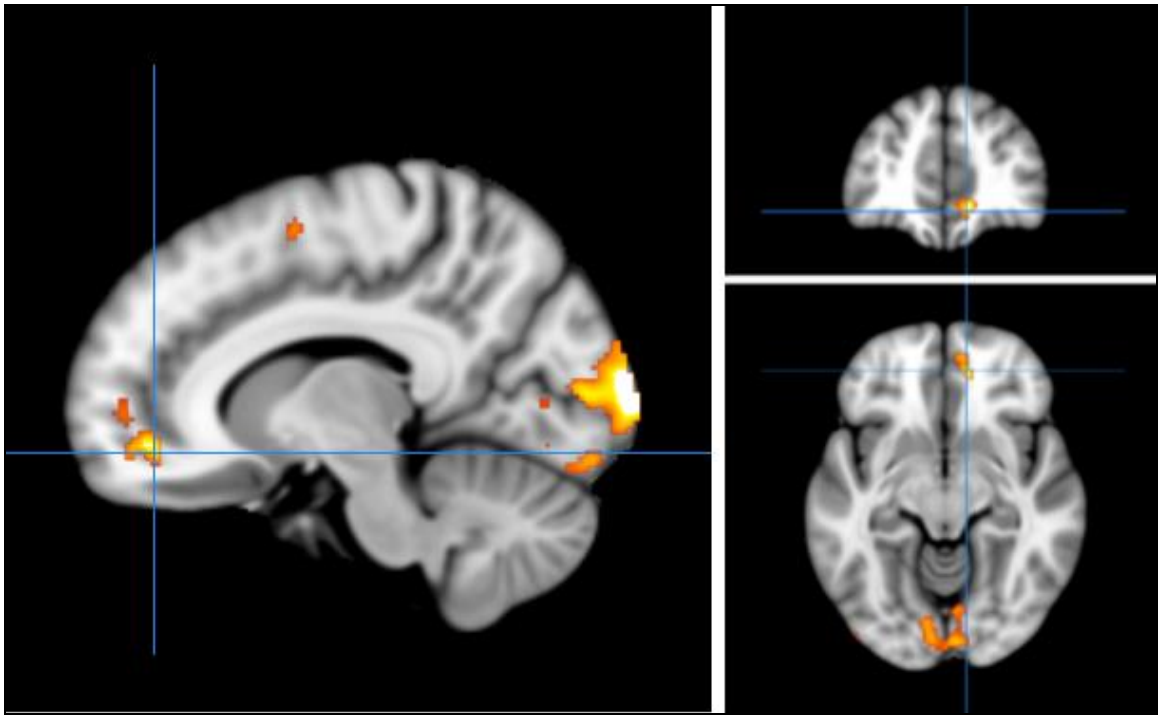

Figure 5. Study 1: Neural Activation in the PST > CBT Contrast.

Note. Brain regions that are significantly more active during Problem-Solving Therapy compared to Cognitive-Behavioral Therapy are shown in warm colors. Peak activation differences occurred in the medial and ventromedial prefrontal cortex (left, in sagittal view, and top-right, in coronal view) and ventral striatum (bottom-right, in axial view). The activations are statistically thresholded at $p < .005$ per voxel and a 150 voxel extent.

Reward and self-referential region of interests. I used an a priori reward and self-referential region of interests (ROIs) from Neurosynth.org, an online platform that synthesizes the results of hundreds of neuroimaging studies to create maps of activated brain regions that are associated with a specific interest (e.g., self-relevance), to compare our mPFC ROI. To find these a priori ROIs, the search terms "self-referential" and "reward" were used, and the resulting maps and coordinates of activated brain regions associated with these two terms were downloaded. The PST condition was significantly

associated with activation in self-referential [$t(27) = 1.90$, $p = .03$] and reward ROIs [$t(27) = 2.46$, $p = .01$]. The significant association with the self-referential ROI provides additional evidence that PST may be more personally relevant for Asian Americans than CBT, and the significant association with the reward ROI suggests that participants may find PST more rewarding than CBT.

Results of Hypothesis 1.2: Self-report Data will not Indicate a Preference for PST over CBT

Neuroimaging vs. self-report. My second hypothesis was that participants would not self-report a preference for PST over CBT, suggesting that neuroimaging methods would be more sensitive in determining participants' preferences for PST or CBT. Activation in the mPFC and vmPFC was not significantly correlated with participants' ratings of personal relevance, helpfulness, or positivity in either the PST or CBT condition. Additionally, a paired samples T-test on participants' self-reported personal relevance of PST and CBT showed no preference for either PST or CBT [$t(27) = .04$, $p = .97$], providing support that fMRI was more sensitive than self-report questionnaires in determining participants' psychotherapy preference (see Table 3).

Table 3. Study 1: Correlations between All Self-Report Measures and Neural Activity in the Medial Prefrontal Cortex Region of Interest (PST>CBT mPFC ROI)

Measure	Relevance of CBT	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	ER: CR[b]	ER: ES[c]	DERS[d]	ATTHSB[e]	SPSI[f]
mPFC ROI	.14	.05	-.11	.23	.13	.11	-.42*	-.13	-.30	-.19	-.23	.17	-.06	.10
Relevance of CBT	-	.89**	.88**	.82**	.77**	.76**	.15	-.07	.40*	.38*	0.31	.08	.63**	-.006
Helpfulness of CBT	-	-	.92**	.83**	.88**	.85**	.25	-.11	.39	.37	-.15	-.09	.74**	.008
Positivity towards CBT	-	-	-	.78**	.82**	.82**	.24	-.07	.38	.53**	-.12	-.01	.60**	-.006
Relevance of PST	-	-	-	-	.92**	.93**	.15	-.28	.29	.39*	-.22	-.04	.52**	.09
Helpfulness of PST	-	-	-	-	-	.97**	.22	-.17	.37	.39*	-.14	-.17	.55**	.12
Positivity towards PST	-	-	-	-	-	-	.26	-.22	.37	.43*	-.10	-.17	.54**	.13
Generation	-	-	-	-	-	-	-	.50**	.35	.25	.28	-.18	.14	-.18

Table 3. (continued).

Measure	Relevance of CBT	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	ER:CR[b]	ER:ES[c]	DERS[d]	ATTHSB[e]	SPSI[f]
English ability	-	-	-	-	-	-	-	-	.21	.07	-.04	.05	-.11	-.11
MEIM[a]	-	-	-	-	-	-	-	-	-	.22	-.06	-.31	.25	.06
ER:CR[a]	-	-	-	-	-	-	-	-	-	-	.18	.04	.15	.25
ER:ES[b]	-	-	-	-	-	-	-	-	-	-	-	-.21	-.02	-.09
DERS[c]	-	-	-	-	-	-	-	-	-	-	-	-	-.30	-.37
ATTHSB[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-.05

*significant at p <.05. **significant at p <.01.

[a]MEIM = Multigroup ethnic identity measure.

[b]ER:CR = Emotion regulation: Cognitive reappraisal.

[c]ER:ES = Emotion regulation: Emotional suppression.

[d]DERS = Difficulties in emotion regulation.

[e]ATTHSB = Attitudes towards help-seeking behavior.

[f]SPSI = Social problem-solving inventory

Results of Hypothesis 1.3: Acculturation will Moderate the Association Between PST and Increased Activation in the mPFC

My third hypothesis was on the potential moderating effect of acculturation on the relationship between PST and increased activation in the mPFC. Acculturation was measured with three variables (i.e., generation, level of ethnic identity [MEIM], and English proficiency) to capture a more comprehensive view of a participant's acculturation level. A two-way ANOVA was run to test the moderating effect of acculturation on the PST>CBT contrast: PST>CBT contrast = intercept + generation + MEIM + English proficiency + generation*MEIM + generation*English proficiency + MEIM*English proficiency + generation*MEIM *English proficiency.

Before running the model, a means plot indicated that there were negligible differences between the average blood-oxygen-level-dependent (BOLD) signal for first- and second-generation Asian Americans when they viewed PST content. Thus, first- and second-generation Asian American participants were grouped together. First- and second-generation participants were considered low-acculturated, while third-generation participants were considered highly acculturated.

Moderating effect of acculturation. A two-way ANOVA showed that there were no significant main or interaction effects among generation, English proficiency, and level of ethnic identity. However, because I had originally hypothesized acculturation would moderate the association between PST and increased activation in the mPFC, a post-hoc Tukey test was conducted. The post-hoc test indicated a significant difference for participants' generation (i.e., first and second compared to third), $F(1, 9) = 7.65$, $p = .02$. This suggests that there was a significant difference in mean BOLD signal between

first- and second-generation participants and third-generation participants. Given that English proficiency and ethnic identity were not significant when a post-hoc test was conducted, further moderation analyses using these measures would be inappropriate. Therefore, for this hypothesis testing the moderation effect, acculturation will only be measured by participants' generation.

When viewing PST content, there was more activation in the mPFC area for first- and second-generation Asian Americans (p= .02) than third-generation Asian Americans (Figure 6), suggesting first- and second-generation Asian Americans found PST significantly more personally relevant than third-generation Asian Americans. There may have been generational differences, but no language or ethnic identity effects, because of consistent evidence that third or later generation Asian Americans are significantly more likely to seek mental health services than first- or second-generation Asian Americans (Abe-Kim et al., 2007; Georgiades et al., 2018).

