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The Effect of Employee Assistance Programs (EAPs) on Behavioral Healthcare Utilization: The Role of Race/Ethnicity

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The Effect of Employee Assistance Programs (EAPs) on Behavioral Healthcare Utilization: The Role of Race/Ethnicity

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Health Policy and Management

by

Courtney Nanette Coles

ABSTRACT OF THE DISSERTATION

The Effect of Employee Assistance Programs (EAPs) on Behavioral Healthcare Utilization: The Role of Race/Ethnicity

by

Courtney Nanette Coles

Doctor of Philosophy in Health Policy and Management

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Professor Susan Louise Ettner, Chair

Research Objective: Employee assistance programs (EAPs) are employer-sponsored interventions aimed at addressing a variety of issues that impact employee well-being and job performance. EAPs are designed to offer early intervention to mitigate problems experienced by employees and their spouses and dependents without requiring copayment. Despite the widespread offering of EAP services, there is little evidence in recent years describing the types of patients who utilize EAP services. It has been estimated that EAP services are benefits offered by tens of thousands of employers; however, estimates suggest only upwards of 6% of employees utilize these services. Researchers have urged that future research in the EAP field focus on identifying facilitators and barriers to EAP utilization and characteristics of EAP users. Compared to gender and age, race/ethnicity is a characteristic less commonly examined as a potential factor influencing EAP service use. This is likely because the study often lacks

race/ethnicity data. The differential use of EAP services by race/ethnicity reported in the literature suggests that there may be a group that potentially benefits from these services, but is not obtaining them – due to inaccessibility, unawareness or negative perceptions of these services. Therefore, it is important to characterize employees who underutilize EAP services when they have access with little to no financial obstacles to utilize these services.

Predictors of behavioral healthcare resource utilization are commonly studied; however, the receipt of EAP services has rarely been examined in recent years. A key research question yet to be answered is whether EAP services serve as a complement or a substitute for behavioral health services. Few studies have rigorously evaluated the effect of EAP use on subsequent behavioral healthcare utilization and the results are mixed. Further, the literature is inundated with evidence that there are lower rates of behavioral health treatment by minorities compared to Whites, and it is plausible that EAP services may serve as an entry point specifically for minorities who would not otherwise pursue behavioral health services. Understanding whether minorities have an alternative route to behavioral health treatment may be helpful in ameliorating behavioral health care disparities. In summary, the research objective of this dissertation was to evaluate if 1) race/ethnicity serves as a predictor of EAP service utilization, 2) individuals utilize EAP services as a complement or a substitute for behavioral health services and 3) whether that relationship differs by race/ethnicity.

Study Design: An individual-level retrospective, cross-sectional analysis. The unit of observation was the person-year.

Principal Findings: Among the sample of commercially-insured adults with access to both EAP services and behavioral health services through a managed behavioral health organization

(n=1,364,539 person-years), the EAP service utilization rate was 2%. Most minorities were found to have statistically significantly lower EAP service utilization relative to Whites, after controlling for other variables in the model. EAP services were utilized as complements – rather than substitutes – of traditional behavioral health services. When examining the results stratified by race/ethnicity, this association is seen by each racial/ethnic group.

Conclusions: The low EAP service utilization suggests stakeholders (e.g. employers, EAP vendors) should consider options to increase utilization. The study findings also suggest that, in a population of adults with employer-sponsored insurance, there are racial/ethnic differences in EAP service utilization. Due to the similar rates of behavioral health disorders relative to Whites, it is unclear why minorities would utilize these services less often. The finding that EAP services were utilized as complements suggests that access to the EAP may have encouraged more employees to seek outpatient behavioral health services as EAPs are typically promoted to employees in a way designed to have a destigmatizing effect. This was found to be true among all racial/ethnic groups.

Implications for Policy or Practice: A key challenge facing stakeholders is how to best encourage racial/ethnic minorities to utilize behavioral health services. Due to the overlapping nature of EAP services and behavioral health services, EAP services appear to be a valuable substitute for traditional behavioral health services.

This dissertation of Courtney Nanette Coles is approved.

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Chapter I. Introduction

Introduction

A key goal of any company is sustaining profitability and this can only be achieved by managing the organization's most important resources: its human capital (Attridge, 2005). The management of employees can be resource intensive due to employee healthcare costs and workplace performance costs. Employment and health are inextricably linked (R. K. McLellan, 2017). There is overwhelming evidence that anxiety, depression and substance abuse, for example, are associated with reduced productivity (Greenberg et al., 1999; Lerner et al., 2004; Lerner and Henke, 2008; Mangione et al., 1999). Estimates suggest that the effectiveness of a company's workforce is likely reduced by 5%-10% as a result of these employee health problems (Berger, Howell, Nicholson, and Sharda, 2003). Business leaders are becoming increasingly aware of the productivity-related cost burden of poor employee health manifested by employee absence and productivity losses.

Many organizations understand that helping an employee with a personal problem will not only improve the employee's ability to perform their job duties, but it is often less costly than replacing the employee (Willbanks, 1999). Therefore, employers have an incentive to provide resources to their employees to promote employee health and productivity. There are a variety of employer-sponsored interventions aimed at improving the health and productivity of their employees including employee assistance programs (EAPs), work-life programs, and wellness programs (Attridge, 2005). These programs can yield significant return on investment for the company while improving the lives of their employees.

Whereas work-life programs are aimed at improving work/life balance, EAPs are designed to offer early intervention to mitigate problems experienced by employees and their spouses and dependents free of charge (Attridge, 2012; Zarkin, Bray, and Qi, 2000). EAPs

initially arose in the 1940's out of a need to provide cost-effective options to identify and provide early intervention to rehabilitate employees who suffered from alcohol problems (Trice and Schonbrunn, 1981). EAPs were developed to mitigate the "revolving door" employment policy of repeatedly hiring and firing workers due to their alcohol abuse. The workplace provides a unique opportunity to provide support for adults with behavioral health issues as most are employed (Abuse, 2015; E. S. L. Merrick, Volpe-Vartanian, Horgan, and McCann, 2007).

EAPs have rapidly evolved since their inception and employers now offer a wide range of services that aim to address a variety of issues that may impact employee well-being and job performance (Attridge, 2012). This may include aid with legal issues, financial problems, coping with life events, and behavioral health issues (Smith and Davidson, 2015). A study conducted by Taranowski and colleagues (2013) found that the top three reasons for contacting EAP were 1) marital and/or family issues, 2) stress/anxiety and 3) depression (Taranowski and Mahieu, 2013). Although services offered vary by employers and there is no standardization of the services offered by EAPs, they tend to provide screenings, assessments, brief supportive counseling and, if needed, referrals to other services (Attridge et al., 2010; McCann et al., 2010a).

EAP services have been characterized as similar to those provided by an ambulance: "get to the patient quickly, stabilize his [or her] condition, and transfer to a longer-term facility for further evaluation and care if necessary" (Smith and Davidson, 2015). The maximum allowable number of EAP sessions typically ranges from 3 to 8 before the employee must transition to traditional behavioral health services where they may be subjected to pay a copayment (Chan, Neighbors, and Marlatt, 2004; Teich and Buck, 2003). Evidence suggests that these short-term services offered by EAPs are similar to traditional behavioral health services (Pompe, 2011; Sharar, 2009).

In recent years it has been estimated that EAP services are benefits offered by tens of thousands of employers to millions of employees across the globe (Attridge, 2012). A survey completed by Teich and Buck (2003) found that the size of an employer largely influenced whether an employer offered an EAP (Teich and Buck, 2003). Only about 10% of employers with fewer than 50 employees offered an EAP, whereas more than 90% of employers with more than 20,000 employees offered an EAP to their employees (Teich and Buck, 2003). Most recent estimates suggest more than three fourths of employers (78%) in the United States offer EAP services to their employees (SHRM, 2018). Despite EAP services being offered widely, estimates suggest only upwards of 6% of employees utilize these services (Taranowski and Mahieu, 2013).

The evidence suggests there is value in offering EAPs (Clavelle, Dickerson, and Murphy, 2012). Specifically, studies have shown that EAPs are associated with improved productivity, reduced medical costs, and improved health outcomes across employers in the United States since their inception (Attridge et al., 2010; Greenwood, DeWeese, and Inscoe, 2006; Hargrave and Hiatt, 2005; Hargrave, Hiatt, Alexander, and Shaffer, 2008; Jacobson, Jones, and Bowers, 2011). For example, Clavelle and colleagues (2012) found that Department of Defense employees who used EAP services reported less distress and better functioning at work (Clavelle et al., 2012). Similarly, Richmond and colleagues (2016) recently demonstrated that the reduced symptoms of depression and anxiety among government employees who utilized EAP services were associated with improvements in absenteeism and presenteeism (Richmond, Pampel, Wood, and Nunes, 2016).

It is understood that various components of EAPs are associated with increased EAP utilization. This includes the existence of a written EAP policy for employees, marketing

strategies and adequate staffing of EAPs (Carchietta, 2015; Weiss, 2003). Yet, there are only limited recent data on the role of patient characteristics, such as race/ethnicity, in EAP service use. Researchers have urged that future research in the EAP field focus on identifying facilitators and barriers to EAP utilization and characteristics of EAP users (E. S. L. Merrick et al., 2007; Teich and Buck, 2003). Understanding the role of race/ethnicity in EAP use could allow key stakeholders – such as EAP service providers and employers – to increase the number of minorities who receive necessary behavioral health care. Differential use of EAP services by race/ethnicity may suggest there is a group that would potentially benefits from these services, but is not accessing them – due to inaccessibility, unawareness or negative perceptions of these services.

Another key research question that has yet to be answered is whether EAP services serve as a complement or a substitute for behavioral health services. The studies that have explored this concept are relatively older, often only consist of data from one or a few health plans and their results have been mixed (Hodgkin, Merrick, Hiatt, Horgan, and McGuire, 2010; E. L. Merrick et al., 2010; Zarkin et al., 2000). Merrick and colleagues (2011) found that, in 2004, individuals in an integrated health plan – including both traditional behavioral health services and EAP services – used more outpatient mental health and substance abuse treatment than those who only had access to behavioral health treatment (E. L. Merrick et al., 2010). Conversely, Hodgkin and colleagues (2010) found that, in 2005, individuals used EAP services as a substitute for behavioral health treatment (Hodgkin et al., 2010). Due to the lack of contemporary data, it will be important to update the literature as recent changes in the EAP marketplace – increased commoditization of EAP services, strong competition between EAP providers, and the capitated

pricing model adopted by many EAP service providers – have resulted in significant changes in EAPs in recent years (Sandys, 2015).

Further, psychiatric epidemiological studies have consistently demonstrated that most individuals with a behavioral health problem are either untreated or undertreated (Kessler, Demler, et al., 2005; Wang et al., 2005). Recent data suggest that despite this documented unmet need and current treatment guidelines outlining the benefits of behavioral health treatment, fewer than 10 percent of adults with co-occurring disorders receive treatment for both disorders, and fewer than 50 percent receive treatment for just one disorder (Han, Compton, Blanco, and Colpe, 2017). Thus, this dissertation explored whether EAP services serve as an important avenue for individuals' behavioral health problem to be identified and treated.

Additionally, there is a need for research that examines the potential differential impact of EAP use on behavioral health service use patterns for various racial/ethnic groups. Evidence suggests that minorities, particularly Blacks, often fail to initiate outpatient mental health treatment and are at a high risk of dropping out of treatment (Interian, Lewis-Fernández, and Dixon, 2013; L. R. Snowden, 2001). In addition to access and financial barriers, beliefs about mental health treatment and perceived stigma associated with obtaining behavioral healthcare contribute to racial/ethnic disparities (L. R. Snowden, 2001; L. R. Snowden, Catalano, and Shumway, 2009; L. R. Snowden and Yamada, 2005). As minorities are less likely to initiate and maintain behavioral health treatment, this dissertation aimed to elucidate a potential alternative route for minorities to obtain behavioral health treatment (i.e. via EAP service use), which could be helpful in ameliorating behavioral health disparities. To my knowledge, there has not been a study that examined behavioral health service use patterns associated with EAP service use among different racial/ethnic groups.

Although there is a widespread belief that EAPs are beneficial for both employers and employees, researchers have concluded that "while promising, the scientific evidence thus far in this area has methodological limitations and there are critical aspects that require further study" (Attridge, 2005). Extensive evaluations of EAPs were prominent in the 1980s and 1990s; however, there have been relatively few updates to the literature since then (Colantonio, 1989; Csiernik, 2005). Much of the research utilizes data that were collected 10 years ago and limited to a single employer or EAP (E. S. L. Merrick et al., 2007). Further, a recent study evaluating the evolution of EAPs in the US over the past two decades (1993-2012) found that the EAP market has changed significantly over time, so there is limited evidence that reflects EAPs in this current landscape (Sandys, 2015).

Research Questions and Hypotheses

Using data from a national commercial behavioral health organization, this dissertation specifically sought to provide insight into the role of race/ethnicity in the use of EAP and the relationship between EAP use and behavioral health care use. The research questions and hypotheses explored in this dissertation are as follows:

- How are race/ethnicity associated with EAP use, all else equal?
    - **Hypothesis A-1**: Whites will be more likely to utilize EAP services compared to minorities, after controlling for other variables in the model.
    - **Competing hypothesis:** Minorities will be more likely to utilize EAP services compared to Whites, after controlling for other variables in the model.
    - **Rationale:** Minorities may face more obstacles than Whites, such as perceived stigma, in obtaining EAP services. However, this effect could be (more than) offset if minorities are simultaneously more likely than Whites to view EAP services as one of their primary avenues for receiving behavioral health treatment.
- Do EAP services serve as a complement or a substitute for behavioral health services after controlling for other variables in the model?
    - **Hypothesis B-1**: EAP service use will serve as a complement to behavioral health services, after controlling for other variables in the model.
    - **Competing hypothesis:** EAP service use will serve as a substitute to behavioral health services, after controlling for other variables in the model.
    - **Rationale:** One role of EAP providers is to identify individuals with problems requiring behavioral health treatment outside of the EAP and referring such individuals to the behavioral health sector. Thus, use of EAP services could

increase use of behavioral health services. However, this effect may be (more than) offset if individuals utilizing EAP services deem behavioral health services to be unnecessary because they perceive that they have already received sufficient treatment during their EAP sessions.

- To what extent is the relationship between EAP service use and behavioral health services use (BHS) moderated by race/ethnicity?
    - If EAP and BHS are complements:
        - **Hypothesis C-1:** Assuming EAP services serve as a complement to behavioral health services, the increase in behavioral health treatment among individuals who obtained EAP services will be higher among Whites compared to minorities, after controlling for other variables in the model. **Rationale:** Whites may be more receptive to having their problems identified through an EAP and being referred to behavioral health treatment, resulting in greater EAP service use and subsequent behavioral health service use.
        - **Competing hypothesis:** Assuming EAP services serve as a complement to behavioral health services, the increase in behavioral health treatment among individuals who obtained EAP services will be higher among minorities compared to Whites, after controlling for other variables in the model. **Rationale:** Minorities would respond more favorably to having their problems identified through an EAP and being referred to behavioral health treatment, resulting in greater EAP service use and subsequent behavioral health service use.

- If EAP and BHS are substitutes:
    - **Hypothesis C-1:** Assuming EAP services serve as a substitute to behavioral health services, the decrease in behavioral health treatment among individuals who obtained EAP services will be higher among minorities compared to Whites, after controlling for other variables in the model. **Rationale:** Minorities who initiate care through an EAP will be less likely to continue receiving care through behavioral health services due to the perceived stigma associated with traditional behavioral health services.
    - **Competing hypothesis:** Assuming EAP services serve as a substitute to behavioral health services, the decrease in behavioral health treatment among individuals who obtained EAP services will be higher among Whites compared to minorities, after controlling for other variables in the model. **Rationale:** Whites who initiate care through an EAP will be less likely to continue receiving care through behavioral health services because they may deem them as unnecessary because they perceive that they have received sufficient treatment during their EAP sessions.

Brief Description of Data Source and Methodology

The data utilized in this dissertation and the methodology employed offer an opportunity to answer the three research questions of interest. This dissertation utilized data from 2011-2014 provided by the behavioral health division of Optum®, United Health Group. As one of the

largest managed behavioral health organizations, Optum Behavioral covers behavioral health accounts for small and large employers with more than sixty million members distributed across all U.S. states and territories. The size and richness of the current dataset allow for the evaluation of contemporary utilization of EAP services and behavioral health services.

As noted, previous research often does not include race/ethnicity as a predictor of EAP service use. This is generally due to the type of data utilized in the analyses (i.e. administrative claims data). A unique characteristic of the dataset utilized for this dissertation was the linkage of administrative claims data to consumer marketing data (e.g. information from credit card applications) from Optum Insight. The consumer marketing data provided categorical data on enrollee education, income/net worth, and race/ethnicity/language. The inclusion of race/ethnicity/language allowed for the evaluation of the role of race/ethnicity in EAP service and behavioral health service use – a key area of research yet to be explored extensively.

In addition to the strengths of the dataset, the methodology employed in this dissertation to address the methodological concern of endogeneity bias is a notable contribution of this dissertation. For the first research question, the potential endogenous relationship between the outcome, EAP service use, and one of the regressors, behavioral health services use was a key concern. As the causal effect of behavioral health services use on EAP use was not one of the study hypotheses, a reduced-form model, rather than structural-equation model, was therefore estimated to avoid the issue of endogeneity bias. Further, EAP service use shares a commonality with most health services data – it is a limited-dependent variable with a skewed conditional distribution. A two-part model was executed to attempt to address this issue.

To answer the second and third research question, endogeneity bias was also a key concern. In contrast to the first question, where the structural effect (the causal effect of

behavioral health services use on EAP use) was not a parameter of interest, for the second and third questions, the structural effects (the causal effect of EAP use on behavioral health services use) is. Available literature that evaluated the relationship between EAP service use and behavioral health service use rarely adequately mitigate the concern of endogeneity bias in a way that allows for the conclusions of causality. In this dissertation, an instrumental variable analysis was employed. This was chosen instead of a reduced-form model, due to the key interest in the relationship between EAP service use and behavioral health service use. For the third research question, the same methodology outlined for the second research question was employed; however, the analysis stratified the data by racial/ethnic group in order to evaluate the potential moderating effect of race/ethnicity.

Chapter II. Background and Significance

Background and Significance

This chapter provides an overview of Employee Assistance Programs (EAPs), a background of each of the research questions and a summary of the significance of this dissertation.

Employee Assistance Programs (EAPs)

The Business Case for EAPs

As the economic landscape continues to be increasingly competitive, employers are under pressure to be successful. Businesses must focus on delivering the best product or service in the marketplace, but also must foster a healthy and productive workforce. For organizations to succeed in today's economy, finding and retaining the best employees means employers are becoming an increasing fundamental component of our health care system (Langlieb, Kahn, and Medicine, 2005).