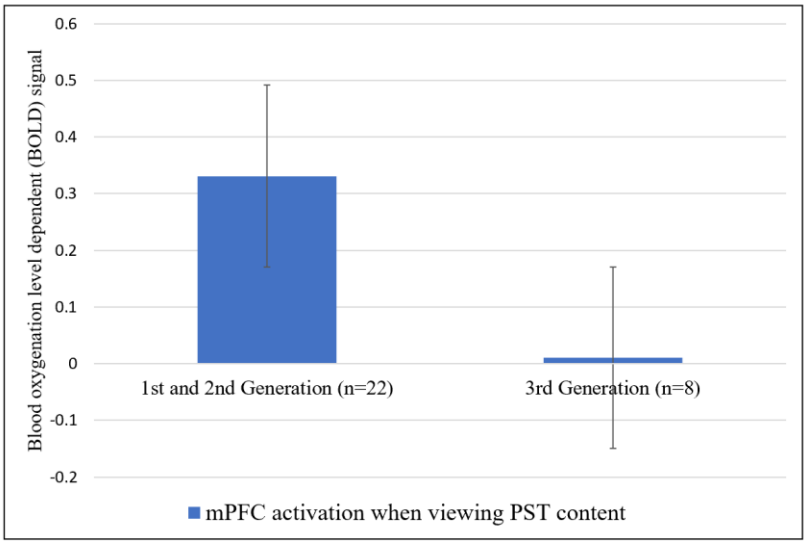

Figure 6. Study 1: Generational Differences in Mean mPFC BOLD Signal among Asian Americans when viewing PST Content over CBT Content

Note. BOLD = Blood oxygenation level dependent; PST = Problem-Solving Therapy; CBT = Cognitive Behavioral Therapy; mPFC = Medial prefrontal cortex

Study 2

Aim 2. Compare Group Differences between Asian and White Americans to Determine General vs. Group-Specific Patterns

A power analysis (1-β = .80, $p < .05$) was conducted and confirmed that a total sample of 136 participants (84 Asian Americans and 52 White Americans) would be sufficient to detect a medium effect size ($d = .50$). Eighty-eight English-speaking Asian American and 53 White American adults (62% female; ages 22-70) participated in an online study (Study 2). Participants' age was collected but not recorded due to technical difficulties. Half of the Asian American participants were born in the U.S. (50%). Forty-two percent were first-generation, 25% were second-generation, and 23% were third-generation Asian. Nine Asian American participants did not provide enough information to calculate their generation status. Among Asian Americans, 48% identified as East Asian (e.g., Chinese, Japanese, Korean), 26% identified as Southeast Asian (e.g., Vietnamese, Filipino), and 24% identified as South Asian (e.g., Indian, Bangladeshi). Two Asian American participants did not report their ethnicity.

See Table 4 for descriptive statistics of all self-report measures by the total sample and by race (i.e., Asian and White Americans). Because there were not significant differences between East vs. Southeast vs. South Asian participants on the study measures, these groups were combined for the analyses (see Table 5). 95% of Asian American participants reported they had good to excellent English ability (i.e., speak, read, and write). For Asian Americans, the mean English proficiency score for first-generation participants was 3.67 ($SD = 0.46$), for second-generation participants was 3.76 ($SD = 0.44$), and for third-generation participants was 3.70 ($SD = 0.40$). There were no

significant differences in average English proficiency scores between generations, $F(2, 76) = 0.31$, $p = .73$.

Table 4. Study 2: Descriptive Statistics of Self-Report Measures

	Total (*N* = 141)		**Asians (*n*=88)**		**Whites (*n*= 53)**	
Measure	**Mean**	**SD[a]**	**Mean**	**SD[a]**	**Mean**	**SD[a]**
English proficiency	3.71	0.44	3.71	0.42	3.71	0.48
Multigroup Ethnic Identity Measure	2.89	0.60	2.88	0.55	2.93	0.67
Relevance of CBT	3.62	0.93	3.44	0.93	3.91	0.86
Helpfulness of CBT	3.61	0.91	3.48	0.93	3.82	0.83
Positivity towards CBT	3.58	0.87	3.47	0.92	3.75	0.77
Relevance of PST	3.70	0.90	3.53	0.90	3.99	0.82
Helpfulness of PST	3.69	0.90	3.57	0.92	3.87	0.83
Positivity towards PST	3.65	0.86	3.54	0.88	3.83	0.79
Difficulties in Emotion Regulation	46.14	17.05	43.03	15.64	51.30	18.16
Attitudes towards Help-Seeking Behavior	18.43	4.29	18.48	4.00	18.34	4.75
Social Problem-Solving Inventory	11.31	2.93	11.73	2.84	10.63	2.97
WHO-5: Mental Well-Being	62.07	21.78	62.50	21.29	61.36	22.76

[a]SD = Standard Deviation.

Table 5. Study 2: Descriptive Statistics of Participants' Self-Report Measures by Ethnicity (N = 86)

	East Asian (n = 42)		Southeast Asian (n = 23)		South Asian (n = 21)	
Measure	**Mean**	**SD[a]**	**Mean**	**SD[a]**	**Mean**	**SD[a]**
English proficiency	3.76	0.38	3.61	0.48	3.70	0.42
Multigroup Ethnic Identity Measure	2.85	0.59	3.03	0.48	2.79	0.53
Relevance of CBT	3.34	0.88	3.45	1.07	3.73	0.82
Helpfulness of CBT	3.42	0.91	3.48	1.11	3.64	0.77
Positivity towards CBT	3.35	0.91	3.49	1.09	3.69	0.76
Relevance of PST	3.50	0.81	3.45	1.13	3.77	0.77
Helpfulness of PST	3.54	0.90	3.50	1.12	3.80	0.72
Positivity towards PST	3.47	0.85	3.48	1.11	3.76	0.68
Difficulties in Emotion Regulation	43.48	15.74	42.35	17.58	42.52	13.45
Attitudes towards Help-Seeking Behavior	18.52	3.49	17.52	4.81	19.19	3.95
Social Problem-Solving Inventory	11.74	2.89	11.75	3.48	11.59	1.96
WHO-5: Mental Well-Being	62.48	19.85	66.26	25.41	60.19	19.29

[a]SD = Standard deviation.

The mean MEIM score for the Asian American sample (M = 2.88, SD = 0.55) suggests that participants moderately identified with and felt connected with their Asian ethnicity. The MEIM score mean for first-generation participants was 2.79 (SD = 0.54), for second-generation participants was 3.00 (SD = 0.57), and for third-generation participants was 2.84 (SD = 0.55). There were no significant differences in mean MEIM

scores between generations [$F(2, 76) = 0.95$, $p = .39$], suggesting that all generations had similar moderate levels of ethnic identification.

Intercorrelations among all measures for the whole sample are reported in Table 6. Difficulties with emotion regulation were significantly positively correlated with how relevant, how helpful, and how much participants liked PST and CBT. Participants who have more trouble regulating their emotions (e.g., "When I'm upset, I lose control over my behavior") may find any psychotherapy, regardless of the modality, beneficial. Social problem-solving skills was negatively correlated with how relevant, how helpful, and how much participants liked PST and CBT. This indicates that participants who reported less social-focused problem-solving skills found PST and CBT more beneficial. These correlations and the direction of the correlations are expected as participants who report fewer social problem-solving skills may not have the skills to cope with increased stress in their lives (e.g., relationship discord, academic or job stress). As a result, they may also find any psychotherapy beneficial. Attitudes toward help-seeking behavior were positively correlated with how helpful and how much participants liked PST and CBT, and how relevant participants found PST. Participants who had more positive attitudes towards help-seeking behavior found PST and CBT more beneficial. These correlations were expected, as more positive attitudes towards help-seeking behaviors are correlated with finding psychotherapy beneficial (Nam et al., 2013).

Table 7 reports intercorrelations among measures for the White sample. The only significant correlation was between how helpful White participants found PST and psychological distress ($r = .30$, $p = .03$). This correlation suggests that White participants

with more distress found PST more helpful. No other correlations were statistically significant.

Intercorrelations among measures for Asian American participants are reported in Table 8. There were many significant correlations between preference for PST or CBT and other self-report measures (e.g., attitudes towards help-seeking, emotion regulation). There were significant positive correlations between attitudes towards help-seeking and how relevant, how helpful, and how much Asian participants liked PST and CBT. These correlations were again expected, as more positive attitudes towards help-seeking are associated with finding psychotherapy more beneficial (Nam et al., 2013). As presented in the *Results of Hypothesis 2.1* section below, there were significant differences in PST vs. CBT preference for Asian Americans, which may explain the multiple significant correlations for Asian participants, but few significant correlations for White participants. White participants did not report a preference for PST or CBT.

There were also significant positive correlations between difficulties with emotion regulation and how relevant and how much Asian participants liked PST and CBT, and how helpful participants found CBT. These correlations suggest that Asian participants who report more emotion dysregulation may find any psychotherapy beneficial. Social problem-solving orientation was negatively correlated with how helpful, how relevant, and how much participants liked PST and CBT, indicating that Asian participants who reported fewer social problem-solving skills found PST and CBT beneficial.

Table 6. Study 2: Correlations between PST Vignettes, CBT Vignettes, and All Self-Report Measures.

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
Relevance of CBT	.94***	.92***	.94***	.89***	.87***	.07	.12	.37***	.29***	.16	-.31***	.05
Helpfulness of CBT	-	.93***	.91***	.95***	.89***	.12	.19*	.34***	.29***	.20*	-.26**	.06
Positivity towards CBT	-	-	.88***	.91***	.93***	.17	.17*	.36***	.25***	.20*	-.27**	.04
Relevance of PST	-	-	-	.92***	.91***	.06	.15	.37***	.25**	.23**	-.25**	.04
Helpfulness of PST	-	-	-	-	.93***	.12	.17*	.36***	.23**	.27***	-.18*	.07
Positivity towards PST	-	-	-	-	-	.10	.19*	.33***	.23**	.25**	-.19*	.09
Generation	-	-	-	-	-	-	-.12	.09	.26**	-.01	-.30***	-.11
English proficiency	-	-	-	-	-	-	-	.06	-.06	.17*	.10	.09

Table 6. (continued).

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
MEIM[a]	-	-	-	-	-	-	-	-	.19*	-.01	-.10	.09
DERS[b]	-	-	-	-	-	-	-	-	-	-.11	-.80**	-.41**
ATTHSB[c]	-	-	-	-	-	-	-	-	-	-	.18*	.04
SPSI[d]	-	-	-	-	-	-	-	-	-	-	-	.44**

*significant at p <.05. **significant at p< .01. ***significant at p <.001.

[a]MEIM = Multigroup ethnic identity measure.

[b]DERS = Difficulties in emotion regulation.

[c]ATTHSB = Attitudes towards help-seeking behavior.

[d]SPSI = Social problem-solving inventory.

[e]WHO-5 = WHO-5 Well-being index.

Table 7. Study 2: Correlations between PST Vignettes, CBT Vignettes, and All Self-Report Measures among White Participants (*n* = 53)

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
Relevance of CBT	.91***	.90***	.93***	.89***	.79***	.19	.21	.28*	.27	-.04	-.27	.23
Helpfulness of CBT	-	.88***	.89***	.95***	.83***	.18	.29*	.31*	.25	.06	-.16	.25
Positivity towards CBT	-	-	.87***	88***	.93***	.17	.24	.32*	.17	.04	-.14	.23
Relevance of PST	-	-	-	.91***	.83***	.25	.26	.28*	.25	.10	-.20	.23
Helpfulness of PST	-	-	-	-	.89***	.22	.26	.30*	.22	.15	-.08	.30*
Positivity towards PST	-	-	-	-	-	.23	.21	.36**	.16	.17	-.04	.27
Generation	-	-	-	-	-	-	.15	.001	-.04	.04	.13	.19

Table 7. (continued).

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
English proficiency	-	-	-	-	-	-	-	.13	-.20	.21	.22	.31*
MEIM[a]	-	-	-	-	-	-	-	-	.34**	.11	-.14	-.09
DERS[b]	-	-	-	-	-	-	-	-	-	-.22	-.76***	-.32*
ATTHSB[c]	-	-	-	-	-	-	-	-	-	-	.42**	.16
SPSI[d]	-	-	-	-	-	-	-	-	-	-	-	..38**

*significant at p <.05. **significant at p< .01. ***significant at p <.001.

[a]MEIM = Multigroup ethnic identity measure.

[b]DERS = Difficulties in emotion regulation.

[c]ATTHSB = Attitudes towards help-seeking behavior.

[d]SPSI = Social problem-solving inventory.

[e]WHO-5 = WHO-5 Well-being index.

Table 8. Study 2: Correlations between PST Vignettes, CBT Vignettes, and All Self-Report Measures among Asian Participants (*n* = 88)

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
Relevance of CBT	.95***	.93***	.94***	.90***	.90***	.11	.08	.44***	.23*	.32**	-.27**	-.05
Helpfulness of CBT	-	.96***	.91***	.94***	.91***	.18	.14	.37***	.26*	.30**	-.28**	-.05
Positivity towards CBT	-	-	.88***	.91***	.92***	.23*	.14	.39***	.26*	.30**	-.29**	-.06
Relevance of PST	-	-	-	.93***	.95***	.10	.09	.43***	.20	.33**	-.22*	-.05
Helpfulness of PST	-	-	-	-	.95***	.15	.15	.34***	.19	.33**	-.21*	-.02
Positivity towards PST	-	-	-	-	-	.16	.15	.36***	.22*	.34***	-.21*	-.03
Generation	-	-	-	-	-	-	.05	.06	.32**	-.05	-.37***	-.05

Table 8. (continued).

Measure	Helpfulness of CBT	Positivity towards CBT	Relevance of PST	Helpfulness of PST	Positivity towards PST	Generation	English proficiency	MEIM[a]	DERS[b]	ATTHSB[c]	SPSI[d]	WHO-5[e]
English proficiency	-	-	-	-	-	-	-	.008	.05	.14	.02	-.06
MEIM[a]	-	-	-	-	-	-	-	-	.05	-.12	-.06	.23*
DERS[b]	-	-	-	-	-	-	-	-	-	-.01	-.81***	-.49***
ATTHSB[c]	-	-	-	-	-	-	-	-	-	-	.01	-.06
SPSI[d]	-	-	-	-	-	-	-	-	-	-	-	..48***

*significant at p <.05. **significant at p< .01. ***significant at p <.001.

[a]MEIM = Multigroup ethnic identity measure.

[b]DERS = Difficulties in emotion regulation.

[c]ATTHSB = Attitudes towards help-seeking behavior.

[d]SPSI = Social problem-solving inventory.

[e]WHO-5 = WHO-5 Well-being index.

Participants who report fewer social problem-solving skills may not have the skills to cope with an increase in stress (e.g., increased depressive symptoms, relationship discord) in their lives. Thus, they could view any psychotherapy that teaches them skills (e.g., skills to cope with emotion or problem-solving skills) as valuable. Notably, how relevant and helpful Asian participants found PST was not correlated with difficulties with emotion regulation. The lack of significant correlations may be because emotion regulation is internally-focused (e.g., focus on controlling one's feelings and thoughts), while PST is externally-focused (e.g., focus on solving a problem). Asian participants who experience greater emotional dysregulation may want internally-focused skills to cope with their emotions. The fact that difficulties with emotion regulation were correlated with how helpful Asian participants found CBT supports this idea. Therefore, an externally-focused psychotherapy such as PST may not be as relevant or helpful to those participants.

Results of Hypothesis 2.1: Asian Americans will prefer PST over CBT, while White Americans will have no preference for PST or CBT.

General preference for PST vs. CBT in Study 2: Total sample. See Table 4 for descriptive statistics of all self-report measures. A paired sample *T*-test indicated that all participants preferred PST over CBT. Participants reported they found PST more personally relevant [$t(140) = -3.12$, $p = .002$], liked PST more [$t(139) = -2.85$, $p = .005$], and found PST more helpful than CBT [$t(140) = -3.03$, $p = .003$].

Racial differences in PST vs. CBT in Study 2: Asian vs. White participants. As expected, White participants reported no particular preference for PST or CBT. There were no significant differences in White participants liking PST or CBT more [$t(52) = -$

1.82, p = .08], finding PST or CBT personally relevant [t(52) = -1.84, p = .07] or helpful [t(52) = -1.11, p = .27].

Asian participants significantly preferred PST over CBT, providing evidence that the preference for PST over CBT is specific to Asian Americans. Asian participants found PST more personally relevant [t(87) = -2.50, p = .01], liked it more [t(86) = -2.20, p = .03], and found it more helpful [t(87) = -2.91, p = .005] than CBT (see Figure 7).

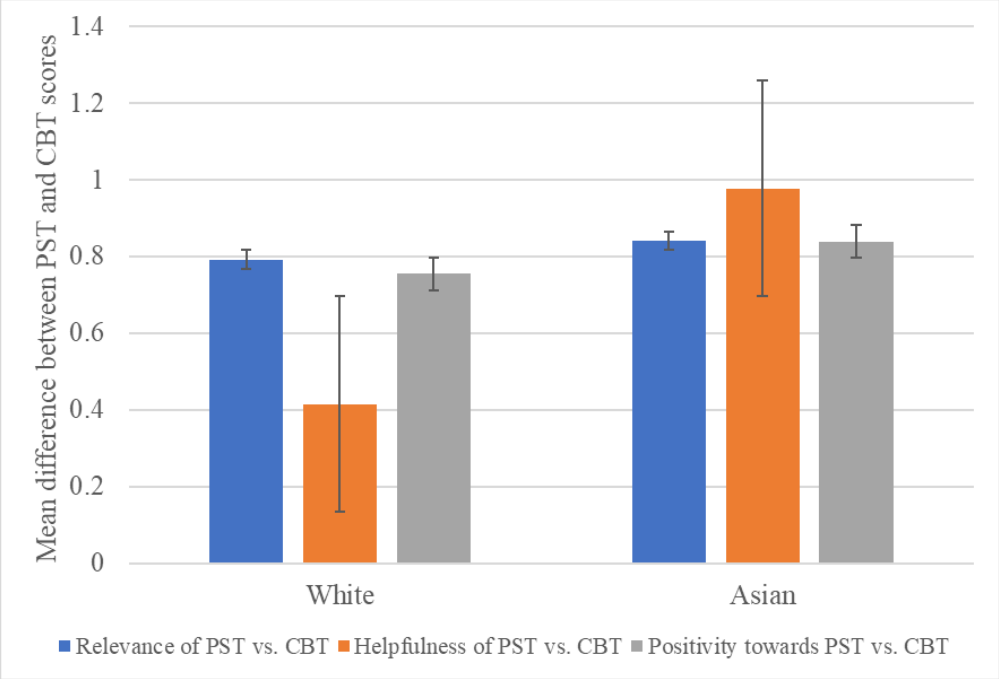

Figure 7. Study 2: Racial/Ethnic Differences in Self-Reported Scores of Relevance, Helpfulness, and Positivity towards PST and CBT

Note. A mean difference close to 0 suggests little difference in preference for PST or CBT. A larger positive mean difference between PST and CBT scores suggests a greater preference for PST.

Acculturation as a moderator on the perceived relevance of PST and CBT in Study 2: Asian American sample. Acculturation was measured by participants' generation, English proficiency, and level of ethnic identity. A two-way ANOVA showed that there were no significant main or interaction effects between generation, English proficiency, and level of ethnic identity on helpfulness, positivity, and relevance of PST

and CBT. However, because I had originally hypothesized acculturation would moderate participants' perceived relevance, helpfulness, and positivity towards PST and CBT, a post-hoc Tukey test was conducted. The post-hoc test also indicated that participants' generation, English proficiency, and level of ethnic identity had no significant effect on helpfulness, positivity, and relevance of PST and CBT. Thus, acculturation was not tested as a moderator for the full Asian American sample.

Results of Hypothesis 2.2.: Acculturation will be associated with the perceived relevance of PST and CBT vignettes.

In Hypothesis 2.2, I hypothesized that collapsing across PST and CBT vignettes, content focusing more on external or social interventions would be more personally relevant to lower acculturated participants. In contrast, vignettes that contained content focusing more on internal interventions would be more personally relevant to highly acculturated participants. Two raters (the author of this dissertation and an advanced clinical doctoral student) rated all vignettes ($\kappa = .89$). If the raters disagreed on a rating, raters discussed their ratings until a consensus was made. Eleven vignettes (9 CBT vignettes and 2 PST vignettes) were rated as internally focused, and 9 vignettes (8 PST vignettes and 1 CBT vignette) were rated as externally focused (see Appendix C for each vignette's rating).

Before a mediation analysis could be conducted, a reliability analysis was conducted to determine if there was internal consistency, measured by Cronbach's alpha, within vignette categories (internally focused, externally focused). The reliability analysis was conducted to determine if vignettes could be combined into one score for each category. For the 11 internally focused vignettes, each participant's three ratings of each

internally focused vignette (i.e., how much they liked it, how helpful they found it, and how relevant they found it) were added together and averaged to get a composite rating of the vignette. A reliability analysis of all participants' composite ratings of the 11 internally focused vignettes was conducted. The reliability analysis indicated there was excellent internal consistency among the 11 internal vignettes (Cronbach's alpha = 0.97), suggesting the internally focused vignettes were similar enough to be combined.

Internal consistency among the 9 externally focused vignettes was also assessed by the same process as above. Each participant's three ratings of each externally focused vignette were again added together and averaged to get a composite rating of the vignette. There was excellent internal consistency among external vignettes (Cronbach's alpha = 0.96), suggesting that the externally focused vignettes were similar enough to be combined.