Mental health and substance abuse disorders are among the most common and costly issues affecting the workplace and yet they are profoundly undertreated. Based on data from national epidemiologic surveys, about 30% of individuals aged 18-54 years of age in the United States were estimated to have a mental disorder that met the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, 4th. Edition* (DSM-IV); however, nearly two-thirds of them reported not receiving any treatment for their disorder (Kessler, Chiu, Demler, and Walters, 2005; Kessler, Demler, et al., 2005).

Data from the National Survey on Drug Use and Health (NSDUH) suggests that disorder rates are lower among those who are employed. For example, estimates suggest that, among those employed full-time or part-time, the rate of Major Depressive Disorder (MDD) in 2010

was 5.5% and 7.0%, respectively (Greenberg, Fournier, Sisitsky, Pike, and Kessler, 2015). Although still low, the treatment rate was estimated to be 52% and 50% for those employed full-time and part-time, respectively (Greenberg et al., 2015). This suggests there is a significant need for programs and interventions that focus on improving the mental health of employees, such as EAPs and behavioral health services.

Mental disorders, namely anxiety and depression, are an increasingly large component of total healthcare costs in the United States (Roehrig, 2016). In addition to medical care costs associated with behavioral and mental health problems, employees can also have health consequences that meet certain disability criteria that make them eligible for paid benefits in the form of short- and long-term disability (Cornelius, Van der Klink, Groothoff, and Brouwer, 2011; Dewa, Goering, Lin, and Paterson, 2002; Kessler et al., 1999). During the disability period, the employer typically pays a percentage of the employee's normal level of compensation.

Employers must also consider the costs associated with the substantive, but often unmeasured costs of unscheduled pattern of unexcused employee absences, or absenteeism. An employee's absence impacts the cost of doing business as it means the employee is not producing what their job requires and the employer often must use inexperienced or inefficient replacement workers (Pauly et al., 2002). This may also negatively affect the performance of their fellow employees. Absenteeism, as it relates to employee behavioral health problems, continues to be cited as a substantial contributor to lost productivity in the workplace (Dash, 2000). An estimated $5 billion are said to be lost yearly to employee absence specifically due to psychiatric disorders (Hargrave et al., 2008).

A less apparent cost to employers is presenteeism, or impaired functioning at work due to mental or physical symptoms (Hemp, 2004). Health and personal or work-life problems may inhibit or hinder an employee's ability to perform at normal levels of high productivity. Although medical costs are typically of utmost concern to employers, recent evidence suggest that direct medical costs only account for a minority of the total health and productivity-related costs experienced by organizations (Goetzel et al., 2004). Stewart and colleagues (2003) concluded that employed individuals with depression had nearly 4 times more health-related lost productive time than their non-depressed individuals (5.6 hours per week vs 1.5 hours per week), resulting in an excess of $31 billion annually (Stewart, Ricci, Chee, Hahn, and Morganstein, 2003).

In addition to the costs of absenteeism and presenteeism are losses from worker turnover. After accounting for the expenses of recruiting and training, replacing a current employee is costly (Tracey and Hinkin, 2008). Waldman and colleagues (2004) found that turnover costs at a major medical center represented an expenditure of about 5% of the annual operating budget (Waldman, Kelly, Aurora, and Smith, 2004).

In the resource-scarce environment in which most businesses operate, it is essential to profitability that the primary factors contributing to reduced employee productivity are ameliorated (Foster and Vaughan, 2005). Employers must face the challenge of balancing often diminishing resources and the increasingly complex personal interactions employees face both at home and at work. This supports the offering of employer-sponsored programs to improve employee productivity.

EAP Core Technology

Employee Assistance Programs (EAPs) are employer-sponsored programs designed to alleviate and assist in eliminating a variety of workplace problems and serve as a prophylactic that businesses around the world deploy to improve the productivity of their employees (Foster and Vaughan, 2005). The foundation of EAPs is an awareness, assessment and treatment of an employee's personal problems on job performance. EAPs offer employees and their family members the emotional and practical support necessary to mediate factors that may hinder employee work performance free of charge. That is, receipt of EAP services does not require a copayment or co-insurance – dissimilar to traditional behavioral health services.

EAPs initially arose in the 1940's out of a need to provide cost-effective options to identify and provide early intervention to rehabilitate employees who suffered from alcohol problems (Trice and Schonbrunn, 1981). EAPs were developed to mitigate the "revolving door" employment policy of repeatedly hiring and firing workers due to their alcohol abuse. Early EAPs primarily focused on mitigating employees' alcohol issues by providing outreach to identify and treat alcohol-related problems (Attridge, 2005). Employers found that the workplace offers a unique opportunity for the identification and referral for adults with substance use problems as most are employed (E. S. L. Merrick et al., 2007; P. M. Roman and Blum, 2002). For example, an estimated 66% of current illicit drug users, 74% of heavy alcohol drinkers, aged 18 or older in 2011, were employed either full or part time. (Abuse, 2011).

Although EAPs share commonalities with other programs that provide mental health and additional counseling, the aim is that EAP practitioners are guided by specific EAP core technology to specifically enhance employee work performance (Sharar, 2009). Roman and Blum (1985) conceptualized the core technology of EAPs to define the distinguishing

characteristics of delivering EAP services (P. M. Roman and Blum, 1985). The seven components of EAP core technology are as follows: 1) identification of employees' behavioral problems (e.g. tardiness, absence, productivity, work relationships, safety), 2) evaluation of employee's success with EAP service use based on improvement in job performance issues, 3) expert consultation provided to supervisors and managers on EAP policies and procedures, 4) availability and appropriate use of techniques to constructively confront employees with alcohol or substance abuse problems to encourage treatment, 5) creation and maintenance of micro-linkages with counseling and treatment, 6) creation and maintenance of macro-linkages with community resources, and 7) focus on employees' alcohol and other substance abuse problems (P. Roman and Blum, 1988; P. J. E. A. Roman, 1990; P. M. Roman and Blum, 1985).

Evolution of EAPs

Although EAPs began with the intention to deal primarily with an employee's alcohol and drug problems, employers began to realize the plethora of issues that employees face that can impact their absenteeism, presenteeism and their probability of requiring short-term disability leave. Employers recognized that it made more sense, both economically and socially, to rehabilitate proven and trained employees than to terminate them. This has led to the expansion of EAP services offered.

As EAPs have evolved, there have been growing concerns about the broadening scope of services EAPs provide. In fact, few EAPs organizations offer traditional EAPs based on the core technology as their only product (Attridge, Cahill, Granberry, and Herlihy, 2013). For example, EAPs have been integrated with wellness and work/life services to provide a more holistic approach as employers recognize the broad range of issues that may impact an employee's performance (Bergh, 2000; Sandys, 2015). Other services offered by EAPs are consultative and educational services related to legal and financial issues that affect employees (Attridge, 2005). Many EAPs also provide services to support employees with workplace-related issues, such as issues with their management or work team (Attridge, 2005). Despite the broadened scope of services offered, the unifying role of an EAP professional is to identify and resolve issues that may affect a worker's job performance whether those issues are realized in the form of emotional issues, substance abuse, family issues, marital issues, for examples (Attridge, 2005).

Due to the expansion of EAP services offered, the landscape of the EAP marketplace continues to evolve and organizations have considerable amount of discretion as it relates to their enrollee benefit plan designs and its features (Fronstin and Werntz, 2004). This includes which employees are eligible to receive EAP services, the EAP service delivery method and how many

EAP visits are allowed (McCann et al., 2010b). The selection of EAP services provided to employees are typically chosen by the employer based on the organization's perceived need, the vendor's recommendation and the cost of the service package (Taranowski and Mahieu, 2013). This has led to the large differentiation in the level of workplace support, the degree of EAP integration and the range of services provided.

Further, due to the growth of the EAP field, it has become challenging for employers and the business consultants who advise them to determine what is the right kind of EAP program, how to confidently select the right provider of EAP services, and how to best implement an EAP program so it is effective and delivers value to the organization. A continual discussion in the EAP field is the limited consistency in definition or implementation of an EAP despite multiple attempts at operationally defining an EAP (Pompe, 2011). There are now a variety of resources that can support EAP purchasers and program managers in making these kinds of decisions. As an example, a recent article developed by Attridge (2010) compiled five employer guides for EAP and other guides for related topics of behavioral health, mental health, and substance abuse and misuse (Attridge et al., 2010).

EAP Accreditation

The Certified Employee Assistance Professional (CEAP) designation is a national credential administered by the Employee Assistance Certification Commission (Taranowski and Mahieu, 2013). The accreditation process for EAPs was designed to ensure that providers meet the minimum qualifications and have obtained the necessary basic knowledge of the workplace to provide high-quality service. The accreditation process provided includes a comprehensive self-study program followed by an on-site review conducted by trained and experienced EAP peer reviewers. Specifically, to qualify for the voluntary credential, the candidate must pass an exam and show previous work experience in employee assistance. The credentialing test measures familiarity with various employee benefit issues, laws such as the Family Medical Leave Act (FMLA), as well as behavioral health knowledge relevant to practice within the workplace.

All EAP professionals are licensed in the states in which they treat patients. They are often independent contractors in their own private practices who have been recruited by the EAP vendor to provide treatment or assessment. Typically EAP professional networks consist of individuals from different professions, such as clinical professional counselors, clinical social workers, substance abuse specialists, occupational nurses, or psychologists (Attridge et al., 2009). Recent surveys suggest that about 80% of the affiliates hold master's degrees and 20% doctorates (Sharar, 2009; Taranowski and Mahieu, 2013). This may support the notion that master's-trained clinicians are seen as a more cost-effective option to offering EAP services relative to doctoral-level clinicians (Sharar, 2009).

Unfortunately, there is little in the training of psychotherapists or in state licensure itself that guarantees that counselors have familiarity with workplace issues necessary for employee

assistance practice. Among a survey of EAP professionals, 76% characterized themselves as "general practitioners" in counseling or psychotherapy as opposed to "EAP professionals" (Sharar, 2009). Further, among two-thirds of the EAP vendor organizations surveyed, less than 10% average of CEAPs contracted as EAP professionals (Taranowski and Mahieu, 2013). The CEAP designation can also be applied to provider companies. In 2010, it was estimated that, among a sample of 26 medium- and large-sized external EAP vendors across the United States, only 50% were accredited (Taranowski and Mahieu, 2013).

Duplication of EAP Services and Behavioral Health Services

The top issues for which employees and their family members were seen at an EAP were (in order of frequency): marital/family issues, stress/anxiety and depression (Taranowski and Mahieu, 2013). Evidence suggests that EAP services have become duplicative with traditional behavioral health services. In other words, the boundaries between treatment via an EAP and outpatient behavioral health treatment are blurred. From an employer perspective, this suggests that they may be paying double for what amounts to an identical service. From the perspective of employees and their family members, they have the opportunity to obtain support for a variety of issues for free of charge prior to utilizing their mental healthcare benefits.

As noted in the previous section, EAP services are provided through contractual networks of EAP professionals, namely licensed social workers, counselors, psychologists and marriage or family therapists. Due to the organization of EAP vendors and provider networks, EAP professionals provide EAP services on behalf of EAP vendors in a variety of settings including private practices and mental health clinics. A recent survey of EAP professionals found that only a small minority of their clients were referred from an EAP (Sharar, 2009). Due to the relatively small proportion of certified EAP providers, it is no surprise that nearly two-thirds (63%) of EAP professionals surveyed reported they had little or no familiarity with the core technology outlined by Roman and Blum to guide EAP treatment (Sharar, 2009). Further, when asked if EAP clients were treated the same or differently from other (non-EAP) clients, 74% indicated that EAP clients were, for the most part, treated essentially the same as non-EAP clients (Sharar, 2009).

This suggests there is not much contrast between EAP work and general practice counseling or psychotherapy, with some exceptions related to the structure of billing and reimbursement and benefit design. The notable differences outlined by EAP professionals

between EAP clients and non-EAP clients were centered on the number of sessions available in EAP and the time-sensitive nature of the short-term EAP counseling (Sharar, 2009). The EAP limit amount typically ranges from 3-8 visits (Chan et al., 2004; Teich and Buck, 2003)) and they are not counted towards the employee's insurance-benefit limits. The respondents noted that a key consideration was how to combine various funding options (e.g. EAP and outpatient mental health benefits) to create the optimal treatment plan for their EAP patients.

Another perceived difference between EAP and behavioral health services was the reduced administrative burden of billing for EAP services. For example, dissimilar to third-party billing requirements, an approved diagnosis code is not necessary for reimbursement for an EAP visit as all presenting problems (e.g. career concerns, stress of work-life balance) are covered. Also, there are no required copayments, co-insurance or deductibles with EAP visits.

Despite the theoretical underpinnings of EAP as a program designed to improve workplace performance, findings reveal that EAPs are not highly differentiated from standard outpatient employee health benefits in the minds of EAP professionals (Sharar, 2009). This suggests that contemporary EAPs are primarily viewed as a quasi-outpatient behavioral health benefit as the services provided by EAP professionals are essentially variants of outpatient behavioral health treatment. An important gap filled by EAPs are the offering of treatment for issues that are not commonly available via health plans (e.g. financial issues). Researchers have argued that one of the primary functions of EAP services have shifted from workplace productivity to providing free, more accessible short-term outpatient behavioral health treatment (Taranowski and Mahieu, 2013).

How to Use EAPs

Most employees use EAP services voluntarily through self-referrals, although some may initiate EAP services because of a referral by their supervisor due to their job performance (Attridge, 2012; Jacobson et al., 2011; Sharar, 2009). A study by Bayer and Barkin (1990) found that among employees from four large federal agencies who had access to an EAP, self-referral was the most common type of referral (68%), regardless of problem area (Bayer and Barkin, 1990). Similar findings were reported among a sample of 3,890 employees from companies utilizing services from an EAP corporation in the United States where the 63% were self-referred, 15% employer-informal, 6% family, 5% mandatory, 5% human resources/medical and 6% other (Chan et al., 2004). Although self-referral outpaced all other sources of referral, many employers emphasize supervisors' ability to refer employees who may benefit from EAP services (Willbanks, 1999).

Generally, employees request EAP services and their problems are assessed by an intake professional. Some EAPs employ customer service representatives (CSRs) to serve as intake professionals (Taranowski and Mahieu, 2013). These individuals take basic demographic information and information about the individual's issue and transfer those with a clinical need to a clinician who can provide a deeper assessment. Conversely, other EAPs employ mental health professionals to serve as intake professionals (Taranowski and Mahieu, 2013). This approach allows the individual calling to only have one point of contact during the intake process. A few vendors are almost completely staffed by CEAPs whereas 24% have no CEAPs among their intake professionals (Taranowski and Mahieu, 2013).

This initial assessment process are structured so that employees can speak confidentially, either by phone or in-person office visit, at no cost and very little delay (Attridge, 2012). It is

critical that this initial interaction engages the individual and ensures them that the EAP can offer appropriate help. A negative initial experience could result in the individual not actually pursuing treatment. An estimated 62% of EAPs have implemented Screening Brief Intervention and Referral to Treatment (SBIRT) as a standard component of their intake process (Taranowski and Mahieu, 2013). During this intake meeting, the patient's needs will be assessed to determine the appropriate next step and they will then be referred to the appropriate resources.

EAP practitioners focus on providing both micro-linkages and macro-linkages for employees. Micro-linkages refer to resources within the company, while macro-linkages refer to resources from the surrounding local communities (Attridge, 2012). Most EAPs maintain a database of community health and social resources appropriate for referral to fulfill this core component in order to ensure appropriate and timely linkages and referrals (Attridge, 2012; R. K. J. H. A. McLellan, 2017). Since individuals mostly commonly seek EAP services for marital/family issues and anxiety/depression, referrals are typically made to services offered directly by the EAP, such as individual and relationship counseling. Employees with more serious problems that merit further treatment are referred to other providers for longer-term mental health treatment (Attridge, 2012).

Number of Employers with EAPs

Estimates suggest that, in 1985, more than two-thirds of large US companies did not have an EAP (Dickman and Challenger, 2009). Among a sample of 336 Fortune 500 firms across multiple industries, 92% offered an EAP in 1997 (Sciegaj et al., 2001). A survey completed by Teich and Buck (2003) found that the size of an employer largely influenced whether an employer offered an EAP (Teich and Buck, 2003). Only about 10% of employers with fewer than 50 employees offered an EAP, whereas more than 90% of employers with more than 20,000 employees offered an EAP to their employees (Teich and Buck, 2003).

In total, nearly 20% of the 2,100 employers surveyed in 2001 offered EAP services to their employees (Sciegaj et al., 2001). More recent evidence suggests the number is even higher. The 2018 annual survey of employee benefits by the Society for Human Resource Management indicates EAP services were widely available to employees at more than 78% of companies in the United States. This percentage rose from 74% in the 2014 benefits survey results, suggesting that employers continue to see value in offering these services to their employees (SHRM, 2018).

Effectiveness of EAPs

The evidence suggests there is value in offering EAPs (Clavelle et al., 2012). In addition to offering access to an EAP as an employee benefit, employers have found value in these programs' ability to improve outcomes for employees and, in turn, employers. Specifically, studies have shown that EAPs are associated with improved productivity, reduced medical costs, and improved health outcomes across employers in the United States since their inception (Attridge et al., 2010; Greenwood et al., 2006; Hargrave and Hiatt, 2005; Hargrave et al., 2008; Jacobson et al., 2011). As the performance of an EAP can be measured in a variety of ways, there is a considerable amount of heterogeneity surrounding EAP evaluation (Attridge et al., 2009; Pompe, 2011).

Clavelle and colleagues (2012) found that Department of Defense employees who used EAP services reported less distress and better functioning at work (Clavelle et al., 2012). Richmond and colleagues (2016) recently demonstrated that the reduced symptoms of depression and anxiety among government employees who utilized EAP services were associated with improvements in absenteeism and presenteeism (Richmond et al., 2016). Similarly, a study of over 60,000 cases found that employee absenteeism was reduced from an average of 2.37 days to 0.91 days of unscheduled absences or tardy days after completing use of EAP services (Selvik, Stephenson, Plaza, and Sugden, 2004).

Economically, multiple studies have reported the positive outcomes associated with offering EAP services to employees and their family members. For example, Philips reported a 4.3 to 1 return on investment (ROI) using data from EAPs at eight universities (Philips, 2005). When specifically exploring the savings associated with improved absenteeism, Hargrave and Haitt (2005) found that among a sample of 11,756 employees over a seven-year period, an EAP

resulted in a positive ROI among the depressed employees by calculating the employees' improvements in lost productive time after EAP treatment (Hargrave and Hiatt, 2005).

EAP Promotion and Utilization

There is limited information reported in the literature regarding EAP utilization rates. Further, when utilization rates are provided, it is often unclear how the rate is calculated and what the denominator is. For example, one study notes that the national EAP utilization rate nationally is about 3-4%; however, details surrounding this value is not provided (Carchietta, 2015). Among a surveyed sample of medium- and large-size EAP vendors, the rate of EAP utilization ranged from 1% to 13% with an average of about 6% (5.7% in 2009 and 6.0% in 2010) (Taranowski and Mahieu, 2013). These values were estimated by analyzing vendors' responses to, "Percent of members who received at least one face-to-face counseling service through the EAP" (Taranowski and Mahieu, 2013). The authors also noted that the wide range of utilization suggests that although higher EAP service utilization is possible, inflated statistics may be influenced by various definitions of utilization (Taranowski and Mahieu, 2013).

Another key point when evaluating EAP utilization is that it is important to clearly outline the denominator of the utilization rate. Some rates may be calculated using only individuals who have some form of mental health and/or substance abuse problem that interferes with their ability to function properly at work or home. Conversely, a utilization rate may be estimated among a sample of those that have access to EAP services. It is also important to note that some EAP vendors estimate the EAP utilization rate using only employees that receive counseling services, but do not include other contacts with the EAP (e.g. EAP trainings, visits to the website) (Taranowski and Mahieu, 2013).

Research has shown higher levels of EAP use when organizations feature EAP specifically in their company policies (Weiss, 2003). A key factor noted for an effective implementation process for the EAP involves explicitly outlining the availability and role of the

EAP by including it in the written human resources (HR) policies and including it in regular communications to the employees (Csiernik, 2011). Regular and ongoing promotion of the EAP within the organization is also important because some users of services come to the EAP as referrals given by others in the organization. Despite frequent communication and promotion for the EAP, stigma and discrimination can inhibit EAP use, even though it is often convenient and available free of charge. This results in many employees who could potentially benefit from using the EAP do not because of the risk of shame and discrimination (Attridge, 2012).

Some EAPs have integrated EAP services into less stigmatized programs offered by the employer, such as Work/ Life programs or corporate health and wellness departments. For example, Ernst and Young combined EAP, Work/Life and their HR benefit websites into one function in the organization (Turner, Weiner, and Keegan, 2005). They found a 25% annual utilization rate for the new program. Previously, the EAP and Work/Life program had an 8% and 12% utilization rate the year before (Turner et al., 2005).

How are race/ethnicity associated with EAP use, all else equal?

Despite the widespread availability of EAP services, there is little evidence describing the types of patients who utilize EAP services in recent years. This area of research is particularly of interest because only a small proportion of employees who have access to EAPs utilize the services (Carchietta, 2015; Taranowski and Mahieu, 2013). Historical data suggest there are differential patterns of EAP service use based on individual-level factors; therefore, it will be important to update the literature (Chan et al., 2004). For example, a study of a national managed behavioral health care organization in 2005 found younger age and female gender were associated with greater EAP use (Azzone et al., 2009b). Compared to gender and age, race/ethnicity is a characteristic less commonly examined as a potential factor influencing EAP service use. This is likely because most of the studies utilize claims data, which often lack race/ethnicity as a variable (Hodgkin et al., 2010; E. L. Merrick et al., 2010; Zarkin et al., 2000).

Much of the literature that reports race/ethnicity data only report this information among EAP users (Chan et al., 2004; Jacobson et al., 2011; E. S. L. Merrick et al., 2011). In each of these articles Whites overwhelmingly represented the largest racial/ethnic group among EAP users. Among a sample of nearly four thousand employees from companies utilizing services from an EAP vendor, the sample consisted of 81% Caucasian, 12% African American, 4% Latino, 2% Asian American, and 1% Native American (Chan et al., 2004). Using EAP case file data from 2007, Jacobson and colleagues (2011) found that among EAP service utilizers at 20 US-based companies, 62% were White, 12% were Black and 10% were Hispanic/Latino (Jacobson et al., 2011). Similarly, Merrick and colleagues (2011) found that 82% of EAP service users at a national provider were White, 6% African American, 5% Asian, and 6% Other (E. S. L. Merrick et al., 2011). Although this information is helpful, it does not provide insight into

whether Whites were overrepresented in the population. That is, the population eligible for EAP services at these institutions is unknown. Without knowing the distribution for the underlying eligible population, we have no way of knowing which racial/ethnic groups are over- or underrepresented among EAP users.

Among the limited evidence where race/ethnicity data were reported among both EAP users and non-EAP users, Blacks were overrepresented among EAP users (Delaney, Grube, and Ames, 1998; Jacobson and Sacco, 2012; Poverny and Dodd, 2000). The results of a cross-sectional study completed by salaried and unionized workers at a manufacturing plant in the Midwest in the 1990s suggested that Blacks were significantly more likely than Whites to answer positively when asked "If you thought you might have a drinking problem, how likely is it that you would go to the Employee Assistance Program at work for help?", when controlling for other variables in the model (Delaney et al., 1998). This suggests Black EAP users were overrepresented relative to the proportion eligible to utilize these services.

Similarly, using nationally-representative data from the 2001-2002 National Epidemiologic Survey of Alcohol and Related Conditions (NESARC), Jacobson and colleagues (2012) found that among adults who sought services for an alcohol or drug problem during their lifetime, Blacks had more than twice the odds (odds ratio = 2.13) to report using EAP services as Whites (Jacobson and Sacco, 2012). Although the study did not measure actual EAP utilization and focused exclusively on alcohol-related problems, this gives us insight into the potential differential treatment seeking behavior by race/ethnicity. Among university faculty at a large metropolitan university in 1996, Whites represented 64.9% of those using EAPs even though they represented 80.1% of university faculty. Conversely, Blacks represented only 2.4% of the

university faculty, but represented about 13.5% of those seeking EAP services (Poverny and Dodd, 2000).

It is important to note that the data from these prior studies may not be generalizable due to the specific populations evaluated (i.e. university staff and faculty, employees at a Midwestern manufacturing plant, and adults who have sought treatment for an alcohol and/or drug problem) and the data are at least 10 years old. The NESARC study also relied on survey data to measure utilization, which may be prone to self-report biases (Poverny and Dodd, 2000).

Evidence suggests that the higher the EAP service utilization rate, the higher the monetary savings (Milne, Blum, and Roman, 1994). Therefore, it is important to characterize employees who underutilize EAP services when they have access with little to no financial obstacles to utilize these services.

The Importance of Race/Ethnicity

As noted, there is a paucity of evidence surrounding race/ethnicity and EAP services. Racial/ethnic minorities may have unique issues and special needs that may constitute difficulty in initiating and maintaining EAP treatment. Evidence suggests that cultural attitudes, and perceptions concerning behavioral health treatment may differ among racial/ethnic groups (Newhill and Harris, 2007). One key point is the role of racial/ethnic discrimination in health (V. M. Mays, Cochran, and Barnes, 2007).

This is especially troubling because even though minorities do not have increased risk for psychiatric disorders or behavioral health problems relative to Whites, they often have more persistent disorders (Breslau et al., 2006; Wang, Berglund, and Kessler, 2000). For example, using nationally-representative data, Williams and colleagues (2007) found that although lifetime MDD prevalence rates were higher among Whites, African Americans and Caribbean Blacks had higher rates of chronicity, lower rates of MDD therapy and rated their condition as more severe and disabling than Whites (Williams et al., 2007). Similarly, Mays and colleagues (2018) found low rates of DSM-IV disorders among a sample of Black men; however, there were high rates chronicity and undertreatment (Jacobson and Sacco, 2012; V. Mays et al., 2018).

These data support the concept of the "double paradox" observed among minorities. That is, evidence suggests that the prevalence of psychiatric outcomes are often comparable or even lower among minorities relative to Whites, despite elevated exposure to many of the social stressors that are associated with worse health outcomes (Barnes, Keyes, and Bates, 2013; Jacobson and Sacco, 2012; V. Mays et al., 2018). A recent systematic review suggests minorities are more likely to have severe and disabling symptoms relative to Whites although their rates of disorders are lower or comparable to Whites (Barnes, 2017). Taken together, the literature

suggests minorities are the most likely to have pervasive behavioral health symptoms and less likely to initiate and maintain treatment – despite the severe and disabling symptoms experienced (Cook et al., 2014). This suggests there is a significant unmet need among minorities related to behavioral health treatment.

The discussion of racial/ethnic disparities in treatment for behavioral health problems is often grounded in the notion that racial/ethnic minorities are overrepresented among the most vulnerable and in need of behavioral health treatment – the homeless, incarcerated, institutionalized and poor. For example, evidence suggests that poverty is a key predictor of poor mental health and greater disparities in mental health service access and use (Chow, Jaffee, and Snowden, 2003). Though this is an important discussion, this dissertation aims to shift the focus in order to evaluate differences in treatment among a population that has access to these services and are not among the most vulnerable – as they have access to commercial insurance. Considerable improvements have been made in civil rights over the past four decades, and many minorities have achieved gains in education, income and other indices of social wellbeing. Nevertheless, racial/ethnic disparities continue to persist (Ojeda and McGuire, 2006).

Newhill and colleagues (2007) conducted a focus group to explore the reason racial/ethnic minorities, specifically Blacks, were less likely to seek help from traditional mental health services than Whites (Newhill and Harris, 2007). The participants detailed the perceived public and private stigma associated with obtaining mental health care. From a public perspective, respondents were concerned about being labeled as "an angry Black man" or as a "crazy woman". Although stigma discourages people of all kinds of backgrounds from seeking mental health treatment, racial/ethnic minorities fear being "doubly discriminated against" due to their race *and* because of mental illness (Newhill and Harris, 2007). From a private perspective,

respondents were concerned about the perceived stigma from their family and friends. Their feelings of stigma were compounded by a pervasive lack of understanding about mental illness and the services available for treatment. These issues likely result in Blacks being unlikely to receive treatment and the increased propensity to leave treatment prematurely. This often leads to mental health treatment occurring frequently in emergency rooms and psychiatric hospitals where the delivery of high-quality mental health care is undermined (L. R. Snowden et al., 2009).

As noted, the rates of behavioral health problems are similar across racial/ethnic groups; therefore, differential use of EAP services by race/ethnicity would suggest that there may be a group that potentially benefits from these services, but is not obtaining them – due to inaccessibility, unawareness or negative perceptions of these services. Although disparities in behavioral health treatment have been documented, there are few certain cures for improving the access, treatment and outcomes among some of the most vulnerable.

Do EAP services serve as a complement or a substitute for behavioral health services?

Predictors of behavioral healthcare resource utilization are commonly studied; however, the receipt of EAP services has rarely been examined in recent years. A key research question that has yet to be answered is whether EAP services serve as a complement or a substitute for behavioral health services. Substitutes are goods or services that are interchangeable, while complements are goods or services that supplement the use of one another. The concept of substitution and complementarity has been explored in health care previously.

For example, Snowden (1998) examined if informal help served as a substitute for professional care for mental health problems (L. R. J. J. o. C. P. Snowden, 1998). Xu and Farrell (2007) examined the complementarity and substitution between unconventional and mainstream medicine among racial/ethnic groups (Tom Xu and Farrell, 2007). Goldstein and Horgan (1988) explored if inpatient and outpatient psychiatric services served as substitutes or complements for each other (Goldstein and Horgan, 1988).

There are competing hypotheses associated with this research question: EAP services could serve as a complement to behavioral health services, as EAPs are designed to identify and treat a variety of behavioral health issues that impair an employee's ability to work. As noted, individuals most commonly obtain EAP services for help with marital/family issues and anxiety/depression (Taranowski and Mahieu, 2013). Typically treating these problems will require long-term treatment– suggesting the employee will need to transition into traditional behavioral health care after they reach their EAP limit amount. Thus, it is often expected that individuals will utilize traditional behavioral health services in addition to their treatment from the EAP. Further, as noted in the previous section, EAP practitioners view EAP services as a

way to provide traditional behavioral health services in a short-term way, with the expectation of providing micro- or macro-linkages to longer-term care, if needed.

Conversely, EAP services may serve as a substitute for behavioral health services and individuals who utilize EAP services receive less treatment from the traditional behavioral health sector because they are receiving treatment through the EAP. From a patient perspective, utilizing free EAP services is essentially a price reduction for an interchangeable service. Employees may substitute traditional behavioral health services for EAP services for a variety of reasons. For example, the employee may perceive their EAP as involving less stigma or having a more convenient location if the EAP is located on-site. As outlined previously, from an EAP provider perspective, EAP services are typically viewed as analogous to traditional behavioral health services (Sharar, 2009). EAP professionals are often the same providers who would see them in a traditional behavioral health setting. EAP professional noted that they there are relatively few differences in treating EAP patients and non-EAP patients (Sharar, 2009).

Few studies have rigorously evaluated the effect of EAP use on subsequent behavioral healthcare utilization and the results are mixed.

Table 1 provides a brief summary of key studies in the literature. Using health claims data from 1991 to 1995, Zarkin and colleagues (2000) found that EAP service use was associated with increased receipt of alcohol, drug abuse or mental health treatment among employees at a large Midwestern company (Zarkin et al., 2000). This suggests that the EAP satisfied its stated goal of identifying behavioral health issues that impact workplace performance and linking those individuals with alcohol, drug abuse or mental health or other healthcare (Zarkin et al., 2000).

Similarly, using healthcare claims data from an employer from 1996-1998, Deitz and colleagues (2005) found that among employees who had received treatment for a substance abuse or mental health problem, employees who utilized the EAP had a significantly higher number of outpatient visits for a substance abuse or mental health problem compared to those who did not access the EAP (Deitz, Cook, and Hersch, 2005). Specifically, employees who had visited an EAP had an average of 1.16 visits for mental health or substance abuse treatment compared to an average of only 0.71 visits among those without a visit to an EAP. This difference was statistically significant at the $\alpha=0.05$ level ($p=0.02$) (Deitz et al., 2005).

Similarly, Merrick and colleagues came to similar conclusions. In 2004, increased utilization of outpatient mental health and substance abuse treatment was also found among individuals with access to an integrated health plan – including both traditional behavioral health services and EAP services (E. S. L. Merrick et al., 2011). Specifically, the researchers found that more enrollees in the integrated plan than those in the standard plan used traditional behavioral health care services more often ($p<0.01$). This suggests that access to the EAP in the integrated plan may have encouraged more enrollees to seek outpatient services. This may have been achieved through enhanced treatment engagement or the destigmatizing effect of utilizing EAP services. A study limitation to note is the possible endogeneity bias due to omitted variables. For

example, individuals who sought and obtained EAP services may have been inherently sicker than those who did not obtain EAP services. Due to greater disease severity, they likely obtained more behavioral healthcare. The concept of omitted variable bias was noted, but not addressed by the researchers. The researchers did note their inability to "allow conclusions regarding causality".

Conversely, utilizing administrative data for 26,464 adults enrolled with a managed behavioral health organization, Hodgkin and colleagues (2010) concluded that, in 2005, individuals were using EAP services as a substitute for behavioral health treatment (Hodgkin et al., 2010). The researchers found that greater EAP coverage resulted in fewer outpatient behavioral healthcare visits (Hodgkin et al., 2010).

Table 1. Brief Summary of Key Studies in the Literature

Publication	Zarkin, 2000	Hodgkin, 2010	Merrick, 2010
Year of Data	1991 -1995	2005	2004
Population Studied	All employees at a large midwestern employer	Individuals enrolled in a large national MBHO* integrated plan**	Individuals enrolled in a large national MBHO*
Sample Sizes	EAP only (n=488) Non-EAP (n=2,882)	26,464	286,750
Methodology	Fixed-effects	IV analysis (employer size and industry were used as instruments)	Matched cohort analysis
Primary Regressor	EAP utilization	EAP coverage	Standard plan or integrated plan**
Race/ethnicity Data Included	No	No	No
Outcome	Alcohol, drug abuse or mental health (ADM) claims	Outpatient behavioral healthcare visits and spending	Mental health (MH) and substance abuse (SA) office visits
Result	EAP services served as a complement to ADM claims	Having more generous EAP coverage predicted fewer outpatient visits and lower spending for outpatient care	A larger proportion of enrollees in the integrated plan** than in the standard plan used outpatient MH and SA office visits
Potential Limitations	• Data are >20 years old • Only includes data from one employer	• Data are nearly 15 years old • Primary regressor is EAP coverage rather than utilization	• Data are 15 years old • Primary regressor is type of plan rather than EAP utilization

*Managed Behavioral Healthcare Organization
**Integrated plan provides coverage for both EAP services and outpatient behavioral healthcare

Key limitations of available evidence are that it is often limited to a single employer and the data are more than 10 years old. Further, despite the inherent concern of endogeneity bias, most of the authors did not execute a technique aimed to mitigate this issue. Hodgkin and colleagues (2010) attempted to mitigate the concern of reverse causality by employing an instrumental variable analysis; however, the primary regressor in the study was EAP coverage – rather than EAP utilization (Hodgkin et al., 2010).

Understanding the potential relationship between EAP use and subsequent behavioral healthcare resource utilization has important implications for key stakeholders. When evaluating the potential return-on-investment of EAPs, analyses frequently consider the economic benefit of increased productivity and reduced absenteeism, but often neglect to consider the potential increases in behavioral health service treatment (Attridge et al., 2009). This is evidenced by the absence of the consideration of potential increased utilization of behavioral health services in the few cost-effectiveness studies of EAPs completed in recent years (Cowell, Bray, and Hinde, 2012; French, Zarkin, Bray, and Hartwell, 1997, 1999).

Although employees do not have to pay to utilize EAP services, employers may provide the resources (e.g. the staff and administrative infrastructure) or the premium to deliver these services. At face value, insurance coverage for those who have EAP and behavioral health care coverage is typically structured to favor EAP service use as it requires no copayment. The actual administrative cost to the employer largely depends on whether the employer is self-insured and whether the EAP is internally or externally managed.

It is also important to consider that EAPs may have the additional benefit of identifying un- or underdiagnosed conditions – particularly among minorities – resulting in the appropriate treatment of individuals who need traditional behavioral healthcare services. Initially treating

these individuals through the EAP may be cost-saving if EAP services are a less costly substitute for traditional behavioral health treatment. Thus, the results of this dissertation could bring insight into the potential overall value of EAPs, as well as whether EAPs serve as a mechanism for identifying and referring individuals with behavioral healthcare needs to treatment. This is a key focus in behavioral health research as psychiatric epidemiological studies have consistently demonstrated that most individuals with a behavioral health problem are either untreated or undertreated (Kessler, Demler, et al., 2005; Wang et al., 2005).

To what extent is the relationship between EAP service use and behavioral health services use moderated by race/ethnicity?

The landmark 2001 report to the Surgeon General outlined disparities affecting the mental health of racial/ethnic minorities in the US, including reduced access of mental health services to minorities and their less common receipt of needed, high-quality mental health care (General, 2001). Despite considerable effort to address racial/ethnic disparities in behavioral health, there is still an urgent need to resolve persistent disparities in behavioral health care. Evidence suggests minorities are less likely than Whites to receive treatment for a behavioral health problem (L. R. Snowden et al., 2009). This is especially troubling because even though minorities do not have increased risk for psychiatric disorders relative to Whites, they often have more persistent disorders (Breslau et al., 2006).