Now that internal consistency among the internal and external vignettes was established, a mediation analysis may be done. There are four steps to establishing mediation (Baron & Kenny, 1986). Step one states that the causal variables (i.e., internal and external vignettes) must be correlated with the outcome variables (i.e., PST and CBT relevance, like, and helpfulness scores). Linear regression models were run; all were significant (all p <.001), suggesting that there is an effect between vignette type and PST and CBT preference that may be mediated. Step one was supported.

In step two, it must be shown that the causal variable (i.e., internal and external vignettes) is correlated with the mediator (i.e., acculturation). Internal vignettes significantly predicted English proficiency ($F[1, 139] = 4.40$, $p = .04$, $R^2 = .03$) and ethnic identity ($F[1, 139] = 19.26$, $p < .001$, $R^2 = .12$). External vignettes significantly predicted

ethnic identity only (F[1, 139] = 23.92, $p < .001$, $R^2 = .15$). Because step two was supported, step three can be completed.

In step three, it must be shown that the mediator (i.e., acculturation) affects the outcome variable (i.e., PST and CBT relevance, like, and helpfulness scores). Linear regression models were conducted. None were significant, suggesting that acculturation (i.e., generation, English proficiency, or ethnic identity) does not mediate the relationship between internal and external vignettes and PST and CBT preference. Because step three was not supported, there is no mediating relationship. Thus, my hypothesis was not supported.

Group differences in mediation analysis: White Americans. To determine if there were differences between Whites and Asians, I repeated the mediation analysis on each racial group. For White participants, all linear regression models were significant (all $p < .001$), suggesting that there is an effect between vignette type and PST and CBT preference that may be mediated. Step one was supported. In step two, both internal and external vignettes significantly predicted ethnic identity, F(1, 51) = 5.54, $p = .02$, $R^2 = .10$ and F(1, 51) = 6.35, $p = .02$, $R^2 = .11$, respectively. Step three was again not supported, suggesting that acculturation did not mediate the relationship between vignette type and psychotherapy preference for White Americans.

Group differences in mediation analysis: Asian Americans. For Asian participants, all linear regression models were significant (all $p < .001$), suggesting that there is an effect between vignette type and PST and CBT preference that may be mediated. These results indicate that step one was supported. In step 2, both internal and external vignettes significantly predicted ethnic identity, F(1, 86) = 13.94, $p < .001$, $R^2 =$ -

.14 and F(1, 86) = 18.19, $p < .001$, $R^2 = .18$, respectively. However, step three was not supported as none of the linear regression models were significant (all $p > .05$). This confirms that acculturation does not mediate the relationship between vignette type and psychotherapy preference for Asian Americans. In conclusion, my hypothesis was not supported for either group.

CHAPTER VIII: DISCUSSION

This dissertation aimed to fill the clinical relevance gap in the cultural neuroscience literature. To my current knowledge, no study has used functional magnetic resonance imaging (fMRI) to assess the personal relevance of psychotherapy for Asian Americans. Using both the Personal Relevance of Psychotherapy (PROP) model as a guide in clinical application and the Tompson et al. (2015) model as a guide in how persuasion, neural processes (i.e., medial prefrontal cortex [mPFC] and related brain regions), and behavior change interact, this dissertation used fMRI to establish and compare the personal relevance of two psychotherapies, social problem-focused Problem-Solving Therapy (PST) and Cognitive Behavioral Therapy (CBT), for Asian Americans (Study 1). I also investigated whether fMRI was more sensitive than self-report data in determining participants' preference for PST vs. CBT and how acculturation moderated Asian Americans' preference for PST vs. CBT.

In a second study (Study 2) with a larger and adequately powered sample, differences between Asian and White Americans were examined to determine general vs. racial group-specific patterns in self-reported psychotherapy preference. Acculturation was again tested as a moderator of Asian Americans' preference for PST vs. CBT. Finally, content differences between PST and CBT vignettes were examined to see if vignettes that contained content focused more on external interventions were more personally relevant to lower acculturated participants. In contrast, I hypothesized that vignettes that focused more on internal interventions were more personally relevant to highly acculturated participants. I discuss each hypothesis, its results, and the implications below.

Study 1

Hypothesis 1.1 and 1.2 Discussion

Hypothesis 1.1 was that PST would be associated with increased activation in neural networks associated with self-processing, specifically the mPFC. This hypothesis was supported. When participants viewed PST vignettes, there was significantly more activity in the mPFC and ventromedial prefrontal cortex (vmPFC) areas than when they viewed CBT vignettes. The PST condition was also significantly associated with activation in self-referential and reward regions of interests (ROIs), providing further evidence that PST may be more personally relevant and rewarding for Asian Americans than CBT.

Hypothesis 1.2 was that there would be no significant differences in self-reported preference for PST over CBT, proposing that neuroimaging methods were more sensitive towards participants' preference for PST vs. CBT than self-report measures. Neuroimaging methods are thought to be more sensitive than self-report measures because one, neuroimaging methods do not require participants to have insight into their behaviors and attitudes and can avoid biases inherent to self-report measures, such as the social desirability effect (Berkman, 2015). Two, neuroimaging methods can directly assess small, subtle differences between participants in a mental process (e.g., preference for psychotherapy), whereas other methods, such as self-report measures, cannot capture these small individual differences (Berkman, 2015). Indeed, there were no significant differences observed in self-reported preferences for PST vs. CBT.

Furthermore, increased activation in the mPFC and vmPFC was not significantly correlated with participants' ratings of personal relevance, helpfulness, or positivity in

either the PST or CBT condition. The lack of correlation implied that the subjective experience of the participants, in response to the two conditions, was not associated with neural changes that indicate personal relevance. These findings provided evidence that fMRI was more sensitive than self-report questionnaires in capturing participants' personal preference for PST vs. CBT.

My results are consistent with previous findings on the associations between increased activation in the mPFC and vmPFC, self-relevance, and behavior change (Falk et al., 2010, 2011; Pegors et al., 2017). Increased activation in the mPFC and vmPFC when viewing PST vignettes indicated participants might have found PST more personally relevant, as these areas have been associated with self-relevance in other studies. Additionally, neural processes differentiated the personal relevance of PST for participants when participants' self-reports did not, adding to the growing evidence that fMRI can provide additional information that self-report measures may not discern (Doré et al., 2019; Falk et al., 2010, 2011; Pegors et al., 2017). My findings were strengthened, and also furthered previous study results, by the inclusion of an all Asian American sample, as earlier samples were predominantly White Americans.

Focusing on Asian Americans is especially vital, as Asian Americans are consistently the least likely racial/ethnic group to use mental health services (Smith & Trimble, 2016). The reluctance to use mental health services may be because Asian Americans do not find conventional mental health treatments (EBTs) or culturally-adapted treatments (CATs) to be personally relevant (Hall et al., 2020; Kim & Zane, 2016). Culturally-adapted treatments, while culturally relevant, are not personally relevant because they often implicitly assume that all individuals from a specific group of

color hold similar cultural values and attitudes. This assumption ignores individual differences. If Asian Americans found mental health treatment personally relevant, they may be encouraged to change attitudes and behaviors, such as becoming more likely to utilize health services (Huang & Shen, 2016).

Indeed, as shown by increased activation in the mPFC when participants viewed PST vs. CBT vignettes, while Asian Americans may not have self-reported a preference for PST, their neural activation indicated they found PST more personally relevant than CBT. One reason why Asian Americans may find PST more personally relevant could be due to PST's main focus on external stimuli (e.g., a problem that needs to be solved) instead of internal stimuli (e.g., feelings and thoughts) (Nezu et al., 2012). CBT, on the other hand, has an internal focus (Beck, 2011). Asian cultures often value emotion moderation instead of emotional expression (Kim et al., 2005). Even without cultural adaptations, the external focus of PST may be more culturally relevant, and also personally relevant, for Asian Americans than CBT.

Activity in the vmPFC may reflect the importance individuals place on a stimulus (Roy et al., 2012). Previous research has shown prompting participants to reflect on their values before viewing health intervention messages (e.g., increase physical activity) increased vmPFC activation, which resulted in a behavior change (e.g., decreased sedentary behavior) (Falk et al., 2015). Falk et al.'s (2015) finding suggests that encouraging participants to reflect on their values may make the stimuli more important and personally meaningful, which can result in behavior change. Although I did not ask participants to reflect on their values, the increased activation in the vmPFC when participants viewed PST vignettes in Study 1 suggests that PST may align with Asian

participants' cultural values on emotion moderation or pragmatic orientation (Hwang, 2006; Kim et al., 2005). Additionally, brain regions work in tandem with each other, not independently of each other (Cooper et al., 2015, 2017; Falk et al., 2015). The fact that there was increased activation in both the mPFC and vmPFC suggests that PST engages both self- and value-relevant neural processes, which in turn may have enhanced the persuasive effect and personal relevance of PST for Asian Americans.

More research is needed to determine if PST and CBT align with their personal or cultural values. The current measure used in this study, the Multigroup Ethnic Identity Measure (MEIM), measures an individual's level of belonging and affirmation to a racial/ethnic group (Phinney, 1992). The MEIM may not measure relevant Asian cultural variables, such as Asian cultures' pragmatic orientation (Hwang, 2006). Future studies should include a measure that explicitly measures how much individuals align with Asian values and U.S. (or Westernized) values, such as the Asian Values Scale (AVS) (Kim et al., 1999).

Notably, my results contrast with previous findings on cultural differences in brain regions associated with self-relevant processes. Other studies had found increased activation in the dorsal medial prefrontal cortex (dmPFC) when Asian Americans viewed self-relevant stimuli (Han & Ma, 2014; Huff et al., 2013), whereas I found increased activation in the mPFC and vmPFC. My results may contradict these findings due to the differences in the stimuli and the specific mental processes the participants engaged in. As reviewed in previous chapters, the dmPFC is associated with evaluating the accuracy of stimuli, whereas the vmPFC is associated with processing the relevance of stimuli (D'Argembeau, 2013; Schmitz et al., 2006). In this study, I was interested in how

personally relevant Asian Americans found the PST and CBT vignettes. Thus, activation in the vmPFC, rather than the dmPFC, would be expected (D'Argembeau, 2013). In previous studies, researchers were interested in which specific brain regions had increased activation when Asian Americans completed self-referential tasks (Han & Ma, 2014; Huff et al., 2013). Self-referential tasks often involve evaluating whether or not a stimulus described themselves, a person close to them, or a stranger. Activation in the dmPFC, rather than the vmPFC, is thus likely because participants are evaluating how accurately the stimulus describes someone or themselves.