Stigma is a key factor that influences whether or not minorities obtain treatment for a behavioral health problem (L. R. Snowden and Yamada, 2005). Therefore, it is plausible that EAPs may serve as an avenue for minorities to receive appropriate behavioral health treatment when needed. Minorities may perceive less stigma associated with receiving care at an EAP relative to traditional behavioral health service. Once a minority begins treatment at an EAP, they may be referred to continue treatment. Thus, increased use of EAP services among minorities may be associated with increased use of subsequent behavioral health services. However, it is hypothesized that this increase will be lower than that seen among Whites due to the pervasiveness of perceived stigma associated with behavioral health treatment among minorities.

Conversely, individuals may view EAPs as a substitute to behavioral health services. The decrease in behavioral health treatment among individuals who obtain EAP services may be higher among minorities compared to Whites. Minorities who initiate care through an EAP may

be less likely to continue receiving care through behavioral health services due to the perceived stigma associated with traditional behavioral health services. This would suggest that greater resources should be invested in combatting stigma during EAP sessions for racial/ethnic minorities.

No published study, to my knowledge, has examined the potential differential impact of EAP service use on subsequent behavioral health service use by race/ethnicity. A key factor could be that much of the literature evaluating EAPs utilizes administrative data that lack race/ethnicity data (Hodgkin et al., 2010; E. S. L. Merrick et al., 2011). This dissertation aims to evaluate the potential moderating effect of race/ethnicity on the relationship between EAP service use and subsequent behavioral health care utilization to fill this gap in the literature.

These findings could have significant implications if EAP service receipt serves as an avenue for minorities to receive needed behavioral health treatment. Key tenets of EAPs are to identify behavioral health problems, provide short-term treatment and provide linkages to long-term care, if needed (Roman, 1990). As perceived stigma is often viewed as a deterrent for obtaining traditional behavioral healthcare (Newhill and Harris, 2007), obtaining EAP services may be a more appealing path to receiving behavioral health treatment.

As noted previously, much of the discussion surrounding racial/ethnic disparities in health is related to socioeconomic disparities (Adler and Newman, 2002). The dissertation focuses on an important, illustrative population – individuals who are commercially-insured and have access to behavioral health treatment – as there are ongoing efforts, such as the Affordable Care Act, that aim to improve health insurance coverage among Americans. As noted by Alegria and colleagues (2016), while expanding insurance is an important part of disparities reduction strategy, a key mistaken assumption is that a universal approach to improving access to care by

itself will reduce disparities in behavioral health services (Alegría, Alvarez, Ishikawa, DiMarzio, and McPeck, 2016). Thus, this dissertation aims to illuminate if access and utilization of EAP services is a potential avenue to ameliorate behavioral health disparities associated with race/ethnicity.

Significance

This dissertation will contribute to the literature in multiple ways: the concepts being evaluated in this dissertation – the role of race/ethnicity in EAP use, the impact of EAP use on behavioral healthcare resource utilization, and the potential moderating effect of race/ethnicity – have not been studied extensively in recent years, the data are complementary or superior to other data used in the literature, and the methodology used will be more sophisticated than that used in most of the previous analyses. In general, this dissertation is aligned with gaps in the EAP literature outlined by researchers (E. S. L. Merrick et al., 2007; Sandys, 2015).

The study of EAPs is important because a large number of employers offer EAP services to their employees (SHRM, 2018). This suggests there is substantial employer motivation for offering EAPs to employees; however, the evaluation of these programs has lagged in recent years. Early evidence has demonstrated that the amelioration of work-place issues has been associated with improved indirect outcomes, such as productivity; however, little research has been done exploring the relationship between EAP access and behavioral healthcare resource utilization and the role of race/ethnicity.

A recent study evaluating the evolution of EAPs in the US over the past two decades (1993-2012) found that the EAP market has changed significantly over time, so it is important to update the literature to reflect EAPs in this current landscape (Sandys, 2015). Key changes observed among contemporary EAPs have emerged as a response to their need to remain competitive. Contemporary EAPs may differ from EAPs offered in the 1990s and early 2000s as EAP vendors are often pressured from employers to "do more with less" in a growing cost-conscientious climate (Courtois et al., 2005). And, since there is no option to shift costs to employees, it is likely that EAPs have adapted to respond to these pressures. Survival strategies, such as a focus on improving cost effectiveness and increased consolidation among EAP

vendors, are key factors that separate traditional and contemporary EAPs (Courtois et al., 2005). These key changes in EAP services during recent years suggest that research should provide an up-to-date evaluation of EAPs.

The specific research questions explored for this dissertation will be a significant contribution to the EAP field. The results from this dissertation will add to the limited literature of the evaluation of the relationship between race/ethnicity and EAP service use. Researchers have urged that future research in the EAP field focus on identifying facilitators and barriers to EAP utilization and characteristics of EAP users (E. S. L. Merrick et al., 2007; Teich and Buck, 2003). Detailing characteristics associated with EAP service use, including race/ethnicity, could be important when employers are determining whether to offer these programs to their employees. Employers can also utilize this information to encourage underutilizes of EAP services to increase their use. Moreover, understanding the role of race/ethnicity could serve as a potential avenue to increase the number of minorities who receive necessary behavioral health care despite the stigma often associated with utilizing these services.

In addition to identifying patient characteristics associated with EAP service use, researchers have also stressed that future research should focus on EAP users and their subsequent use of other behavioral health services (E. S. L. Merrick et al., 2007; Teich and Buck, 2003). While available data suggests EAP use is associated with increased behavioral healthcare resource utilization, much of the data are limited in that it was collected from one site and is often at least ten years old (Deitz et al., 2005; E. L. Merrick et al., 2010; Zarkin et al., 2000).

There are potentially competing hypotheses, thus this dissertation addresses an important gap in the literature by presenting empirical data to better understand the relationship between these services among individuals who have access to these services. Once this information is

better understood in the current healthcare climate, employers will have a better handle on the needs of their employers and may be able to better manage healthcare-related costs.

Recent data suggest that despite this documented unmet need and current treatment guidelines outlining the benefits of behavioral health treatment, fewer than 10 percent of adults with co-occurring disorders receive treatment for both disorders, and fewer than 50 percent receive treatment for just one disorder (Han et al., 2017). Thus, this dissertation may identify that EAP services serve as an important avenue for individuals to identify and treat their behavioral health problem.

This dissertation also aimed to supplement the currently available literature by exploring the potential moderating effect of race/ethnicity on the relationship between use of EAP services and behavioral health treatment. The literature is inundated with evidence that there are lower rates of behavioral health treatment by minorities compared to Whites (L. R. Snowden, 2007; L. R. Snowden et al., 2009). It is plausible that EAP services may serve as an entry point specifically for minorities who would not otherwise pursue behavioral health services. Understanding whether minorities have an alternative route to behavioral health treatment may be helpful in ameliorating behavioral health care disparities.

The data utilized in this dissertation are also a significant contribution to the literature. Researchers have noted that there is a dearth of larger-scale studies that encompass multiple employers in the EAP field (E. S. L. Merrick et al., 2007). The dataset used in this dissertation consists of data from hundreds of employers around the United States. The dataset includes highly-reliable data regarding EAP and behavioral health services use, combined with sociodemographic information including race/ethnicity. The availability of race/ethnicity data is a key advantage of this dataset as many similar analyses utilize administrative data that do not

include these data. Based on the limited evidence available in the literature, this provides a unique opportunity to infer important insights on the role of race/ethnicity in utilization of EAP services and behavioral health services.

Another key advantage is that the data are recent– consisting of data from 2011 to 2014. This allows an update to the literature with data from employers with contemporary EAPs. As mentioned previously, studies that have evaluated the impact of EAP service use and behavioral healthcare resource utilization typically only include data from one employer or EAP and were collected at least 10 years ago (E. S. L. Merrick et al., 2011; Zarkin et al., 2000).

Moreover, the methodology used in this dissertation is an important contribution to the literature. Researchers in the field of EAP have noted the need for methodological approaches to improve the quality of EAP evidence including employing statistical techniques to reduce selection bias and control for group differences as well as capturing a wider range of factors in multiple domains to more accurately measure utilization and outcomes (E. S. L. Merrick et al., 2007). This study attempts to ameliorate the concern of endogeneity bias through a variety of methodological techniques. For the first research question, a reduced-form specification, rather than a structural equation was employed to avoid the issue of reverse causality. Alternatively, an instrumental variable analysis was employed for the second and third research questions to mitigate the concern of endogeneity bias.

In all, this dissertation aimed to increase our knowledge of the role of race/ethnicity in predicting EAP service use, the relationship between EAP service use and behavioral healthcare resource utilization and the role of race/ethnicity in that relationship.

Chapter III. Conceptual Framework

Conceptual Framework

This chapter details the conceptual frameworks that guide the analyses outlined in a subsequent chapter of this dissertation. There are two conceptual frameworks, both pertaining to commercially-insured individuals with EAP and behavioral health benefits: one that outlines factors influencing use of EAP services and another outlining factors that influence the use of behavioral health services.

Conceptual Framework for Utilization of Employee Assistance Program Services

Figure 1 below illustrates the conceptual framework for EAP service use among commercially-insured individuals with an EAP and behavioral health benefit. There is a multitude of factors that influence utilization of EAPs, including both individual- and system-level factors. Individual-level factors include perceived need for services (influenced by one's religiosity), awareness of EAP, social support, utilization of behavioral health services, perceived stigma and supervisor referral due to poor job performance. System-level factors include accessibility of EAP services (which in turn, depends on provider supply and location of EAP services) and the generosity of EAP services offered.

Individual-level factors

Starting in the far left of **Figure 1**, a key factor influencing utilization of EAP services is the individual's perceived need for these services. If individuals do not believe that they have a problem, they likely perceive that they do not need to obtain EAP services. One's perception of need for EAP services is likely in part influenced by one's religiosity. Evidence suggests that individuals may not perceive a need for EAP services if they view their religion as a sufficient substitution for formal care, such as EAP services. Findings from a study using focus groups

found that many participants noted that the solutions to mental health problems are found in religious faith (Newhill and Harris, 2007).

Moving clockwise on **Figure 1**, awareness of the EAP is another key factor in predicting EAP service use. Employees who may be interested in obtaining EAP services may not be aware of the services that are offered within their organization, particularly if the EAP is not located on-site. Additionally, some employers change the name of their EAPs. For example, UCLA's EAP is called the Staff and Faculty Counseling Center (SFCC). As a result, UCLA employees interested in obtaining EAP services may not be aware that the SFCC offers services that are free of charge. Greater awareness of EAPs is likely associated with increased use of these services. One company noted that it successfully increased EAP utilization rate to 16% over 3 years by enacting five changes – one notably being developing a distinct brand and logo that easily identified the EAP throughout the company (Carchietta, 2015). A survey of municipal employees found that greater awareness of EAPs among employees is associated with more willingness to use these services (Reynolds and Lehman, 2003). Similarly, research has shown that EAP promotion activities are related to a greater likelihood of using EAP counseling services (Azzone et al., 2009a).

Whether an individual has social support or not likely has an influence on their use of EAP services. The presence of a support system may facilitate the use of EAP services because an individual may be encouraged to seek these services. Moreover, EAP services are available for dependents and spouses and services are available to address familial issues; therefore, a supportive loved one may also participate in the employee's EAP treatment. Alternatively, an individual with high levels of social support may be less likely to seek behavioral health treatment in all settings, including EAP, because they perceive that the social support they are

receiving may be adequate in managing their behavioral health problem. Newhill and Harris (2007) found that participants in a focus groups noted that mental health problems were a family issue and should be kept within the family (Newhill and Harris, 2007). Other studies have demonstrated individuals' preference for family and friends as the primary resource for alcohol and drug problems – rather than traditional behavioral health services (Tucker, Foushee, and Simpson, 2009).

As illustrated in **Figure 1** with a double-headed arrow, receipt of traditional behavioral health services may predict EAP service use and the inverse may also be true. Behavioral health service use may predict EAP service use because individuals utilizing behavioral health services may be less likely to utilize EAP service. An individual may perceive that they have adequately treated their behavioral health problem through their behavioral health treatment, thus behavioral health services serve as a substitute for EAP services.

Due to the concern of reverse causality between EAP service use and behavioral health service use (illustrated with a double-headed arrow), the empirical model employed utilized a reduced-form model. That is, the exogenous predictors of behavioral health service – rather than behavioral health service utilization itself – was included. The predictors of behavioral health service will be described in the following section on determinants of behavioral health service.

EAP service use may predict behavioral health service use as an individual may be referred to receive traditional behavioral health treatment after their behavioral health problem is identified while receiving EAP services. In this case, if the individual continues treatment, EAP services serve as a complement to behavioral health treatment, resulting in increased utilization of behavioral health services. Alternatively, EAP services may serve as a substitute for behavioral health treatment due to an individual's perception that they have adequately treated

their behavioral health problem through their EAP treatment. Similar logic can be applied if the inverse is true and behavioral health treatment predicts EAP service use. As noted previously, the limited available evidence makes it unclear if EAP services serve as a complement or a substitute for behavioral health services.

EAP services are often obtained due to a need for help with a sensitive issue, such as a substance abuse problem or a financial problem, thus, a significant predictor of EAP services use is the individual's perceived stigma associated with obtaining these services. Employees may be concerned that their receipt of EAP services could negatively impact their employer's or fellow employees' perception of them. Using survey data from two organizations, Butterworth and colleagues (2001) found that although a large proportion of employees supported EAP service use, there was a clear negative association between perceived stigma and receipt of EAP counseling (Butterworth, 2001). The location of the EAP services compounds the perceived level of stigma associated with obtaining EAP services. If the EAP is located on-site at the individual's employer, the perception of stigma may be a larger issue as EAP users may be concerned that their employer or a fellow employee may become aware that they are receiving EAP services.

There are two avenues for an employee to receive EAP services: 1) referral by their supervisor due to poor job performance, for example or 2) voluntary enrollment. An employee's poor job performance may increase the likelihood that a supervisor refers the employee to receive EAP services, resulting in an increased use of EAP services. An individual who is referred to an EAP by their supervisor may have a more ubiquitous issue to deal with than an individual who self-refers to EAP services. Harley (1991) found that impaired job performance

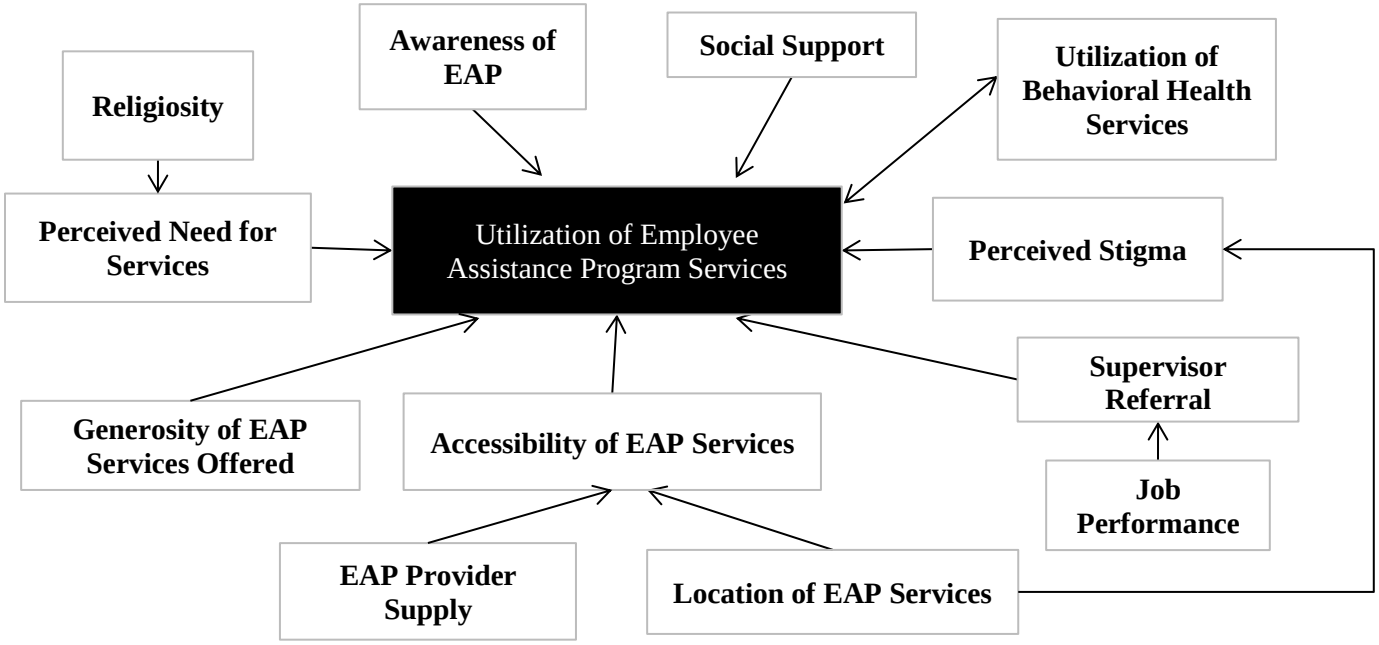
and worksite incidents were key factors influencing EAP referrals among surveyed supervisors at 25 sites from seven organizations (Harley, 1991).

System-level factors

The accessibility of EAPs is another key factor. The number of EAP service providers can have an impact on the accessibility of EAP services in that more EAP service providers in an area likely increases the accessibility of receiving these services. To increase utilization opportunities, employees may access EAP services via on-site counseling that may be offered in addition to off-site services. The location of services – on- or off-site – likely has a dual effect on EAP service use. If services are located on-site at an employer, employees may be more likely to utilize the services because they are easier to access. However, employees may be less likely to utilize the services if they are concerned that this increased convenience results in reduced anonymity. A survey sent to a random sample of 16,603 employees and adult dependents of a large, multinational company with an internal EAP found that employees' perception of confidentiality and the potential for negative career effect were related to indicating willingness to use the EAP (Harlow, 1998).

The generosity of EAP services offered has an important impact on utilization of EAP services. Evidence suggests that employees with benefits (i.e. higher EAP limit amount) allowing access to more (free) EAP visits utilized more of these services (Taranowski and Mahieu, 2013).

Figure 1. Conceptual Framework for Utilization of Employee Assistance Program (EAP) Services Among Commercially-insured Individuals with an EAP and Behavioral Health Benefit



Notes:

- For simplicity, the model does not show all moderating effects (e.g. social support moderates the relationship between perceived stigma and utilization of EAP services)
- For ease of exposition, the model does not show all predictors of BHS (e.g. perceived stigma is a predictor of both utilization of BHS and EAP, but there is only an arrow going into EAP in the figure)

Conceptual Framework for Utilization of Behavioral Health Services

Figure 2 outlines the conceptual framework for the utilization of behavioral health services among commercially-insured individuals with access to both EAP and behavioral health benefits. Individual-level factors influencing an individual's decision to obtain behavioral health services include perceived need for services (influenced by one's religiosity), social support, utilization of EAP services, perceived stigma, direct out-of-pocket cost-sharing (which is in turn determined by the generosity of health insurance plan) and financial resources. Health-system factors include the accessibility of behavioral health services, which in turn depends on the provider supply, facility hours and a need for referral to obtain services. Another determinant of behavioral health services use are the opportunity costs of the time spent obtaining behavioral health services (in turn influenced by competing time demands as well as system-level factors such as facility wait time and distance to provider). Since many of these factors are key factors that were described above as predictors of EAP service use and employ a similar rationale for their inclusion in a model of behavioral health services utilization, only the factors that uniquely predict behavioral health services will be outlined in detail below.

Individual-level factors

As noted in the previous model, EAP utilization is a predictor of behavioral health services. The relationship has been outlined in the previous section, so it will not be repeated here. However, it is important to note that, in this model, reverse causality will be empirically addressed utilizing an instrumental variable analysis – rather than a reduced-form model as in the EAP utilization model. The details of the methodology are outlined in more detail in a subsequent chapter.

Dating back to the RAND Health Insurance Experiment in 1987, increased cost-sharing has been shown to be associated with reduced health care utilization (Manning, Newhouse, Duan, Keeler, and Leibowitz, 1987). If an individual is required to pay a large co-payment or a substantial proportion of the costs associated with seeing a healthcare provider, they may be less likely to obtain behavioral health services. Conversely, if an individual has little to no cost-sharing, they may be more likely to seek these services. Among a commercially-insured population, out-of-pocket (OOP) cost-sharing is determined by the generosity of health insurance benefits.

In addition to direct OOP cost-sharing, financial resources impact an individual's utilization of behavioral health services. In general, greater financial resources allow individuals greater freedom to participate in activities they are interested in. This is true in health care as an individual with greater financial resources may have fewer obstacles to receiving behavioral health care (Mojtabai et al., 2011).

System-level factors

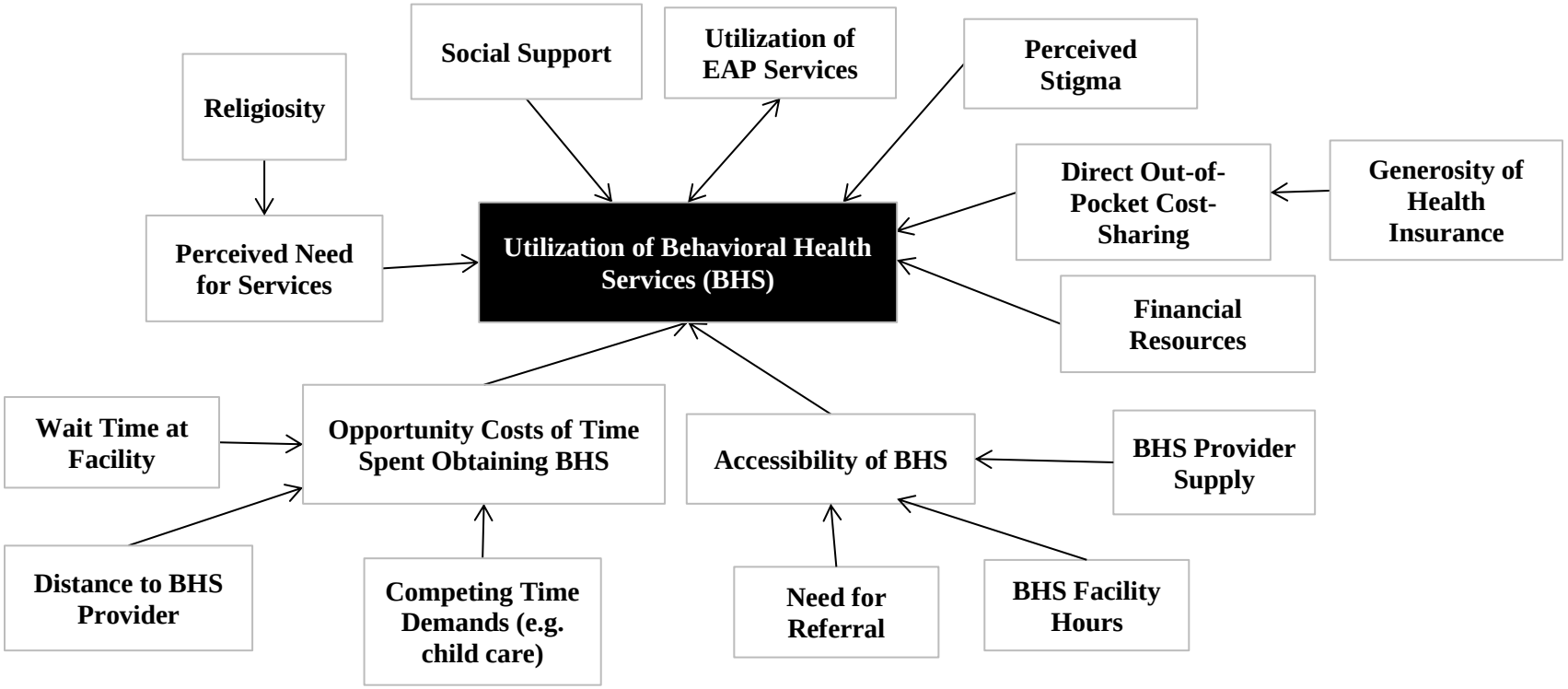
Increased accessibility of behavioral health services is likely associated with greater utilization of these services. Similar to EAP services, the more opportunities individuals have to obtain behavioral health treatment, the greater the probability they will utilize the services. In addition to the role of provider supply outlined previously, facility hours and need for a referral are key factors that uniquely influence accessibility of behavioral health services. The facility hours influence the accessibility of services as the more generous the facility hours are, the more accessible the services are to obtain. This may not be a key concern for EAP service users

because they may be allowed to leave work to visit the EAP. Conversely, the need for a referral to receive behavioral health treatment may result in less utilization of behavioral health services.

The opportunity costs of the time associated with obtaining behavioral health treatment are a key factor that may influence utilization of these services. These opportunity costs are the forgone value of the time it takes to obtain the care, which are influenced by factors that affect either the time required to obtain the services or the value of each hour of the individual's time. Scheduling an appointment for behavioral health treatment, traveling to and from the appointment, and being seen by the provider may require a substantial amount of time. Therefore, the time spent receiving behavioral health treatment could be at the detriment of their other responsibilities.

A key factor that influences an individual's opportunity costs through the value they place on their time are their competing time demands, such as childcare. The more competing demands that an individual has, the higher the value they are likely to place on each hour of foregone time and the less likely they are to obtain behavioral health treatment. Another factor that influences an individual's opportunity cost is the wait time at the facility and the distance an individual must travel to be seen by the provider. If an appointment requires a significant amount of waiting before being seen, this increases the opportunity costs associated with these services and likely results in reduced utilization of behavioral health services. Similarly, if an individual must travel long distances to obtain care, they may be less likely to obtain these services. Schmitt and colleagues (2003) found that distance to providers was a significant predictor of outpatient mental health aftercare following inpatient substance abuse treatment among veterans (Schmitt, Phibbs, and Piette, 2003).

Figure 2. Conceptual Framework for Utilization of Behavioral Health Services (BHS) Among Commercially Insured Individuals with an EAP and Behavioral Health Benefit



Notes:

- For simplicity, the model does not show all moderating effects (e.g. social support moderates the relationship between perceived stigma and utilization of behavioral health services)
- For ease of exposition, the model does not show all predictors of utilization of EAP services (e.g. perceived stigma is a predictor of both utilization of BHS and EAP)

Chapter IV. Data and Measurement

Data and Measurement

This chapter details the data sources, study sample, and variables that were utilized in this dissertation. The administrative data used were from 2011-2014. The dataset consists of data from one of the largest managed behavioral health groups in the United States, Optum®, and its sister company, United Healthcare. Since the focus of this dissertation is the role of race/ethnicity in EAP service use, the sample is restricted to individuals with race/ethnicity data and access to an EAP benefit administered by Optum.

Data Sources

This dissertation utilized data provided by the behavioral health division of Optum, United Health Group. Optum contracts with 2,500 facilities and 130,000 providers to serve approximately 2,500 customers (including UnitedHealthcare and other commercial medical insurance plans in addition to employer groups), with 60.9 million members distributed across all U.S. states and territories. As one of the largest managed behavioral health organizations, Optum Behavioral covers behavioral health accounts for small and large employers across the U.S. as well as provides care management services.

Although data from 2008-2014 were available, only data from 2011-2014 were utilized. This allowed for the evaluation of the predictors of EAP use and behavioral health services use without the potential confounding effect of the implementation of the Mental Health Parity and Addiction Equity Act (MHPAEA). This landmark piece of legislation prohibited commercial, large-group insurance plans covering mental health and/or substance use disorders from applying financial requirements (e.g. deductibles and copayments) or treatment limits (e.g. number of inpatient days or days of coverage) that are more restrictive than the limits applied to

medical/surgical benefits (Ettner et al., 2016). The MHPAEA was passed in October of 2008 and became effective for most plans in January of 2010, with additional provisions taking effect in January 2011. Therefore, beginning the analysis using 2011 data should reduce the confounding effect of the MHPAEA on EAP or behavioral health service use.

The analytical file consisted of data from multiple data files provided from Optum for beneficiaries from 2011-2014: (i) member eligibility files, (ii) specialty behavioral health claims, routinely collected and archived for all Optum behavioral health beneficiaries, (iii) the "Book of Business" files; (iv) provider supply data; and (v) linked commercial marketing data.

Member eligibility file: The member eligibility data include age, gender, relationship to subscriber (primary beneficiary, spouse, dependent) and eligibility information. An enrollment file identifies all insurance plan enrollees with a member identification number and plan identification in each year. This information was used to identify all enrollees in eligible health plans, including those that did not make any service claims on their insurance in a particular year. The member eligibility file also indicates sex, age and state of residence for each patient. The member eligibility file also indicates age, gender, relationship to subscriber (primary beneficiary, spouse, dependent) and eligibility information for each individual.

Specialty behavioral health claims file: The service-level claims file provides information on the patient and provider; setting (inpatient vs outpatient); date(s) of service; diagnosis and procedure codes and costs associated with each service. These data do not include pharmaceutical or medical claims. Each service is described using Current Procedural Technology (CPT) codes, revenue codes, or Healthcare Common Procedure Coding System (HCPCS). Each service also has associated plan (Optum plus any other insurers paying for a

portion of the service through coordination of benefits), patient, and total expenditure amounts, with patient expenditures being the sum of deductible, copayment and patient coinsurance amounts. In addition, the claims data provide information about patients including whether or not they are dependents, diagnoses recorded during behavioral health visits, and some further description of the services they used (e.g. in-network versus out-of-network, provider type, and setting of care).

"Book of Business" (BOB) files: A plan-year-level file provides employer and plan-level characteristics. Employer characteristics include employer group size and the industry into which the employer is categorized using the North American Industry Classification System (NAICS). Plan characteristics include carve-in status (i.e. whether the plan is "carve-in" and both behavioral health and insurance benefits are offered as one insurance product or the plan is "carve-out" and offers an insurance product that only includes behavioral health services , while the purchaser offers separate medical insurance through another vendor), type of coverage (i.e. behavioral health, EAP and/or work-life), and the level of management (e.g., health maintenance organization (HMO) versus preferred provider organization (PPO)).

Provider supply data: A file indicating the number of specialty behavioral health providers per 1,000 enrollees, by state and by year, was also provided by Optum. These counts include providers in Optum networks, and thus describe the in-network provider supply, but not the total provider supply available to enrollees in in-and-out-of-network plans.

Linked commercial marketing data: The database was linked to consumer marketing data (e.g. information from credit card applications) from Optum Insight. This dataset provides categorical data on enrollee education, income/net worth, and race/ethnicity/language. It is

important to note that the income/net worth and race/ethnicity/language variables are combination variables in addition to using categorical responses. In other words, the variables used in our study provide categories based on the joint values of each of the individual variables. This aggregation was done to satisfy Optum's confidentiality requirements for providing the sociodemographic data. The information in this file facilitates the key exclusion criteria needed to create the study sample.

Study Design

The study design was an individual-level, retrospective, cross-sectional analysis. The unit of observation was the person-year.

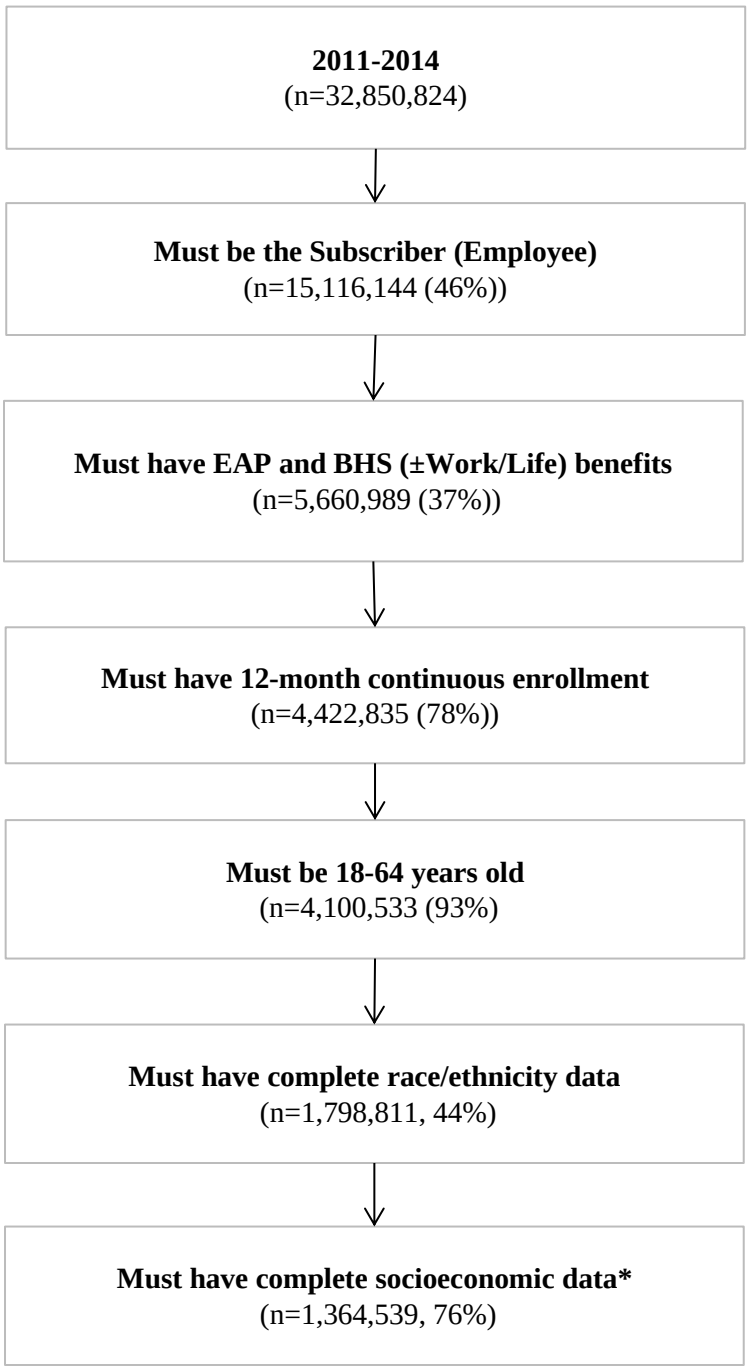
Study Sample

Each analysis was executed using the same analytical sample. The first step of creating the study sample was to limit to only 2011-2014. Since the focus of this dissertation is EAP service use, the analysis was also limited to subscribers (i.e. employees). Dependents, such as spouses and children, were excluded from the sample. Although family members may utilize EAP services with the employee, use of EAP services by family members is less common and more difficult to interpret as there is limited data available in the dataset about family members. An analysis including family members would likely require alternative models than those presented in this dissertation. Therefore, this dissertation focuses on the employee. All individuals in the study sample were required to be enrolled in a health plan that offered benefits for both EAP services and behavioral health services – with or without a Work-Life program – managed by Optum in 2011-2014. For each analysis, the unit of observation is the person-year;

therefore, everyone in the sample had to have at least 12 months of continuous enrollment. Only person-year observations with continuous 12-month enrollment were included in the sample. The sample excludes children (i.e. less than 18 years of age) and adults over the age of 64. The inclusion of children would require an alternative conceptual model and literature review as factors that drive EAP service use and behavioral health services use likely differ for children. Further, including a Medicare-eligible population based on age would increase the probability that the study sample had access to services outside of the benefits for which data are available in this dataset. Additionally, since the focus of this dissertation is the role of race/ethnicity, only individuals with linked sociodemographic data were included in the analytical sample. The resulting study sample is illustrated in **Figure 3**. The size of the employers was not restricted so that the results can be more easily generalizable to both small and large employers in the United States.

It is important to note that since a moderate proportion of the original sample was excluded due to incomplete socioeconomic data – either due to the fact that the individual's administrative claims data were not linked to the commercial marketing database or they had item non-response – sensitivity analyses were conducted. A subsequent section describes the sensitivity analyses executed to examine potential biases due to this missingness. The size of the employers was not restricted so that the results can be more easily generalizable to both small and large employers in the United States.

Figure 3. Study Sample Cohort Diagram (person-years)



* The methods section below outlines the sensitivity analyses estimating the potential impact of missing socioeconomic data.

Measurement Model

This section details each measurement model, both pertaining to commercially-insured individuals with behavioral health benefits in addition to their EAP benefits: one that outlines the measures for factors influencing use of EAP services and another for factors that influence use of behavioral health services. **Figures 4 and 5** add measurement proxies to the conceptual model from the previous chapter. Measurement proxies are presented within the box for the corresponding conceptual factor (labeled in bold text). When measurement proxies are not available, the corresponding concept box indicates this. Dashed lines indicate mediating concepts that are not controlled directly in the models (in other words, the models are in reduced-form with regard to these mediators). This section rationalizes use of each measurement proxy, and reports whether it is used in the main analysis or sensitivity analysis.

Measurement Model for Utilization of Employee Assistance Program Services

Figure 4 below illustrates the measurement model for EAP service use among commercially-insured individuals with an EAP benefit.

Utilization of EAP services. Annual number of EAP visits at the enrollee level represents EAP utilization.

Awareness of EAP. A key predictor of EAP service use is awareness of the EAP. EAP Penetration Rate is the proxy for the awareness of EAP at the employer level. As described in the literature, EAP Penetration Rate is calculated as a percentage and represents the proportion of those with access to an EAP that utilize EAP services (Bayer and Barkin, 1990). It is estimated that a greater EAP penetration rate at an employer would suggest that a greater number of

employees were aware of the EAP services available. Conversely, a lower EAP penetration rate would suggest lower awareness of these services.

Social support. It is difficult to find comprehensive proxies for social support in administrative claims data. However, there are three proxies– gender, number and type of dependents covered and age –available to control for the modifying effect of these concepts on the effects of EAP service utilization.

Utilization of behavioral health services. Procedure codes and service units recorded in the claims during enrollees' specialty behavioral health encounters were used to measure specialty mental health utilization, more specifically individual outpatient psychotherapy visits. Current Procedural Technology (CPT) codes and Healthcare Common Procedure Coding System (HCPCS) codes were used to identify claims for these services.