Hypothesis 1.3 Discussion

I hypothesized that acculturation would moderate the association between PST and increased activation in the putative self-processing area, such that greater increases in the mPFC would be observed during PST (vs. CBT) trials for participants who were less acculturated. This hypothesis was partially supported. I measured acculturation with three variables: English proficiency, level of ethnic identity, and generation status. English proficiency and level of ethnic identity had no moderating effect on the increase in mPFC activation when viewing PST vignettes. However, a post-hoc test indicated that participants' generation status (i.e., first, second, or third) had a moderating impact on the association between increased mPFC activation and viewing PST vignettes in the expected direction. First- and second-generation Asian Americans, who are generally less acculturated than third- and later generations of Asian Americans, experienced greater mPFC activation when viewing PST (vs. CBT) vignettes than third-generation Asian Americans. My results support earlier research that acculturation impacts brain activity in self-referential processing (Chen et al., 2015). My findings expand upon Chen et al.'s

(2015) findings through the focus on psychotherapy and the inclusion of assessing personal relevance.

There is consistent evidence that third- and later generations of Asian Americans are more likely to seek mental health services than first- or second-generation Asian Americans (Abe-Kim et al., 2007; Georgiades et al., 2018). Thus, third-generation Asian Americans, such as those in this study, may find psychotherapy more helpful and relevant than earlier generations. Although generational status may be associated with acculturation, neither English proficiency nor level of ethnic identity moderated the current results. English proficiency may not have had a moderating effect on treatment preference because there was little heterogeneity in English proficiency in our sample, as over 92% of participants reported they had good to excellent English ability (i.e., speak, read, and write).

The MEIM may not have had a moderating effect on treatment preference because, as stated earlier, the MEIM measures an individual's level of belonging and affirmation to a racial/ethnic group (Phinney, 1992). The MEIM may not measure relevant Asian cultural variables, such as pragmatic orientation (Hwang, 2006). Unexpectedly, there were significant differences in MEIM scores between third-generation participants and first- and second-generation participants, where third-generation participants had higher MEIM scores than first- and second-generation participants. Third-generation participants' higher MEIM scores suggest that third-generation participants have a greater sense of belonging and affirmation to their ethnicity and culture than first-and second-generation participants. Two psychometric studies that investigated MEIM scores across generations (Homma et al., 2014; Yap et

al., 2016) confirmed that the MEIM could generally be used to compare levels of ethnic identity across generation groups. However, Yap et al. (2016) cautioned that the MEIM did not have strong scalar invariance, which suggests that differences in mean MEIM scores across generations, such as the differences I found in Study 1, should be tentatively interpreted.

Regardless, the finding that third-generation participants had stronger levels of Asian identity was notable as it is counterintuitive and inconsistent with a previous study that investigated differences in mean MEIM scores between generations. Earlier generations reported higher levels of Asian identity than later generations (Homma et al., 2014). As stated in Chapter VII: Results, the inconsistency may be due to the different samples in Study 1 (adults, M_{age} = 37.6 years) and Homma et al. (2014) (adolescents, 12 to 19 years old). Adolescence and emerging adulthood (college-age) is a crucial period in ethnic identity development, where adolescents and young adults are exploring their identity (Yip et al., 2006). In later adulthood, ethnic identity is generally more stable (Yip et al., 2006). In Study 1, third-generation participants (M = 55.5 years) were significantly older than first- (M = 34.33) and second-generation participants (M = 31.54 years). Although not college-aged, first- and second-generation participants were younger adults and may still be exploring their ethnic identity. In contrast, the older third-generation participants may have a more stable ethnic identity than first- and second-generation participants.

Additionally, later generations of Asian Americans, such as third- and fourth-generation Japanese Americans, have reported a stronger desire to reconnect with their ethnic culture and roots than earlier generations (Tsuda, 2012). Tsuda (2012) found that

later generations of Japanese Americans made a conscious effort to engage in and retain their cultural background. First- and second-generation Asian participants may already feel like they belong in their racial/ethnic group, so they may have found questions on the MEIM about engaging with their cultural background, not as relevant. Instead, an explicit measure of adherence to Asian values (e.g., AVS; Kim et al., 1999), which can capture Asian culture's pragmatic orientation, may be more relevant for all generations in assessing whether ethnic identity moderates psychotherapy preference.

Limitations of Study 1

One limitation of this study was that I only examined specific regions of interest (i.e., the mPFC region). Other brain regions are also important to the understanding of personal relevance, such as the posterior cingulate cortex (PCC) and anterior cingulate cortex (ACC) (van der Meer et al., 2010). However, the mPFC was specifically chosen a priori and examined because of substantial evidence that increased activation in the mPFC is strongly associated with self-relevance (Denny et al., 2012; van der Meer et al., 2010).

Another major limitation of this study was that the number of Asian Americans scanned in this study, 28, is considered small and does not meet recommendations for an adequately powered sample (Turner et al., 2018). Inferences to the greater Asian American population are limited. Additionally, because of the small sample size, my moderating analyses on acculturation were not powerful enough to make definitive statements about the moderating effect of generation status. Any significant results from these analyses should be interpreted cautiously. Finally, there is a possibility that if I had an adequately powered sample, self-report measures might indicate a preference for PST

vs. CBT. In Study 1, I argued that fMRI was more sensitive than self-report measures, as fMRI discerned a preference for PST over CBT, while self-report measures did not indicate any preference. However, my sample was underpowered. Having an underpowered sample may have contributed to the lack of differences in psychotherapy preference on self-report measures, rather than the sensitivity of fMRI in measuring individual differences in mental processes. More research in a larger sample is needed to determine fMRI's contribution to understanding how a person perceives psychotherapy beyond self-report measures.

The majority of my sample identified as East Asian (71%), limiting the generalizability of my results to other Asian ethnicities, such as Southeast Asians or South Asians. White Americans were also not included in Study 1, so it is unclear if the preference for PST over CBT is specific to Asian Americans. Future research will need larger sample sizes, different racial groups (e.g., White Americans), a broader spread of Asian ethnicities and language abilities, and investigate ethnic differences in psychotherapy preference. Finally, participants in Study 1 were considered low-distress, as individuals were excluded if they reported a current diagnosis of a mental health disorder (e.g., depression, anxiety). Participants in Study 1 are, therefore, not representative of individuals who are highly distressed or have a diagnosis of a mental disorder.

Despite these limitations, this study is the first to use fMRI to investigate the personal relevance of psychotherapy among Asian Americans. There are also no studies, regardless of sample race or ethnicity, that has used fMRI to explore the personal relevance of psychotherapy. My findings provide crucial preliminary data that future

studies can expand on. Additionally, this study adds to the existing literature on fMRI as a viable alternative form of assessment and supplement to self-report measures. In Study 1, despite a small sample, fMRI was sensitive to differences in the personal relevance of psychotherapy, whereas self-report measures were not. If only self-report data were used, these novel and important explorations on the personal relevance of psychotherapy would have been missed.

Clinical Implications and Recommendations of Study 1

Study 1 has several important clinical implications. First, it should be noted that I am not suggesting EBTs or CATs do not work with Asian Americans, nor that personal relevance should be the only factor in determining whether an intervention would be effective for Asian clients. There is substantial evidence that both EBTs and CATs are effective in reducing negative mental health symptoms for Asian Americans (Hall et al., 2016; Huey & Tilley, 2018), and can encourage Asian Americans to engage and stay in therapy (Presley & Day, 2019). However, despite the development of EBTs and CATs, there has been minimal evidence that disparities among Asian Americans' mental health service use have reduced over the past few decades (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015; Smith & Trimble, 2016). Evidence-based treatments' lack of cultural relevance and the limited availability of CATs may contribute to Asian Americans' underutilization of mental health services (Hall et al., 2020). A way to increase the reach of EBTs and CATs is needed.

As presented in the PROP model, I argue that personal relevance may be a crucial component in increasing psychotherapies' reach with clients. The goal of using fMRI in establishing the personal relevance of interventions is to help clinicians know when to

generalize or individualize psychotherapy to a client (Hall et al., 2020; Sue, 1998). The goal is not to scan every individual to see what treatment they would respond to or prefer (Ball et al., 2014). The personal relevance of interventions is especially crucial to engage Asian Americans in therapy because Asian Americans may not use mental health services if they do not find them personally relevant or helpful (Hall et al., 2020; Kim & Zane, 2016). Cultural factors, such as stigma towards mental health illness and face concerns, also impact Asian Americans' mental health service use (Cheng et al., 2018; Zane & Ku, 2014). By investigating and establishing what makes treatment personally relevant, clinicians and researchers may be able to adapt existing EBTs and CATs to address cultural and individual factors.

As the first known study that used fMRI to assess the personal relevance of psychotherapy for Asian Americans, results have revealed that Asian Americans find PST more personally relevant than CBT. More specifically, less acculturated Asian Americans found PST more personally relevant than CBT than highly acculturated Asian Americans, who reported no significant preference for PST vs. CBT. As stated, the goal of this dissertation is not to recommend one treatment over the other or recommend that only PST vs. CBT can be used with Asian American clients. Instead, I aim to provide more insight and guidance for clinicians working with Asian Americans, such that if an Asian client identifies a certain way, PST vs. CBT may be a good starting point. From there, clinicians can then use their clinical judgment to adapt the treatment accordingly to make it personally relevant to their clients.

Applying my findings to the PROP model, a clinician who sees an Asian American client may consider having PST in their "therapy toolbox," and depending on

the client, may consider using PST with the client as PST's external focus makes it inherently more culturally relevant for Asian Americans. I am not advocating clinicians to use a "cookbook" therapy approach, where clients are assigned to a specific psychotherapy based on their ethnicity (Sue & Zane, 1987). Instead, based on their Asian client's individual characteristics (e.g., generation, acculturation level, endorsement of Asian values), clinicians should select a treatment accordingly to increase the personal relevance of treatment. For example, for an Asian client who is highly acculturated but nonetheless endorses more stigma towards mental illness, framing mental illness as an external problem to be "fixed" could lessen the stigma. Thus, a clinician could first start with PST for this client. As trust and rapport begin to build between the clinician and client, the clinician could incorporate some more internally-focused therapeutic techniques, such as thought records. Another example could be an Asian client who is less acculturated and has face concerns. A clinician may again frame face concerns as an external problem that can be fixed. By starting with PST, the client may feel supported by the clinician as they generate solutions to allow the client to maintain their social image and interpersonal harmony. A final example could be an Asian client who is highly acculturated and does not align closely with Asian values. Because the client has more Westernized attitudes and beliefs towards mental illness and psychotherapy, the clinician may start with CBT, because my findings suggest highly acculturated Asian Americans do not have a preference for PST vs. CBT. Also, CBT is one of the most widely used and effective psychotherapies (Hofmann et al., 2012).