Perceived stigma. It is difficult to find comprehensive proxies for social support in administrative claims data. However, there are four crude proxies– *race/ethnicity/language, gender, education and age* –available to control for the modifying effect of these concepts on the effects of EAP service utilization.

Supervisor referral. No proxy available.

Job performance. No proxy available.

Accessibility of EAP services. No proxy available.

EAP provider supply. No proxy available.

Location of EAP services. No proxy available.

Generosity of EAP services offered. *EAP Limit Amount* serves as the proxy available for the generosity of EAP services offered. The EAP limit amount represents the annual number

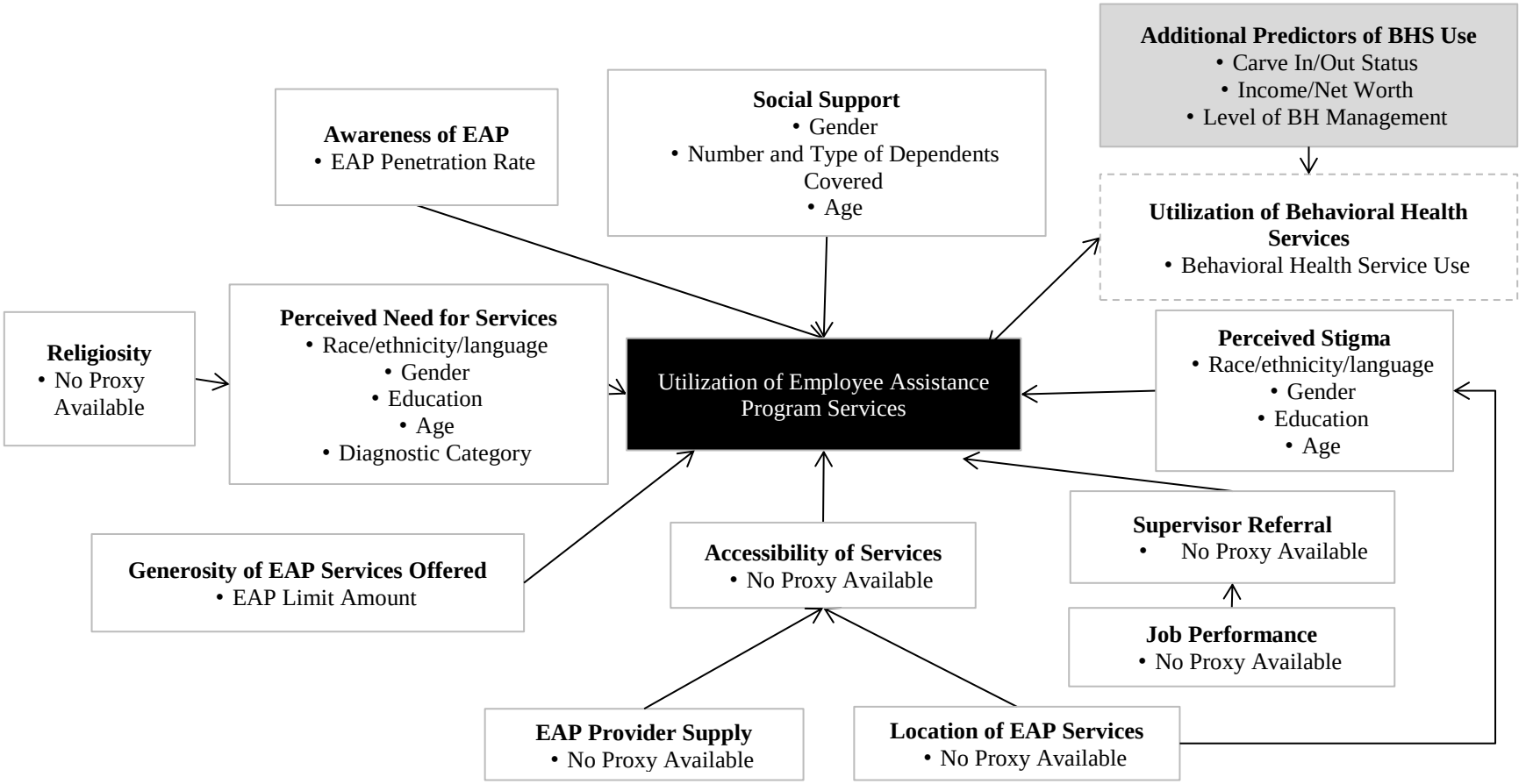
of EAP visits – total or per incident – per enrollee. The more EAP visits allowed, the more generous an enrollee's plan is.

Perceived need for services. Five proxies were utilized for this measure: diagnoses, gender, race/ethnicity/language, education, and age. Diagnosis codes are intended to reflect a clearly defined, standardized list of disorders, set out by the Diagnostic Statistical Manual of Mental Disorders, 4th Edition. The code is entered by a licensed provider based on a face-to-face evaluation of the patient, increasing the code's ability to accurately reflect mental health status.

Although diagnoses reflect the provider's assessment of the patient's need, and therefore are arguably a reasonable proxy for the patient's own perceived need, one limitation of using claims-based diagnostic codes as a proxy for mental health status is that diagnoses depend not only on whether relevant symptoms presented, but also on whether the individual sought care in order to treat the symptoms. Enrollees who do not seek care do not have their diagnosis recorded, and the more visits made by an enrollee, the more opportunities they have for diagnoses to be made. Additionally, conditions with mild symptoms may be less likely to prompt care-seeking, while conditions with very severe symptoms may pose a barrier to care seeking. Both scenarios present cases where conditions can be unidentified in claims data due to lack of formal diagnoses.

It is important to note that once patients do seek care and do have opportunities for diagnoses to be made, diagnostic codes do not always capture the severity of a patient's condition. It has been reported that diagnosis codes are selected more for reimbursement purposes rather than truly documenting the patient's diagnosis (Sharar, 2009).

Figure 4. Measurement Model for Utilization of Employee Assistance Program Services among Commercially Insured Individuals with an EAP and Behavioral Health Benefit



Notes:

- For simplicity, the model does not show all moderating effects (e.g. social support moderates the relationship between perceived stigma and utilization of EAP services)
- For ease of exposition, the model does not show all predictors of BHS (e.g. perceived stigma is a predictor of both utilization of BHS and EAP, but there is only an arrow going into EAP in the figure)

Measurement Model for Utilization of Behavioral Health Services

Figure 5 outlines the measurement model for the utilization of behavioral health services among commercially-insured individuals with access to both an EAP and behavioral health services. For brevity, only the concepts that were not outlined in the previous section will be detailed here.

Direct out-of-pocket cost-sharing. This is a deliberately unmeasured mediator and, therefore, no proxy was used.

Generosity of health insurance. Carve-in status is the key proxy for generosity of health insurance in this database. Evidence suggests that carve-out plans result in decreased behavioral health service utilization relative to carve-in plans due to more narrow provider options and a focus on reduced intensity of services (Frank and Garfield, 2007).

Financial resources. The combined household income/net worth categorical variable serves as a proxy for financial resources. While income is a large component of many individuals' financial means, net worth also provides insight into one's personal assets that may be liquidated to obtain necessary behavioral health treatments.

Accessibility of BHS. Level of behavioral health plan management serves as a proxy for accessibility of BHS. A plan with higher levels of management is likely associated with lower accessibility of services. For example, individuals enrolled in a PPO plan likely have greater accessibility – relative to an individual enrolled in an HMO plan – due to a larger network of providers and the ability to access a behavioral health specialist without the need for a referral.

BHS provider supply. Provider supply, which can predict travel time to a provider and thus partially predicts opportunity cost of obtaining mental healthcare, is measured by contracted specialty behavioral health provider supply per 1000 enrollees in each state, in each year.

BHS facility hours No proxy available**.**

Need for referral. No proxy available.

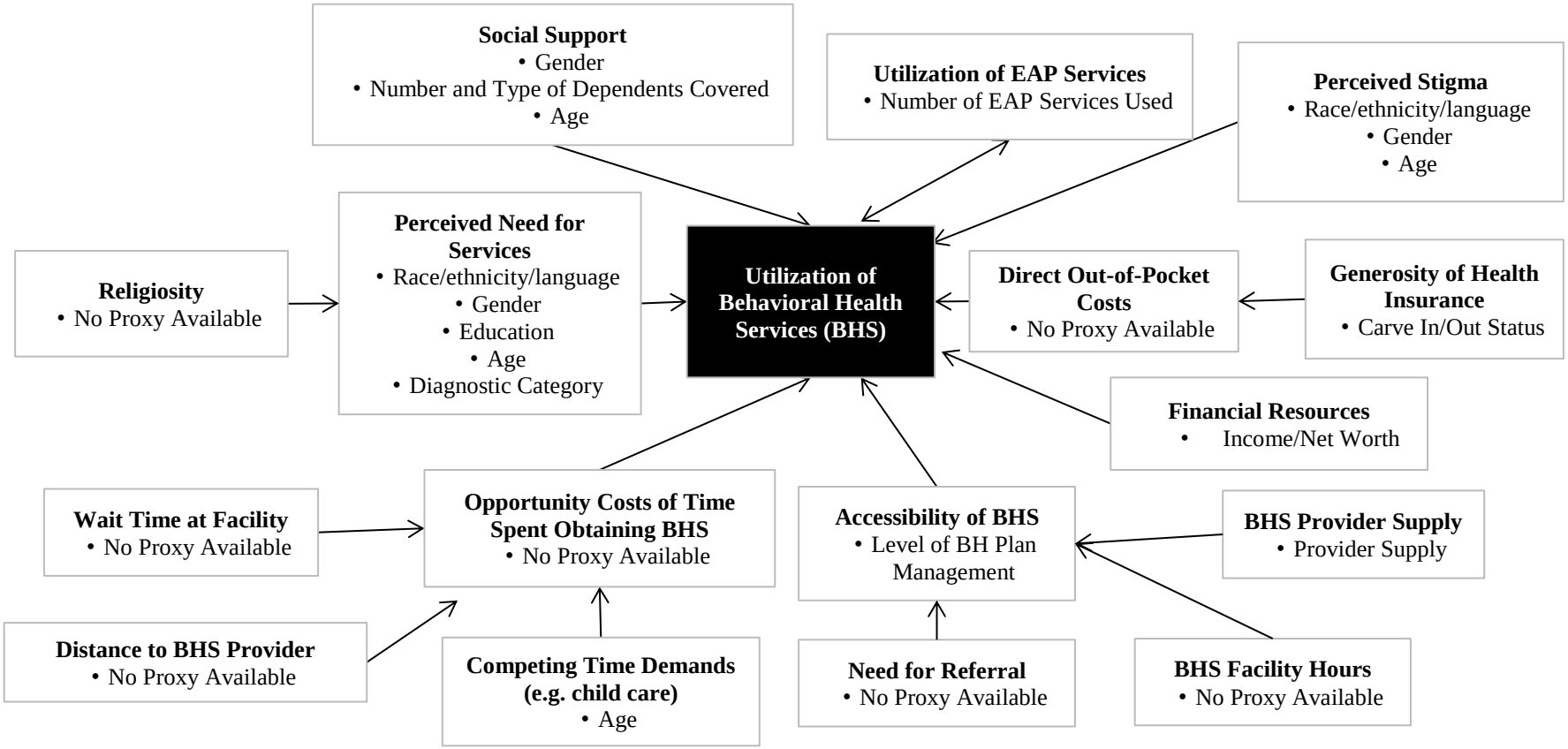
Opportunity costs of time spent obtaining BHS. This is a deliberately unmeasured mediator and, therefore, no proxy was used.

Competing time demands. This is a deliberately unmeasured mediator and, therefore, no proxy was used.

Distance to BHS provider. No proxy available.

Wait time at facility. No proxy available.

Figure 5. Measurement Model for Utilization of Behavioral Health Services (BHS) among Commercially Insured Individuals with an EAP and Behavioral Health Benefit



Notes:

- For simplicity, the model does not show all moderating effects (e.g. social support moderates the relationship between perceived stigma and utilization of behavioral health services)
- For ease of exposition, the model does not show all predictors of utilization of EAP services (e.g. perceived stigma is a predictor of both utilization of BHS and EAP)

Variable Construction

Tables 2-4 below provide an overview of the definitions of the variables used in this dissertation. The unit of measurement is the person-year; therefore, the outcome measures were aggregated to the annual level.

The definitions for both outcome variables are outlined in **Table 2**. Both of the outcomes were created using Current Procedural Technology (CPT) codes, Healthcare Common Procedure Coding System (HCPCS) codes and Derived Level of Care (DLOC) categories. The list of codes used to categorize the data are located in **Appendix A.** Individuals in the enrollment file who have no EAP claims have EAP visit counts of zero.

The outcome for the second and third research questions, outpatient behavioral health services use, was constructing using separately counted visits for assessment/diagnostic evaluation, medication management, individual, family and group psychotherapy. Individuals in the enrollment file who have no behavioral health services claims have visit counts of zero.

Table 2. Definitions for Outcome Variables

Variable	Description
EAP Visits	Continuous variable representing the total number of EAP visits
Outpatient Behavioral Health Services Use	Continuous variable representing the total number of outpatient visits

The definitions for individual-level variables are outlined in **Table 3**. Separate dichotomous variables indicate an enrollee's race/ethnicity and primary language used to

communicate. The variables include Asian English speaker, Asian non-English speaker, Black, Hispanic English speaker, Hispanic non-English speaker, or White. Language categories were aggregated with Blacks and Whites to preserve statistical de-identification, due to very small numbers of non-English speakers. The analysis focuses on race/ethnicity; however, the primary language used to communicate can provide insight into other characteristics of the individual (e.g. immigration status and language ability).

A dichotomous variable has a value of 1 for male and 0 for female. A continuous variable was calculated for each enrollee based on their birth year and age on January 1 for each year. Dichotomous age group indicators were constructed for ages: 18-24, 25-34, 35-44, 45-54 and 55-64. A dichotomous variable indicated whether the enrollee has dependents or spouses covered under their plan. There are four continuous variables that represent the number of dependents covered by age: less than 5 years old, 5-11 years old, 12-17 years old and greater than 18 years old.

Separate dichotomous variables indicate enrollees' level of income (low, moderate, and high income) and their level of net worth (very low, low, moderate, high very high). Separate variables indicate enrollee's level of educational attainment with levels that include high school or less, some college, Associate degree, and bachelor's degree or above. Employer industry is a categorical variable with 19 industry values. A continuous variable indicates the number of Optum INN providers who conduct psychotherapy services by service type per 1,000 Optum enrollees in the enrollee's state in the year.

Table 3. Definitions for Individual Variables

Variable	Description
Race/Ethnicity and Primary Language Used to Communicate	
Asian, English speaker	=1 if enrollee is an Asian and English is Primary Language; =0 if not
Asian, non-English speaker	=1 if enrollee is an Asian and English is not their Primary Language; =0 if not
Black	=1 if enrollee is Black; =0 if not
Hispanic, English speaker	=1 if enrollee is a Hispanic and English is their Primary Language; =0 if not
Hispanic, non-English speaker	=1 if enrollee is a Hispanic and English is not their Primary Language; =0 if not
White	=1 if enrollee is White; =0 if not
Male	=1 if enrollee is male, =0 if enrollee is female
Age	
18-24	=1 if enrollee is 18-24; =0 if not
25-34	=1 if enrollee is 25-34; =0 if not
35-44	=1 if enrollee is 35-44; =0 if not
45-54	=1 if enrollee is 45-54; =0 if not
55-64	=1 if enrollee is 55-64; =0 if not
Spouse / Domestic Partner Covered	=1 if enrollee has a spouse, domestic partner, ex-spouse, surviving spouse covered; =0 if not
Number of Dependents Covered by Age	
Less than 5 years old	Continuous variable representing the number of dependents under the age of 5 covered by the subscriber
5-11	Continuous variable representing the number of dependents aged 5-11 covered by the subscriber
12-17	Continuous variable representing the number of dependents aged 12-17 covered by the subscriber
Greater than 18 years old	Continuous variable representing the number of dependents greater than 18 years old covered by the subscriber

Table 3. Definitions for Individual Variables (continued)

Variable	Description
Education	
High School or less	=1 if enrollee's highest educational attainment is high school or less, =0 if not
Some college	=1 if enrollee's highest educational attainment is some college, =0 if not
Associate degree	1=if enrollee's highest educational attainment is associate degree; =0 if not
Bachelor's degree or higher	1=if enrollee's highest educational attainment is bachelor's degree or higher; =0 if not
Household-level Income / Net Worth	
Low income, very low net worth	=1 if enrollee's low income (<$75K), low net worth (<$25K); =0 if not
Low income, low net worth	=1 if enrollee's low income (<$75K), low net worth ($25-$100K); =0 if not
Low income, moderate to very high net worth	=1 if enrollee's low income (<$75K), moderate to very high net worth ($100K+); =0 if not
Moderate income, very low to low net worth	=1 if moderate income ($75-$150K), very low to low high net worth ($0-99K); =0 if not
Moderate income, moderate net worth	=1 if moderate income ($75-150K), moderate net worth ($100-$249K); =0 if not
Moderate income, high to very high net worth	=1 if moderate income ($75-$150K), high to very high net worth ($250K); =0 if not
High income, very low to high net worth	=1 if high income ($150K); very low to high net worth ($0-$499K); =0 if not
High income, very high net worth	=1 if high income ($150K+), very high net worth ($500K+); =0 if not

Table 3. Definitions for Individual Variables (continued)

Variable	Description
Industry	
Professional, Scientific, and Technical Services	=1 if enrollee employed in the Professional, Scientific, and Technical Services industry; =0 if not
Agriculture, Forestry, Fishing and Hunting	=1 if enrollee employed in Agriculture, Forestry, Fishing and Hunting industry; =0 if not
Mining, Quarrying, and Oil and Gas Extraction	=1 if enrollee employed in Mining, Quarrying, and Oil and Gas Extraction industry; =0 if not
Utilities	=1 if enrollee employed in Utilities industry; =0 if not
Construction	=1 if enrollee employed in Construction industry; =0 if not
Manufacturing	=1 if enrollee employed in Manufacturing industry; =0 if not
Wholesale Trade	=1 if enrollee employed in Wholesale Trade industry; =0 if not
Retail Trade	=1 if enrollee employed in Retail Trade industry; =0 if not
Transportation and Warehousing	=1 if enrollee employed in Transportation and Warehousing industry; =0 if not
Information	=1 if enrollee employed in Information industry; =0 if not
Finance and Insurance	=1 if enrollee employed in Finance and Insurance industry; =0 if not
Real Estate and Rental and Leasing	=1 if enrollee employed in Real Estate and Rental and Leasing industry; =0 if not
Management of Companies and Enterprises	=1 if enrollee employed in Management of Companies and Enterprises industry; =0 if not
Educational Services	=1 if enrollee employed in Educational Services industry; =0 if not
Health Care and Social Assistance	=1 if enrollee employed in Health Care and Social Assistance industry; =0 if not
Arts, Entertainment and Recreation	=1 if enrollee employed in Arts, Entertainment and Recreation industry; =0 if not
Accommodation and Food Services	=1 if enrollee employed in Accommodation and Food Services industry; =0 if not
Other Services (except Public Administration)	=1 if enrollee employed in Other Services (except Public Administration) industry; =0 if not
Public Administration	=1 if enrollee employed in Public Administration industry; =0 if not

Table 3. Definitions for Individual Variables (continued)

Variable	Description
Mental Health Diagnosis	
Adjustment disorder	=1 if enrollee has adjustment disorder; =0 if not
Post-Traumatic Stress Disorder (PTSD)	=1 if enrollee has PTSD; =0 if not
General anxiety disorder	=1 if enrollee has general anxiety disorder; =0 if not
Obsessive Compulsive Disorder (OCD)	=1 if enrollee has OCD; =0 if not
Panic disorder	=1 if enrollee has panic disorder; =0 if not
Phobia	=1 if enrollee has phobia; =0 if not
Dementia	=1 if enrollee has dementia; =0 if not
Attention Deficit Hyperactivity Disorder (ADHD)	=1 if enrollee has ADHD; =0 if not
Bipolar	=1 if enrollee has bipolar; =0 if not
Depression	=1 if enrollee has depression; =0 if not
Personality disorder	=1 if enrollee has personality disorder; =0 if not
Schizophrenia	=1 if enrollee has schizophrenia; =0 if not
Other mental health condition	=1 if enrollee has other mental health condition; =0 if not

The definitions for plan, employer and EAP variables are outlined in **Table 4**. Plan variables include carve-in status. The EAP limit amount is a continuous variable representing the number of EAP visits allowed annually to employees. The EAP penetration rate is a continuous variable representing the proportion of EAP users at an employer. The rate was calculated by

dividing the total number of EAP users at an employer-year level by the average number of employees enrolled in Optum in the sample at the employer-year level.

Table 4. Definitions for Plan, Employer and EAP Variables

Variable	Description
Carve-In Status	=1 if employer is carve-in; =0 if employer is carve-out
Behavioral Health Plan is "more managed" vs "less managed"	=1 if plan is EPO, POS or HMO; =0 if plan type is PPO or HDHP
Provider Supply per 1,000 Members for the Given State and Year	
MD Rate	Continuous variable representing the number of MD providers per 1,000 members, for the given state and year
MSW Rate	Continuous variable representing the number of MSW providers per 1,000 members, for the given state and year
PhD Rate	Continuous variable representing the number of PhD providers per 1,000 members, for the given state and year
RN Rate	Continuous variable representing the number of RN providers per 1,000 members, for the given state and year
Non-Independent Licensed Provider Rate	Continuous variable representing the number of non-independent licensed providers per 1,000 members, for the given state and year
EAP Limit Amount	Continuous variable representing the number of EAP visits allowed to employees
EAP Penetration Rate	Continuous variable representing the proportion of EAP users at an employer

EPO: Exclusive provider organization; POS: point of service; HMO: health management organization; PPO: preferred provider organization; HDHP: high deductible health plan; MSW: Masters of Social Work; PhD: Doctor of Philosophy

Chapter V. Empirical Methods

Empirical Methods

The empirical methods employed in this dissertation to answer the three research questions of interest are outlined in this chapter. The following three sections detail each research question and the associated hypotheses, as well as the analyses used to assess each hypothesis. A key methodological concern was the endogenous relationship between EAP service use and behavioral health service use, due to reverse causality. The empirical methods executed in this dissertation aimed to mitigate this concern, as well as other methodological concerns including the likely high proportion of zero values in the dependent variable and the possible impact of diagnosis.

How are race/ethnicity associated with EAP service use, all else equal?

In this analysis, the following primary hypothesis and a competing hypothesis were tested:

- **Hypothesis A-1**: Whites will be more likely to utilize EAP services compared to minorities, after controlling for other variables in the model.
- **Competing hypothesis:** Minorities will be more likely to utilize EAP services compared to Whites, after controlling for other variables in the model.

Single-equation Linear Model

Dissimilar to demographic characteristics, behavioral health services use is not pre-determined and is likely influenced by the outcome of interest – EAP service use. Although there is limited evidence in the literature, it is plausible that an individual who is utilizing EAP services may be less likely to utilize behavioral health services as they may perceive that they are

being adequately treated, for example. A reduced-form rather than structural-equation model was therefore estimated to avoid the problem of endogeneity bias when answering the first research question. Further, EAP service use shares a commonality with most health services data – it is a limited-dependent variable with a skewed conditional distribution. A series of sensitivity analyses, including employing a two-part model, were executed to attempt to address this key methodological concern, as well as other concerns, associated with the first research question.

As mentioned, a key methodological concern associated with the first research question explored was the endogenous relationship between one of the regressors of interest, behavioral health service utilization, and the outcome of interest, EAP service use. EAP service use and behavioral health service use are both endogenous variables in the regression, as illustrated in the equations below:

$$\text{EAP service use} = f(\text{behavioral health service use}, X_{EAP,}\, \varepsilon_{EAP})$$

$$\text{Behavioral health service use} = g(\text{EAP service use}, X_{BHS}, \varepsilon_{BHS}),$$

where f and g are functions to be specified.

Due to reverse causality, any change in EAP service use (Y) will *also* induce a change in behavioral health service use (X), thereby violating the OLS assumption that X and ε are uncorrelated. Thus, naïve regression estimates are likely to bias the causal impact of behavioral health service use on EAP service use. It is difficult to determine the possible bias *a priori* as it is unclear if the effect of behavioral health service use on EAP service use and the effect of EAP service use on behavioral health service use are both positive, both negative, or if their effects are in opposite directions. For example, if the effects were in opposite directions (e.g. utilization of EAP services resulted in a referral and increased utilization of behavioral health services *and*

utilization of behavioral health services resulted in decreased utilization of EAP services), the bias would be conservative.

Instead of executing an endogenous model as a set of structural equations, a reduced-form specification in which the endogenous variable (i.e. behavioral health service use) was estimated as a function of all the exogenous regressors was executed. Whereas structural equations depict the causal relationship among variables in a system of equations, reduced-form equations are those that have been rearranged algebraically to ensure endogenous variables are on the left-hand side of the equation, expressed as a function of only exogenous variables that affect EAP use either directly or indirectly (through behavioral health services use) on the right-hand side of the equation. That is, reduced-form equations of endogenous models are derived by solving the structural equations in terms of the exogenous variables. The reduced-form equation for EAP service use was preferred to the structural equation as the reduced-form equation corresponds to the first stage of the instrumental variable estimation – detailed later this chapter – and the structural equation is not of particular interest, in regard to the first research question.

The use of a model in partial reduced-form will address the issue of reverse causality between EAP service use and behavioral health service utilization for the first research question (i.e., that EAP service use depends on behavioral health treatment and behavioral health treatment, in turn, depends on EAP service use). As the structural relationships are not the focus of the first research question, the reduced-form equation simplifies the equation. The reduced-form regression specification for the first research question was as follows:

EAP service use = f (race/ethnicity/language, number of dependents covered by age, spouse / domestic partner covered, gender, education, income/net worth, age, carve-in

status, state, industry, behavioral health services provider supply, level of behavioral health plan management, EAP penetration rate, EAP limit amount), where f is a function to be specified. As outlined in more detail in a subsequent chapter, indicators for diagnosis were included in sensitivity analyses as a proxy for perceived need for services.

For the main analysis, the outcome of interest – EAP service use – was analyzed as a continuous variable using an ordinary least squares (OLS) regression model. Although there was concern regarding the probable high number of zeros in the outcome, for simplicity of exposition and interpretation, the main analyses are based on OLS. A two-part model was executed as a sensitivity analysis, outlined in detail below, to explore the possible impact of this. Using OLS, the hypothesis was tested by doing a two-tailed F-test of joint significance at the alpha=0.05 level to test for significance of the coefficients on the race/ethnicity/language variables (i.e. Black; Asian, Non-English Speaking; Asian, Non-English Speaking; Hispanic, English Speaking; Hispanic, Non-English Speaking) relative to the reference category (i.e. White). The signs on each of the race/ethnicity/language variables were expected to be negative if the primary hypothesis were true; however, the signs would be positive if the competing hypothesis were true.

In order for OLS to provide asymptotically efficient estimates, it is important that the variance of the error term is the same across observations (i.e. homoscedastic), and that the error term is independent across observations. These assumptions may be violated in the present analysis where individuals in the sample are clustered within employers. Clustering occurs when the error terms are not independent across observations, as is assumed in ordinary least squares. In this case, information from one employee may provide information about other employees in

the sample; thus, the error terms between observations may be correlated. Though the point estimates (e.g. means, coefficient estimates) should be unbiased and consistent, the violation of the independence of the residuals leads to incorrect estimates of the variances and standard errors as well as incorrect confidence intervals and significance levels of the inference tests, thus overestimating the precision of the estimate of the coefficient. In other words, the non-independence of observations will result in smaller variances and standard errors, narrower confidence intervals, biased inference tests, and there is a greatly likelihood of succumbing to a Type I error. Whether the variance is overestimated or underestimated as the result of intra-cluster correlation depends on the fraction of total variance among the regressors that is attributable to within-cluster vs. between-cluster variance.

Interpretation of the results without accounting for clustering should be viewed with caution. The correlation of error terms for observations from the same employer might be greater than the correlation of the error terms for observations from different employers. Controlling for clustering at the highest level, which, for many people, is employer group, gives the most conservative standard errors. For this reason, to adjust for both the non-independence and heteroskedasticity of the errors, the models were run with the robust cluster option that generate standard errors that are robust even with heteroskedasticity in the distribution of the errors (Nichols, 2007). Specifically, the GEE with an exchangeable correlation matrix was employed.

Sensitivity Analyses

Two sensitivity analyses were executed to explore the robustness of the findings. The first sensitivity analysis attempted to mitigate the concern of a high proportion of zeros by employing a two-part model. An additional sensitivity analysis was executed to explore the impact of controlling for diagnostic categories in the analysis.

Two-part Model

A histogram (not shown) was created to examine the distribution of the continuous dependent variable (i.e. EAP service use). In a given year, a high proportion of the values of the dependent variable (i.e. EAP service use) were anticipated to be zero. This is because the sample includes all enrollees, only a fraction of whom obtain any treatment via an EAP during the study period. In other words, the outcome of interest was skewed with a right-hand tail due to a spike of zero values. There are also a few outliers at the end of the right tail. This violates the first of the assumptions for OLS to produce unbiased, minimum-variance estimates: dependent variable has a normal distribution and has a linear relationship with explanatory variables. Because of these data properties, there was concern that the estimates from the OLS model may be inefficient.

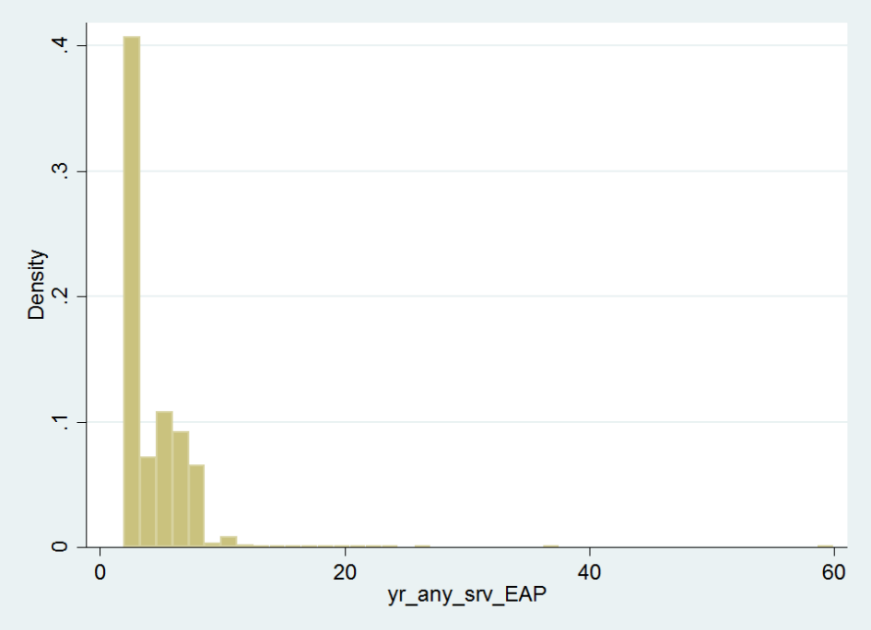
For the primary analysis, this issue was ignored, and the Central Limit Theorem and large sample sizes were relied upon to use a naïve OLS. However, as a sensitivity analysis, a technique that attempts to account for the large numbers of zeros and skewed distribution of EAP service use was employed. There are multiple options for dealing with the large number of zero values for EAP service use (e.g. zero-inflated count data model); however, the most commonly used

type of multi-part models (i.e. two-part model) was utilized. A two-part model was selected as there was an interest in evaluating predictors of any EAP service use *and* the intensity of EAP service use among users. Specifically, a non-linear, two-part model was executed to test the robustness of the estimates.

The likelihood function of the two-part model examines these outcomes in two parts, and it can be shown that the likelihood function for this model separates into two independent regressions, one for Pr(EAP Service Use > 0) and the other for E(EAP Service Use | EAP Service Use > 0), where E denotes the expected value. Specifically, the first part of the two-part model modeled the probability of any EAP service use (Pr(EAP Service Use > 0)) using a logit model.

The second part requires the estimation of a conditional regression that models the effect of race/ethnicity on EAP service use for the subsample of cases with non-zero values on the outcome (i.e. EAP Service Use>0). In other words, with the second part of the two-part model the role of race/ethnicity and other regressors on the level of EAP service use among those who have had initial contact with an EAP was estimated. This analysis utilized a generalized linear model (GLM). **Figure 6** below illustrates the annual number of EAP visits used among users. The range of EAP service use was 1-60.

Figure 6. Histogram of Annual EAP Service Use among Users



The same covariates were used in both regressions. However, an additional sensitivity analysis was completed by controlling for the diagnosis categories outlined in **Table 3** during the second part of the two-part model. The diagnosis categories were not included in the first stage of the two-part model because diagnoses are more likely to be endogenous in the regression of whether or not any services were received. Although it is customary to assume the covariates to be the same in both regressions, it is not necessary. Outside of the diagnosis categories, it was not hypothesized that the initial visit to an EAP is primarily driven by different factors than those that drive additional visits to an EAP. Even though the regressors were the same in the first and second parts, it was anticipated that their effects would likely have different significance, magnitudes and even signs in the two regressions. This flexibility is one of the key advantages of executing a two-part model.

The estimates from the two parts of the two-part model were recombined to get the overall effects on unconditional service use using the following equation: E(EAP Service Use) = Pr(EAP Service Use > 0)*E(EAP Service Use | EAP Service Use >0), where E denotes the expected value. After estimating a two-part model, the results were compared to those from the OLS.

Analysis of Diagnosis Categories

As outlined above, the second sensitivity analysis controlled for diagnosis categories in the second part of the two-part model.

Do EAP services serve as a complement or a substitute for behavioral health services, after controlling for other variables in the model?

The following hypotheses were tested to answer the second research question – do EAP services serve as a complement or a substitute for behavioral health services after controlling for other variables in the model?:

- **Hypothesis B-1**: EAP service use will serve as a complement to behavioral health services, after controlling for other variables in the model.
- **Competing hypothesis:** EAP service use will serve as a substitute to behavioral health services, after controlling for other variables in the model.

To answer this research question, endogeneity was also a key concern. This section outlines the methods employed to mitigate this issue. Notably, a naïve OLS was executed as well as an instrumental variable analysis. A series of sensitivity analyses were completed to test the robustness of the results.

Single-equation Linear Model

For comparison purposes, a naïve OLS model was first executed. The regression specification was as follows:

> Behavioral health service use = f (EAP service use, race/ethnicity/language, number of dependents covered by age, spouse / domestic partner covered, gender, education, income/net worth, age, carve-in status, industry, state, level of behavioral health plan management, EAP penetration rate, EAP limit amount), where f is a function to be specified.

Clustering was also controlled for in this analysis using the methodology outlined in the previous section.

Using OLS, the hypothesis was tested by doing a two-tailed F-test of joint significance at the alpha=0.05 level to test for significance of the coefficient for EAP service use. It was expected that the sign on the EAP service use variable to be positive if the primary hypothesis were true; however, the sign would be negative if the competing hypothesis were true. That is, if employees were utilizing EAP services as a complement, the relationship between EAP service use and behavioral health service use would be positive. However, if the inverse were true and EAP services were utilized as a substitute, the relationship between EAP service use and behavioral health service use would be negative.

Instrumental Variable (IV) Analyses

As noted above in the explanation of the methods for the first research question, there was concern of endogeneity in the second research question. It is difficult to assess causality in the absence of random assignment because of the potential for reverse causality when assessing only association between the predictor of interest and the outcome being examined. It is empirically impossible to determine whether the predictor of interest (i.e. EAP service use) causes the outcome (i.e. behavioral health service use) or the outcome causes the predictor simply by using an ordinary regression equation. This causality loop must be mitigated in order to appropriately estimate models that aim to evaluate the direction of the effect correctly.

Without executing an analysis that aims to mitigate reverse causality, consistency of the model estimates may be threatened due to the presence of endogeneity bias. Ignoring reverse causality and estimating the model in a single-estimation equation, such as OLS, may result in biased coefficients of EAP service use on behavioral health service use because EAP service use will be correlated with the error term. In the absence of randomization, an instrumental variables (IV) model is a statistical solution to the problem of endogeneity bias.

The core tenet of instrumental variable models is to express the endogenous regressor as a function of exogenous regressors (i.e. regressors determined outside the model) as a way to break the correlation between the endogenous regressor (X) and the error term in the Y regression model. Instruments (i.e. a variable that has a causal effect on X but does not have a direct influence on Y) are used to break the correlation of the endogenous regressor and the error term. Potential instruments that were hypothesized to satisfy these requirements are EAP

characteristics including the EAP penetration rate (i.e. proportion of EAP users at the employer-level) and the EAP limit amount (i.e. annual number of EAP visits allowed).

There are multiple key assumptions associated with IV models (Angrist, 1997). The first assumption is the non-zero average causal effect. That is, the instrument must predict the endogenous regressor after controlling for other covariates. The second assumption, exclusion restriction, states that the instrument cannot be correlated with the error term. In other words, the instrument can only have negligible direct influence on the outcome after controlling for other variables in the model. The third is monotonicity, or that the instrument's effect on the endogenous regressor must be monotonic. Random assignment is the assumption that the instrument is not being influenced by the outcome or the endogenous regressor as the individual is effectively randomized into the value of the instrument. Stable Unit Treatment Value Assumption can be described as the assumption that the outcome for one respondent is unaffected by the particular value of the endogenous regressor for other variables.