Study 2

Hypothesis 2.1 Discussion: General and Racial Differences in PST and CBT Preference

In Study 2, with a larger and adequately powered sample, I hypothesized that Asian American participants would prefer PST over CBT. In contrast, White participants would have no preference for PST or CBT. This would suggest that the preference for PST over CBT was specific to Asian Americans. My hypothesis was supported and provided evidence that the preference for PST over CBT is group-specific. White participants reported no preference for PST or CBT, while Asian participants reported a significantly greater preference for PST over CBT. Asian participants reported finding PST more personally relevant, liking PST more, and found PST more helpful than CBT.

Several factors are relevant in interpreting these results. Of the Asian American participants who reported their generation, the majority in Study 2 were first- and second-generation (75%). These results are consistent with Study 1, in which activation levels in the mPFC indicated that first- and second-generation Asian Americans significantly preferred PST over CBT. As most of the Asian American sample in Study 2 probably were less acculturated, they possibly aligned more with their Asian culture and values, which emphasizes emotion moderation or suppression and interpersonal harmony (Kim et al., 2005; Wei et al., 2013). PST generally does not focus on an individual's thoughts and emotions. Instead, it focuses on generating pragmatic solutions to solve a problem (Nezu et al., 2012). The issues presented to participants in the PST vignettes were often interpersonal (e.g., "How do I ask my family to clean up after themselves?"). However, interpersonal harmony and its solutions were conceptualized externally instead of

internally (e.g., “We will brainstorm solutions to ask your family to clean up after themselves” vs. “How do you feel about your family not cleaning up after themselves?”). PST’s external focus may thus align more with less-acculturated Asian Americans’ Asian values, increasing its credibility and personal relevance. Unfortunately, Study 2 did not include a measure for participants’ alignment with Asian values. Future studies should have a measure that explicitly assess Asian values to investigate this association further.

Hypothesis 2.1 Discussion: Acculturation as a Moderator on Perceived Relevance of PST and CBT for Asian Americans.

In Hypothesis 2.1, I predicted that acculturation, measured by English proficiency, ethnic identity, and participant generation, would have a moderating effect on the perceived relevance of PST vs. CBT for Asian Americans. My hypothesis was not supported. This finding was different from my moderation results in Study 1, where English proficiency and ethnic identity did not moderate participants’ preference for PST vs. CBT, but participants’ generation did moderate participants’ preference for PST vs. CBT. In Study 2, there were no generational differences observed in terms of how personally relevant, how helpful, or how much participants liked PST vs. CBT.

Participants’ generation may not have had a moderating effect on preference for PST or CBT because of limited heterogeneity among participants. First-, second-, and third-generation Asian Americans were not more acculturated or distressed than one another. English proficiency may also not have had a moderating effect because there was limited heterogeneity in English proficiency in the sample. In Study 2, over 95% of Asian American participants reported they had good to excellent English speaking, reading, and writing skills. Finally, ethnic identity may not have had a moderating effect

on treatment preference because, as discussed previously, the MEIM may not measure relevant Asian cultural variables, such as pragmatic orientation (Hall et al., 2020; Hwang, 2006). Future studies comparing group or ethnic differences in psychotherapy preference should use multiple measures to fully capture ethnic identity, as ethnic identity is a dynamic and multifaceted concept (Phinney & Ong, 2007; Umaña-Taylor, 2015). A measure of specific ethnic-group identity, such as the Suinn-Lew Asian Self-Identity Acculturation (SL-ASIA) scale, which explicitly assesses Asian American acculturation and ethnic identity (Suinn et al., 1987), could be helpful.

Hypothesis 2.2 Discussion: Acculturation will be Associated with the Perceived Relevance of PST and CBT Vignettes.

Hypothesis 2.2 was that collapsing across PST and CBT vignettes, content focusing on external or social interventions would be more personally relevant to less-acculturated participants, while vignettes that contained content focusing on internal interventions would be more personally relevant to highly acculturated participants. My hypothesis was not supported. Acculturation did not have a mediating effect on vignette type (external or internal interventions) and personal relevance. When comparing group differences, acculturation also did not have a mediating effect on vignette type and personal relevance. This may have been because I was focused on vignette content (internal vs. external) instead of PST vs. CBT as a whole.

Limitations of Study 2

One limitation of Study 2 was the fact that constructs of acculturation and culture specifically relevant to psychotherapy, such as pragmatic orientation (Hall et al., 2020; Hwang, 2006), were not measured. Additionally, similar to Study 1, Study 2 did not

include participants with a mental health disorder. Variability in psychological distress was investigated, but psychological distress, while a similar concept to a mental health disorder, is not interchangeable for a mental health disorder (Payton, 2009).

Despite these limitations, to my knowledge, Study 2 is the first to investigate the personal relevance of psychotherapy among White and Asian Americans. Study 2 furthers and strengthens Study 1's findings by addressing some limitations of Study 1. Specifically, Study 2 included White Americans to investigate group differences in psychotherapy preference and confirmed Asian Americans' preference for PST in a larger, adequately powered, and more ethnically diverse Asian American sample.

Clinical Implications and Recommendations of Study 2

In addition to replicating findings and addressing limitations from Study 1, Study 2 establishes group differences in psychotherapy preference between White and Asian Americans. Findings from Study 2 provide more support that Asian Americans prefer PST over CBT and provide initial evidence that White Americans have no specific preference for PST vs. CBT.

Study 2's findings supplement Study 1's findings to help guide clinicians on knowing when to generalize or individualize psychotherapy to a client (Sue, 1998). For example, a clinician who sees a White American client may choose to use either CBT or PST, as my findings have suggested White Americans have no preference for one psychotherapy over the other. The clinician may even decide to start with CBT with all their White clients as CBT is one of the most well-established and effective psychotherapies (Hofmann et al., 2012).

For an Asian client, a clinician should first assess their individual characteristics (e.g., generation, acculturation level) to determine what treatment may be most appropriate. For example, if a first-generation Asian client is seeking treatment for anxiety, even if they may be highly acculturated in some aspects (e.g., high English proficiency), the client may endorse cultural stigma towards mental illness. Study 1 suggests less-acculturated Asian Americans may find PST more helpful. Study 2, with a larger sample of less-acculturated Asian Americans, confirmed this finding and found that Asian participants preferred PST over CBT. A clinician could begin with PST with this client and generate external solutions to address their anxiety (e.g., deep breathing skills to slow heart rate). Or, if an Asian client seeking treatment for anxiety is first generation but is highly acculturated and does not endorse cultural stigma towards mental illness, then a clinician could use either CBT or PST with the client. However, as the clinician continues therapy with their Asian American client, they should continue adapting and individualizing treatment to the client.

General Clinical Implications, Recommendations, and Future Directions

Clinical Implications and Recommendations

As previously stated, it is not feasible, reasonable, nor the goal of clinical neuroscience to use fMRI to scan every individual in psychotherapy to see which one they would respond to or prefer (Ball et al., 2014). Additionally, this dissertation is not recommending one treatment over the other or that only specific therapies should be used. Instead, bolstered by findings from Study 1 and 2, this dissertation aims to provide insight into Asian Americans' psychotherapy preferences and individual differences (e.g., acculturation level) that may impact these preferences. This knowledge gives some

guidance for clinicians working with Asian Americans to make treatment personally relevant for their clients.

Applying findings across both studies into the PROP model, I provide an example below of how these findings and the PROP model can guide clinicians on when to generalize and individualize treatment for an Asian American client. In Study 1, using fMRI, I determined that Asian Americans found PST more personally relevant than CBT, as shown by increased activation in the mPFC region when viewing PST vignettes vs. CBT vignettes. Specifically, less acculturated Asian Americans (first- and second-generation) found PST more personally relevant than CBT than highly acculturated Asian Americans (third-generation). The latter reported no significant preference for PST vs. CBT. Study 2, using only self-report measures, confirmed that the preference for PST is group-specific, as Asian Americans found PST more personally relevant than CBT, while White Americans did not report a preference for either.

A clinical example is Jane, a 36-year-old Chinese American woman, who is seeking treatment for depression. She moved to the U.S. when she was 18 years old to complete her undergraduate degree. She currently works at a large company as a manager. She reports being in a relationship with a White partner, has close relationships with her family, and states most of her friends are other immigrant Asian Americans. Jane also states that she has never sought therapy before.

Jane's individual characteristics that may influence how personally relevant she finds treatment include: her generation status, nativity, adherence to Asian values, and endorsement of cultural stigma towards mental illness. A clinician could measure Jane's adherence to Asian values and endorsement of cultural stigma through the Asian Values

Scale (Kim et al., 1999) and the Stigma Scale (King et al., 2007), respectively. Jane is highly-acculturated in some aspects (e.g., high English proficiency) but less acculturated in other aspects (e.g., cultural stigma towards mental illness). Thus, a clinician may decide first to use PST with Jane because extant research on EBTs and CATs, including this dissertation, has suggested that psychotherapy with an external focus (e.g., PST) may make it inherently more culturally relevant for less-acculturated Asian Americans.

Using PST, the clinician could frame depression as an external problem (e.g., "What in your life is making you feel sad?") or focus on external stressors (e.g., feeling overwhelmed at work) to generate tangible solutions such as creating small goals (e.g., create a to-do list). By starting with PST, similar to gift-giving from Sue and Zane's (1987) Proximal-Distal Model, Jane may feel like she is "gaining" something from therapy, which leads to increased trust in the clinician, engagement with treatment, and effectiveness of psychotherapy. As Jane and her clinician continue treatment, the clinician should always be re-assessing if the therapy is personally relevant to Jane. For example, because Jane is highly acculturated in other ways (e.g., educated in the U.S., interested in therapy), she may be interested in trying internally-focused therapeutic techniques (e.g., reflection over thoughts and emotions). The clinician could consider incorporating therapeutic techniques from CBT, such as thought records.

This example demonstrates how an Asian client's individual characteristics could shape how a clinician adapts and delivers treatment to be more personally relevant for the client. It may be necessary to first use a culturally-relevant treatment, like PST, to establish credibility and trust between clinician and client, especially for an unacculturated client (e.g., first-generation Asian American). However, the client's

individual differences are just as crucial as a therapist's cultural competence or a culturally-relevant treatment, as ensuring a client is engaged with therapy may be imperative in keeping them in treatment (Hall et al., 2020).

Future Directions

This dissertation has provided essential preliminary data for future studies on the personal relevance of psychotherapy for Asian Americans. First, the neuroimaging results from Study 1 need to be replicated in a larger and adequately powered sample of Asian Americans. White Americans should also be included to investigate group differences. The larger sample of Asian Americans should consist of a broader range of English abilities, Asian ethnicities, and generation statuses. Additionally, increased activation in both the mPFC and vmPFC suggests that PST engages both self- and value-relevant neural processes. Study 1 only measured the self-relevance of PST and CBT. The value-relevance of PST and CBT needs to be further investigated using a priori brain regions of interests associated with value-relevance (e.g., vmPFC) or prompting participants to reflect on their values before viewing self-relevant stimuli. In Study 1, participants also did not self-report whether PST or CBT aligned with their values. A measure on value alignment (i.e., more Western or more Asian) should also be included to confirm the association between increased activation in the vmPFC and PST's alignment with personal values.

In Study 2, I showed how the personal relevance of psychotherapy could be determined with self-report measures in an adequately powered sample. This is not to say that fMRI studies are unnecessary. As stated previously, fMRI can provide supplemental information to self-report studies. However, fMRI studies are expensive and time-

consuming (Crosson et al., 2010). Research on the personal relevance of psychotherapy needs to continue, even if fMRI methods cannot always be used. Future research with larger, more diverse samples, including clinical samples, could investigate how individual differences (e.g., acculturation level, alignment with Asian cultural values, level of ethnic identification) moderate psychotherapy preference. In addition, randomized clinical trials are needed to determine whether personal relevance predicts greater effectiveness in reducing mental illness symptoms. For Asian Americans and other groups of color, the goal of personal relevance is to decrease mental health disparities. By comparing the personal relevance of CATs and EBTs for groups of color, information on what makes a treatment personally relevant may inform future intervention development, which in turn may help decrease mental health disparities.

Conclusion

In conclusion, this dissertation provided support that Asian Americans find PST more personally relevant than CBT, increased activation in the self-related neural responses can assess the personal relevance of psychotherapy for Asian Americans, and that personal relevance was moderated by generation status. In a larger sample of White and Asian Americans, Asian Americans' preference for PST over CBT was supported, suggesting that preference for PST is specific to Asian Americans. Together, these findings offer guidance in deciding how to evaluate and adapt a specific therapeutic approach for a client to increase its personal relevance, and thus a client's engagement with treatment.

For almost 50 years, significant mental health disparities between people of color and White Americans have existed. There has been minimal movement in decreasing

mental health disparities, particularly among Asian Americans. CATs, even more so than EBTs, are effective in improving mental health outcomes for Asian Americans. However, despite their effectiveness, CATs have not reduced mental health disparities. The personal relevance of CATs and EBTs may be a crucial link in furthering intervention research, increasing client engagement with treatment, and addressing these disparities.

APPENDICES

APPENDIX A: CBT AND PST VIGNETTES

CBT1. CBT Rationale
We will work to change thoughts and behaviors that are feeding the negative feelings you've been experiencing. For example, if you feel depressed, you will likely have many negative thoughts, possibly about yourself or others, or about your life in general. Also, when you're depressed, you're more likely to act in ways that feed your negative thoughts and sadness. These behaviors may include withdrawing socially, avoiding tasks, and poor self-care. In therapy, you will learn skills to change unhelpful thought and behavior patterns, which will help you feel better emotionally.

CBT2. Negative Automatic Thoughts: How to Identify A
When depressed, people frequently overlook their negative thoughts or cognitions, and assume what they are thinking is truth or reality. In therapy, we work to question the reality created by depressive thoughts. The first step in doing this is learning to catch or identify automatic thoughts. Automatic thoughts are thoughts that pop into our heads, and most of the time, they happen automatically and outside of our awareness. We are usually more aware of the emotions these thoughts make us feel, such as sad or depressed, and we do not question what we are thinking. But often, the thoughts we are having are distorting reality in some way. Before we can even start questioning our thoughts, we have to slow down our thoughts and know what may be fueling our sadness. One way to do this is to systematically write down moments we feel a negative emotion, and identify what thoughts we were having during those moments.

CBT3. Negative Automatic Thoughts: How to Identify B
As you get better at identifying your automatic thoughts, you will see that these negative thoughts that flood your mind can fuel your sadness and depression. These thoughts can keep you feeling lethargic and inadequate. Finding ways to notice and evaluate the accuracy of your negative thoughts are key to feeling better.

CBT4. Negative Automatic Thoughts: How to Identify C
When we look at your thoughts, sometimes they are true, not true, or have a grain of truth. We will teach you how to evaluate the accuracy of your thoughts by looking at the evidence. What evidence is there that the thought is true? What evidence is there that the thought is not true?

CBT5. Negative Automatic Thoughts: Tracking A
Because your automatic thoughts are so quick, they are hard to notice or remember, we want to practice identifying them by writing them down on what we call a *Thought Record.* We usually notice how we're feeling before we notice what we're thinking. I want you to notice moments when you feel a negative emotion and write down on the Thought Record what the situation was, what emotions you were feeling, and then what thoughts you had when the event or situation happened.

CBT6. Negative Automatic Thoughts: Tracking B
It is crucial to write down your automatic thoughts. Writing them down forces you to look at them more objectively. It also helps you see if there are any patterns or mistakes in your thoughts.

CBT7. Negative Automatic Thoughts: Cognitive Distortions
There are many common mistakes, or "cognitive distortions," people make in their thinking. By figuring out what cognitive distortions you may be having, you can respond to situations in a more healthy way. One cognitive distortion is called "all or nothing thinking," where you see things in very black and white terms. For example, if you were feeling depressed and unable to finish your homework, you might think that you are a failure and will be a failure forever.

CBT8. Behavioral Experiments: Rationale
Earlier we talked about finding evidence for your automatic thoughts. Doing a "behavioral experiment" is one way to collect and examine the evidence. To do this, you may act out your automatic thought to see if what you predict happens. For example, say you think you will feel worse if you get out of bed and take a shower because you feel so sad. You can test that out by getting out of bed and showering when you feel depressed and want to lay in bed. We can then see if you do indeed feel worse as your automatic thought predicts you will.

CBT9. Behavioral Experiments: Hypothesis Testing A
When we do behavioral experiments, we will create hypotheses to test. In "hypothesis testing," we challenge unhelpful behaviors and thoughts by testing out alternative ways of responding. We do this by developing a behavioral experiment to test if your new way of thinking or new behavior makes you feel better than your current thoughts and behaviors. We then "collect data" as you run the experiment. For example, you know that avoiding your email is unhelpful for your depression. You have the hypothesis that checking your email will only worsen your mood and depression. You can then test out this hypothesis by checking your email at a specific time, and rating your mood before and after you checked your email. Once you've collected the data, we will evaluate the benefits of challenging your avoidance.

CBT10. Behavioral Experiments: Hypothesis Testing B
Doing these behavioral experiments is difficult and can bring up many emotions. To help better understand how intensely you are feeling these emotions, we will teach you to use a rating scale called the subjective units of distress scale (SUDS). Using the SUDS, your emotions will range in intensity from 0 (not noticeable) to 100 (the highest extreme). The SUDS will help you communicate what you are feeling more accurately and in an understandable way to both of us. As you become more skilled at using the SUDS, you will feel clearer about your feelings and more able to make decisions about what you would like to try to do in therapy.

PST1. Toolkit #1: Planful Problem Solving A
Effectively managing stressful life problems requires a planful approach. The set of skills required to do this require both learning and practice and include four planful problem-solving skills. We teach you these skills and help you practice them in your everyday life by completing PST planful problem-solving worksheets. The four skills are *problem definition, generating alternatives, decision-making, and solution implementation and verification.*

PST2. Toolkit #1: Planful Problem Solving B
One skill that may help you is called *problem definition,* or the clarifying the nature of a problem. You will learn how to set a realistic problem-solving goal and identify the obstacles that are currently preventing you from reaching that goal. For example, if you want to get a promotion, we will figure out a realistic promotion that you can achieve and identify the very real obstacles that are currently preventing you from reaching that.

PST3. Toolkit #1: Planful Problem Solving C
One skill that may help you is the *generation of alternatives,* in which we teach you to use your creative skills to brainstorm different types of solutions. You will come up with as many solutions as you can. Not all will be the best solution, but it helps you think of alternatives. For example, if you are struggling to talk to your family about cleaning up after themselves, you can use the brainstorming tool to discover that there are many ways to get closer to your goal and get past the obstacles in your way.

PST4. Toolkit #1: Planful Problem Solving D
Using the skill of *decision making,* you will learn how to look at the likely consequences of different solution ideas. After looking at these consequences, you will learn how to develop an action plan that is geared toward achieving the problem-solving goal. For example, if you want to get a promotion, you can develop an action plan that represents the best solution match for you.

PST5. Toolkit #1: Planful Problem Solving E
One skill that may help you is called *solution implementation and verification.* This skill involves carrying out the action plan, monitoring and evaluating the consequences of the plan, and determining whether one's problem-solving efforts have been successful. For example, if you are struggling to talk to your family about cleaning up after themselves, once you have figured out the best solution, you can carry it out, see what happens, and evaluate if the outcome is what you wanted.

PST6. Toolkit #2: Problem-Solving Multitasking Toolkit: Overcoming Brain Overload A
Through "externalization" you will experience how writing things down, recording messages for yourself on your iPhone, or talking through a difficult problem helps you to be less overwhelmed. Try getting the brain overload you are experiencing with a difficult problem "out of your head" and onto paper, and you may notice that the thinking part of your brain can better understand and begin to organize this challenging problem or goal. For example, trying to talk someone about your struggles may be really hard. Let's write

down all of the thoughts, feelings, and concerns that are contributing to your experience of being overwhelmed as a way to begin to organize all of this information.

PST7. Toolkit #2: Problem-Solving Multitasking Toolkit: Overcoming Brain Overload B

Through visualization, you learn to use visual imagery to help understand and clarify a current problem or goal. One way is to try picturing the problem in your imagination to help you better define it. You can also use visualization to rehearse how you'll carry out a solution or action plan that you have developed. Finally, you can use visualization to help calm you when you experience strong emotions associated with stress.

PST8. Toolkit #2: Problem-Solving Multitasking Toolkit: Overcoming Brain Overload C

We teach you the use of "simplification" to break down a large or complex problem to make it more manageable. You will learn how to break down these big problems into smaller steps. For example, consider how you would begin to break down a complex situation like getting a job into smaller pieces to accomplish one at a time.

PST9. Toolkit #3: Enhancing Motivation for Action: Overcoming Reduced Motivation and Feelings of Hopelessness

When facing a stressful problem or daunting goal, it can be hard to believe that there are ways to effectively manage the stress, reach a goal, or solve the problem. One tool that can help uses visualization in a special way to give you a glimpse of the future. Try imagining what it would be like at a moment in time in the future when a stressful problem you are facing is largely resolved and the obstacles overcome, such as making a change in your plan for a career. This won't immediately solve the problem but will give you an experience of what it would feel like to reach your goal and experience a "light at the end of the tunnel." We all need a picture in our head of what we are working toward. We will continue to practice doing this together.

PST10. Toolkit # 4: Stop and Slow Down: Overcoming Emotional Dysregulation

This important toolkit is referred to as the "SSTA" method.

In SSTA, the first S = Stop (and be aware of what you are experiencing).

The second S = Slow down and take a moment to "turn down the volume of strong emotions." You can take a few deep breaths, or use other techniques, so you can still listen to your feelings which give you important information, but allow your brain to keep working.

Ultimately, you will need to think carefully and planfully about an action plan that gives you the best chance of reaching your goals or solving a problem. Only after reducing intense emotional arousal and "turning down the volume," can you planfully and carefully.

Finally, T = Think, and A = Act.

APPENDIX B: CODEBOOK

Internally-focused therapy techniques:

Emotion-focused

Thought-focused

Externally-focused therapy techniques

Behavior-focused

Problem-focused

APPENDIX C: RATINGS OF VIGNETTES

Vignette #	PST Vignette	Rating	CBT Vignette	Rating
1	Effectively managing stressful life problems requires a planful approach. The set of skills required to do this require both learning and practice and include four planful problem-solving skills. We teach you these skills and help you practice them in your everyday life by completing PST planful problem-solving worksheets. The four skills are *problem definition, generating alternatives, decision-making, and solution implementation and verification.*	EF[a]	We will work to change thoughts and behaviors that are feeding the negative feelings you've been experiencing. For example, if you feel depressed, you will likely have many negative thoughts, possibly about yourself or others, or about your life in general. Also, when you're depressed, you're more likely to act in ways that feed your negative thoughts and sadness. These behaviors may include withdrawing socially, avoiding tasks, and poor self-care. In therapy, you will learn skills to change unhelpful thought and behavior patterns, which will help you feel better emotionally.	IF[b]
2	One skill that may help you is called *problem definition,* or the clarifying the nature of a problem. You will learn how to set a realistic problem-solving goal and identify the obstacles that are currently preventing you from reaching that goal. For example, if you want to get a promotion, we will figure out a realistic promotion that you can achieve and identify the very real obstacles that are currently preventing you from reaching that.	EF[a]	When depressed, people frequently overlook their negative thoughts or cognitions, and assume what they are thinking is truth or reality. In therapy, we work to question the reality created by depressive thoughts. The first step in doing this is learning to catch or identify automatic thoughts. Automatic thoughts are thoughts that pop into our heads, and most of the time, they happen automatically and outside of our awareness. We are usually more aware of the emotions these thoughts make us feel, such as sad or depressed, and we do not question what we are thinking. But often, the thoughts we are having are distorting reality in some way. Before we can even start questioning our thoughts, we have to slow down our thoughts and know what may be fueling our sadness. One	IF[b]

			way to do this is to systematically write down moments we feel a negative emotion, and identify what thoughts we were having during those moments.	
3	One skill that may help you is the *generation of alternatives,* in which we teach you to use your creative skills to brainstorm different types of solutions. You will come up with as many solutions as you can. Not all will be the best solution, but it helps you think of alternatives. For example, if you are struggling to talk to your family about cleaning up after themselves, you can use the brainstorming tool to discover that there are many ways to get closer to your goal and get past the obstacles in your way.	EF[a]	As you get better at identifying your automatic thoughts, you will see that these negative thoughts that flood your mind can fuel your sadness and depression. These thoughts can keep you feeling lethargic and inadequate. Finding ways to notice and evaluate the accuracy of your negative thoughts are key to feeling better.	IF[b]
4	Using the skill of *decision making*, you will learn how to look at the likely consequences of different solution ideas. After looking at these consequences, you will learn how to develop an action plan that is geared toward achieving the problem-solving goal. For example, if you want to get a promotion, you can develop an action plan that represents the best solution match for you.	EF[a]	When we look at your thoughts, sometimes they are true, not true, or have a grain of truth. We will teach you how to evaluate the accuracy of your thoughts by looking at the evidence. What evidence is there that the thought is true? What evidence is there that the thought is not true?	IF[b]
5	One skill that may help you is called *solution implementation and verification.* This skill involves carrying out the action plan, monitoring and evaluating the consequences of the plan, and determining whether one's	EF[a]	Because your automatic thoughts are so quick, they are hard to notice or remember, we want to practice identifying them by writing them down on what we call a *Thought Record.* We usually notice how we're feeling before we notice what	IF[b]

	problem-solving efforts have been successful. For example, if you are struggling to talk to your family about cleaning up after themselves, once you have figured out the best solution, you can carry it out, see what happens, and evaluate if the outcome is what you wanted.		we're thinking. I want you to notice moments when you feel a negative emotion and write down on the Thought Record what the situation was, what emotions you were feeling, and then what thoughts you had when the event or situation happened.	
6	Through "externalization" you will experience how writing things down, recording messages for yourself on your iPhone, or talking through a difficult problem helps you to be less overwhelmed. Try getting the brain overload you are experiencing with a difficult problem "out of your head" and onto paper, and you may notice that the thinking part of your brain can better understand and begin to organize this challenging problem or goal. For example, trying to talk someone about your struggles may be really hard. Let's write down all of the thoughts, feelings, and concerns that are contributing to your experience of being overwhelmed as a way to begin to organize all of this information.	EF[a]	It is crucial to write down your automatic thoughts. Writing them down forces you to look at them more objectively. It also helps you see if there are any patterns or mistakes in your thoughts.	IF[b]
7	Through visualization, you learn to use visual imagery to help understand and clarify a current problem or goal. One way is to try picturing the problem in your imagination to help you better define it. You can also use visualization to rehearse how you'll carry out	IF[b]	There are many common mistakes, or "cognitive distortions," people make in their thinking. By figuring out what cognitive distortions you may be having, you can respond to situations in a more healthy way. One cognitive distortion is called "all or nothing thinking," where you see things in very black	IF[b]

	a solution or action plan that you have developed. Finally, you can use visualization to help calm you when you experience strong emotions associated with stress.		and white terms. For example, if you were feeling depressed and unable to finish your homework, you might think that you are a failure and will be a failure forever.	
8	We teach you the use of "simplification" to break down a large or complex problem to make it more manageable. You will learn how to break down these big problems into smaller steps. For example, consider how you would begin to break down a complex situation like getting a job into smaller pieces to accomplish one at a time.	EF[a]	Earlier we talked about finding evidence for your automatic thoughts. Doing a "behavioral experiment" is one way to collect and examine the evidence. To do this, you may act out your automatic thought to see if what you predict happens. For example, say you think you will feel worse if you get out of bed and take a shower because you feel so sad. You can test that out by getting out of bed and showering when you feel depressed and want to lay in bed. We can then see if you do indeed feel worse as your automatic thought predicts you will.	IF[b]
9	When facing a stressful problem or daunting goal, it can be hard to believe that there are ways to effectively manage the stress, reach a goal, or solve the problem. One tool that can help uses visualization in a special way to give you a glimpse of the future. Try imagining what it would be like at a moment in time in the future when a stressful problem you are facing is largely resolved and the obstacles overcome, such as making a change in your plan for a career. This won't immediately solve the problem but will give you an experience of what it would feel like to reach your goal and experience a "light at the end of the tunnel." We all need a picture in our head of what we are working toward. We will continue to practice doing	IF[b]	When we do behavioral experiments, we will create hypotheses to test. In "hypothesis testing," we challenge unhelpful behaviors and thoughts by testing out alternative ways of responding. We do this by developing a behavioral experiment to test if your new way of thinking or new behavior makes you feel better than your current thoughts and behaviors. We then "collect data" as you run the experiment. For example, you know that avoiding your email is unhelpful for your depression. You have the hypothesis that checking your email will only worsen your mood and depression. You can then test out this hypothesis by checking your email at a specific time, and rating your mood before and after you checked your email. Once you've collected the	EF[a]

	this together.		data, we will evaluate the benefits of challenging your avoidance.	
10	This important toolkit is referred to as the "SSTA" method. In SSTA, the first S = Stop (and be aware of what you are experiencing). The second S = Slow down and take a moment to "turn down the volume of strong emotions." You can take a few deep breaths, or use other techniques, so you can still listen to your feelings which give you important information, but allow your brain to keep working. Ultimately, you will need to think carefully and planfully about an action plan that gives you the best chance of reaching your goals or solving a problem. Only after reducing intense emotional arousal and "turning down the volume," can you planfully and carefully. Finally, T = Think, and A = Act.	EF[a]	Doing these behavioral experiments is difficult and can bring up many emotions. To help better understand how intensely you are feeling these emotions, we will teach you to use a rating scale called the subjective units of distress scale (SUDS). Using the SUDS, your emotions will range in intensity from 0 (not noticeable) to 100 (the highest extreme). The SUDS will help you communicate what you are feeling more accurately and in an understandable way to both of us. As you become more skilled at using the SUDS, you will feel clearer about your feelings and more able to make decisions about what you would like to try to do in therapy.	IF[b]

[a]Externally focused
[b]Internally focused

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