There are important concerns to outline when using an IV model. First, even though an IV model will be consistent if the instruments are valid, IV can be less efficient compared to OLS, so the estimates may lose statistical significance even if the instruments meet the IV assumptions. Second, evidence suggests it is relatively easy to find an instrument that meets the assumption of the non-zero average causal effect in terms of having statistically significant effects. However, if the instruments are only weakly correlated with the endogenous regressor, then the IV estimation will have very low precision and the consistency will be compromised. The resulting IV estimates could be more biased than the OLS (naïve) estimates. Third, finding an instrument that meets the exclusion restriction is often the most difficult barrier to overcome.

There were two candidate instruments to choose from, however, increasing the likelihood that at least one of them will be both a strong predictor of EAP use and excludable from the second-stage regression of behavioral health services use.

In deciding between an IV model and standard OLS, the presence of endogeneity was tested via the Hausman test. The aim of the Hausman test of endogeneity is to determine if the endogenous regressor (i.e. EAP service use) is endogenous by comparing the estimates from the naïve OLS model to the estimates of the second-stage regression from the IV model. The null hypothesis of the Hausman test is that there are no systematic differences between OLS and IV coefficients (i.e. there is no endogeneity and EAP service use is exogenous). The alternative hypothesis is that there are systematic differences between the OLS and IV coefficients (i.e. there is endogeneity). If the null hypothesis is rejected, the standard OLS model to the IV model is preferred. If we fail to reject the null hypothesis, then there is endogeneity and OLS would be inconsistent. Therefore, the IV model is preferred to the OLS model. If the results of the Hausman test suggest that the OLS estimates were consistent with the estimates from the IV model (i.e. no endogeneity bias), it would be preferred to continue the estimation of the research equation using an OLS model since it is more efficient than the IV model.

As noted, the basic premise of instrumental variable models is to express the endogenous regressor as a function of exogenous regressors (i.e. regressors determined outside the model) to break the correlation between the endogenous regressor (EAP service use) and the error term in the utilization of behavioral health service regression model. The endogeneity bias can be eliminated using IV in two steps. The first step is to regress the endogenous regressor (EAP service use) on all the exogenous variables. This will be executed with an OLS model using a

reduced-form equation to estimate a predicted value of EAP service use: $\mathbf{X = \alpha W_Y + \beta Z_X + \eta}$, where X is the endogenous regressor (i.e. EAP service use), W_Y, is a matrix of exogenous variables influencing Y (i.e. predictors of behavioral health service use, some of which may also directly predict X), and Z_X (i.e. the instruments) is a matrix of additional exogenous variables influencing only X (i.e. predictors of EAP service use). α and β are parameter estimates while η is the error term of the first-stage regression.

In the second step of the IV, the actual value of EAP service use is replaced with the predicted value of EAP service use in the OLS with a structural equation for the utilization of behavioral health services (with the standard errors being adjusted for the use of a predicted rather than actual value). The substitution of the predicted value of EAP service use in the structural equation allows the correlation of EAP service use and the error term to be "broken" because it is now exogenous. Specifically, the second-stage equation is $\mathbf{Y = \delta X_P + \tau W_Y + \varepsilon_Y}$, where X_p is the predicted values of the endogenous regressor from the first-stage regression (i.e. EAP service use), and W_Y is the matrix of exogenous variables influencing Y (i.e. behavioral health service use). δ and τ are parameter estimates while ε_Y is the error term of the second-stage regression.

For this analysis, there were multiple options for types of IV estimation as both the dependent variable (i.e. BHS use) and the endogenous regressor (i.e. EAP use) are treated as continuous variables – namely two-stage least squares (2SLS) or generalized method of moments (GMM). While there was concern with using 2SLS due to the possible presence of heteroskedasticity, GMM generates efficient estimates in the presence of heteroskedasticity of unknown form. Although one of the key advantages of GMM is consistency in the presence of

arbitrary heteroskedasticity, there is a tradeoff of possibly poor performance in small samples – although that is not an issue due to the large sample size of the data utilized in this dissertation. The test of Pagan and Hall (1983) allows us to test for the presence of heteroskedasticity in IV estimation (Pagan and Hall, 1983). Due to the large sample size and the results of the Pagan test, GMM was utilized in this dissertation.

Testing the Validity of Instruments

The predicted values of the endogenous regressor (i.e. EAP service use) were derived by modeling the endogenous regressor as a function of the exogenous covariates from the second-stage regression in addition to the instruments. To properly identify the parameter estimates, there must be an exogenous regressor in the first stage that is not included in the second stage (the "instrument"). Otherwise, there is perfect collinearity between the predicted values and the linear combination of the second-stage regressors. In addition to other assumptions outlined subsequently, an instrument is a variable that predicts the endogenous regressor (i.e. EAP service use) but does not directly affect the outcome (i.e. behavioral health service use) after controlling for the endogenous regressor (i.e. EAP service use) and the other covariates. The first assumption described is called the "non-zero average causal effect" and the latter assumption is called the "exclusion restriction".

As mentioned, potential instruments that were hypothesized to satisfy these requirements were EAP characteristics including the EAP penetration rate (i.e. employer-level annual EAP user rate) and the EAP limit amount (i.e. annual number of EAP visits allowed). A strong enough correlation between the instruments (i.e. EAP characteristics) and the endogenous variable (i.e.

EAP service use) was anticipated, resulting in a strong prediction of the endogenous regressor. Since the causal impact of the endogenous regressor (i.e. EAP service use) on the outcome (i.e. behavioral health service use) is "identified" through the assumption that the instruments do not directly affect the outcome (i.e. behavioral health service use), it was anticipated that the instruments would also satisfy the exclusion restriction. That is, each instrument would only have a negligible direct influence on the outcome (i.e. behavioral health service use) after controlling for EAP service use and the other covariates (i.e. the instruments are uncorrelated with the error term).

The validity of the instruments was empirically tested. Specifically, the validity of both instruments – EAP penetration rate and EAP limit amount – was tested, as well as the validity of each of the instruments alone (i.e. only EAP penetration rate or only EAP limit amount utilized as the sole instrument) as sensitivity analyses. To test the assumption of the non-zero average causal, the F-test of Joint Significance of Excluded Instruments test was executed. The null hypothesis of the test is that the coefficient is jointly equal to zero. The alternative hypothesis is that at least one coefficient is not equal to zero. If the null hypothesis is rejected, the results suggest that, as a group, the instruments are jointly related to the endogenous regressor. That is, because there were two proposed instruments in the model (i.e. EAP penetration rate and EAP limit amount), when testing the validity of both instruments, the test evaluated if the presence of the two instruments were jointly significant.

The null hypothesis of the underidentification test (Kleibergen-Paap rk LM statistic) is that the equation is underidentified. The alternative hypothesis is that the equation is identified. If the null hypothesis is rejected, this suggests the model is identified. The test of weak

identification (Kleibergen-Paap rk Wald F statistic) was also executed. The null hypothesis is that the estimator is weakly identified. The alternative hypothesis is identified. Instead of a p-value, this test statistic is compared to the Stock-Yogo critical value of 19.93 at the 10% maximal IV size cutoff. This cutoff may be too low as the critical value cutoff assumes i.i.d. errors. Rejecting the null means that the correlations between the instruments and the endogenous regressor are sufficiently large that the instruments are not considered to be unacceptably weak, i.e. the bias is not considered to be unacceptably large.

To test the exclusion restriction assumption, the Hansen J Chi-Square Test of Overidentification was executed. The null hypothesis of the test is that the instruments are uncorrelated with the residuals in the outcome equation. In other words, the error term is uncorrelated with the instruments (which should be the case if the instruments are truly exogenous). The alternative hypothesis of the test is that the instruments are not uncorrelated with the residuals in the outcome equation. Rejecting the null means that the instrument set is not valid because one or more of the instruments are correlated with the residuals in the outcome equation. That is, a statistically significant result of the test would suggest a problem of non-excludability *for at least one of the instruments*. However, which instrument failed the exclusion restriction would not be identifiable given the results of the test.

In addition to the non-zero causal effect and exclusion restriction assumptions, the instruments must satisfy three additional assumptions: monotonicity, random assignment and stable unit treatment value. Unfortunately, there are no empirical tests available to confirm that the instruments satisfy these three assumptions. However, based on the interpretation of the assumptions, it is safe to assume that the instruments do satisfy these additional three

assumptions. The monotonicity assumption is that the instruments must have a monotonic effect on the endogenous regressor (i.e. EAP service use). It is reasonable to conclude that both of the instruments satisfy this assumption. For the first instrument, EAP penetration rate, employees who would utilize EAP services if their employer had a low EAP penetration rate would also utilize EAP services if their employer had a high EAP penetration rate. Similarly, employees who would utilize EAP services if they were limited to a few EAP services would also utilize EAP services if their limit was higher.

The random assignment assumption is described as the assumption that respondents be effectively randomized into the value for the instrument, at least within subgroups defined by the other covariates. This would rule out the instrument being influenced by the dependent variable or endogenous regressor. In the context of this dissertation, it is reasonable to assume that knowing what an individual's use of behavioral health services does not yield any information about the individual's actual employer EAP penetration rate or number of EAP services allowed.

The last assumption, the stable unit treatment value assumption, outlines that the outcome of one respondent is not influenced by the value of the endogenous regressor for other respondents. It is reasonable to assume that the use of behavioral health services by one individual is not influenced by whether other individuals utilize EAP services, and differences in EAP effectiveness are relatively minor.

To what extent is the relationship between EAP service use and behavioral health services use moderated by race/ethnicity?

The hypotheses tested were as follows:

- If EAP and BHS are complements:
    - **Hypothesis C-1:** Assuming EAP services serve as a complement to behavioral health services, the increase in behavioral health treatment among individuals who obtained EAP services will be higher among Whites compared to minorities, after controlling for other variables in the model.
    - **Competing hypothesis:** Assuming EAP services serve as a complement to behavioral health services, the increase in behavioral health treatment among individuals who obtained EAP services will be higher among minorities compared to Whites, after controlling for other variables in the model.
- If EAP and BHS are substitutes:
    - **Hypothesis C-1:** Assuming EAP services serve as a substitute to behavioral health services, the decrease in behavioral health treatment among individuals who obtained EAP services will be higher among minorities compared to Whites, after controlling for other variables in the model.
    - **Competing hypothesis:** Assuming EAP services serve as a substitute to behavioral health services, the decrease in behavioral health treatment among individuals who obtained EAP services will be higher among

Whites compared to minorities, after controlling for other variables in the model.

To answer the third research question, the same methodology outlined for the second research question was employed after stratifying the data by each racial/ethnic group: White; Asian, English Speaking; Asian, Non-English Speaking; Black; Hispanic, Non-English Speaking; and Hispanic, English Speaking. Again, both naïve OLS and IV models were estimated. As outlined in the methodology of the second research question, the test of substitution versus complementarity is given in the direction and magnitude of the coefficient of EAP service use.

If EAP and BHS are complements and Hypothesis C-1 were to be true, the coefficients of the EAP service use variable among the non-White racial/ethnic groups would be positive but smaller than the (positive) coefficient of the EAP service use variable for Whites. Alternatively, if the competing hypothesis were to be true, the magnitude of the positive coefficient of the EAP service use variable would be smaller for Whites.

If EAP and BHS are substitutes and Hypothesis C-1 to hold, the coefficients of the EAP service use measure among non-White racial/ethnic groups would be negative and larger in absolute value than the (negative) coefficient of the EAP service use for Whites. Conversely, if the competing hypothesis were to hold, the magnitude of the EAP service use coefficient among non-White racial/ethnic groups would be smaller (and negative) than the coefficient among Whites.

In addition to the naïve OLS and IV models, an OLS analysis was completed with the addition of an interaction term for race/ethnicity and EAP service use. Researchers have noted the value of adding interaction terms in cases where there are conditional hypotheses (Braumoeller, 2004).

Chapter VI. Results

Results

This chapter reports the descriptive statistics and the multivariable results of the primary analyses and sensitivity analyses for each research question.

Descriptive Statistics

The study sample, which consists of primary, commercially-insured adults includes 1,364,568 person-years. This section reports the descriptive statistics. Percentages are presented for categorical variables while means and standard deviations are presented for continuous variables.

Table 5 outlines the descriptive statistics for both the study sample and the full sample (i.e. the sample that includes individuals who did not have complete socioeconomic data – either due to the fact that the individual's administrative claims data were not linked to the commercial marketing database or they had item non-response). When compared to the parsimonious study sample that excluded those without sociodemographic data, the results are comparable. Specifically, the rates of EAP visits and outpatient behavioral health service use were the same between the two samples. The only notable differences in the samples were the lower proportion of individuals in the full sample enrolled in carve-in plans and plans considered "more managed". The descriptive statistics for the study sample are described in more detail below.

The annual rate of EAP service use among the study sample was 1.9%. The mean EAP penetration rate, or the proportion of employees at an employer that utilize EAP services, was 1.8%. Among those who received at least one EAP service, there were an average of 3.6 EAP visits (SD=2.2). The mean EAP limit amount was 4.8 visits (SD=2.0) – suggesting that

individuals who utilize the services are taking advantage of most of the visits that are allocated to them. The annual rate of any outpatient behavioral health service use was higher (5.5%) than the EAP service use. Among those utilizing behavioral health services, the average number of services used was considerably higher (9.3 visits, SD=14.2) than EAP service use.

The sample consists of mostly White adults (71.2%), with Blacks accounting for the largest minority group (11.3%). About three out of five individuals in the sample were male (60.7%). The high proportion of men in the sample is likely due to limiting the sample to employees, because men have higher labor force participation rates than women. The mean age of the sample was 44.9 years (SD=11.9), with nearly 80% of the sample being over the age of 35. Forty-seven percent of the primary subscribers included in the sample also had a spouse or domestic partner covered on their plan. Not surprisingly in a sample of commercially-insured, a plurality of the sample reported some college as the highest level of educational attainment (48.8%) while 22.7%, 21.3%, 12.2% reported earning a bachelor's degree or higher, high school or less, and an associate degree, respectively. As expected in this sample of commercially-insured adults under the age of 65, household financial resources were relatively high. For example, about 1 in 5 were reported to have moderate income ($75-$150K) with high to very high net worth ($250K+).

Table 5. Sample Characteristics

Variable	Study Sample (n=1,364,568) Frequency or Mean (Standard Deviation)	Full Sample (n=4,100,533) Frequency or Mean (Standard Deviation)
Annual Number of EAP Visits		
Percent with Any EAP Visits	1.9%	1.9%
Mean Number of EAP Visits	0.1 (0.6)	0.1 (0.6)
Mean Number of EAP Visits among EAP Users	3.6 (2.2)	3.8 (2.4)
EAP Limit Amount†	4.8 (2.0)	5.2 (2.1)
EAP Penetration Rate‡	1.8% (1.1%)	1.8% (1.0%)
Annual Outpatient Behavioral Health Services (BHS) Use		
Percent with Any BHS Use	5.5%	5.1%
Mean Number of BHS Visits	0.5 (3.9)	0.5 (5.5)
Mean Number of BHS Visits among BHS Users	9.3 (14.2)	9.8 (22.3)
Race/Ethnicity and Primary Language Used to Communicate		
White	71.2%	Not Applicable
Asian, English speaker	2.8%	Not Applicable
Asian, non-English speaker	2.7%	Not Applicable
Black	11.3%	Not Applicable
Hispanic, English speaker	4.6%	Not Applicable
Hispanic, non-English speaker	7.4%	Not Applicable
Male	60.7%	60.0%
Age (in years)	44.9 (11.9)	44.8 (11.1)
Age group		
18-24	2.1%	2.1%
25-34	19.8%	20.1%
35-44	25.2%	25.3%
45-54	29.5%	29.4%
55-64	23.4%	23.2%
Percent with Covered Spouse/Domestic Partner	47.3%	47.0%
Percent with Covered Non-Spouse Dependents by Age Group		
Less than 5 years old	10.2%	9.2%
5-11 years old	16.9%	16.5%
12-17 years old	16.8%	16.5%
Greater than 18 years old	18.7%	18.7%

Table 5. Sample Characteristics (continued)

Variable	Study Sample (n=1,364,568) Frequency or Mean (Standard Deviation)	Full Sample (n=4,100,533) Frequency or Mean (Standard Deviation)
Industry		
Professional, Scientific, and Technical Services	15.9%	14.7%
Agriculture, Forestry, Fishing and Hunting	0.1%	0.0%
Mining, Quarrying, and Oil and Gas Extraction	1.6%	1.6%
Utilities	1.2%	3.9%
Construction	3.4%	1.5%
Manufacturing	10.1%	13.4%
Wholesale Trade	1.7%	0.7%
Retail Trade	4.1%	5.6%
Transportation and Warehousing	22.1%	9.5%
Information	6.5%	3.7%
Finance and Insurance	4.1%	5.4%
Real Estate and Rental and Leasing	0.9%	0.5%
Management of Companies and Enterprises	0.9%	0.5%
Educational Services	3.4%	4.9%
Health Care and Social Assistance	2.8%	1.9%
Arts, Entertainment and Recreation	3.9%	2.9%
Accommodation and Food Services	0.6%	2.7%
Other Services (except Public Administration)	2.0%	3.2%
Public Administration	1.4%	4.4%
Plan is Carve-In	82.4%	64.0%
Behavioral Health Plan is "more managed"	80.0%	61.6%
Average Annual Provider Supply by Type per 1,000 Optum Enrollees for the Given State		
MD Rate	0.9 (0.9)	1.0 (0.9)
MSW Rate	3.3 (3.9)	4.0 (4.8)
PhD Rate	1.2 (1.4)	1.3 (1.4)
RN Rate	0.2 (0.4)	0.3 (0.5)
Non-Independent Licensed Provider Rate	0.2 (2.2)	0.3 (2.7)

Table 5. Sample Characteristics (continued)

Variable	Study Sample (n=1,364,568) Frequency or Mean (Standard Deviation)	Full Sample (n=4,100,533) Frequency or Mean (Standard Deviation)
Education		
High School or less	21.3%	Not Applicable
Some college	43.8%	Not Applicable
Associate degree	12.2%	Not Applicable
Bachelor's degree or more	22.7%	Not Applicable
Household-level Income / Net Worth*		
Low income, very low net worth	13.5%	Not Applicable
Low income, low net worth	8.6%	Not Applicable
Low income, moderate to very high net worth	14.4%	Not Applicable
Moderate income, very low to low worth	8.3%	Not Applicable
Moderate income, moderate net worth	11.7%	Not Applicable
Moderate income, high to very high net worth	20.1%	Not Applicable
High income, very low to high net worth	9.9%	Not Applicable
High income, very high net worth	13.5%	Not Applicable

†EAP Limit Amount represents the annual number of EAP visits allowed

‡EAP Penetration Rate represents the proportion of EAP users at the employer level

*Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K+)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)

How are race/ethnicity associated with EAP service use, all else equal?

Single-equation Linear Model

The results from the single-equation linear model of EAP service use are outlined in **Table 6.** The results of the OLS analysis suggest minorities have lower annual EAP service use relative to Whites. This effect was statistically significant ($p<0.001$) among each racial/ethnic group except Hispanic, English-Speakers. This suggests that Hypothesis A-1, rather than the competing hypothesis, is true. That is, Whites were more likely to utilize EAP services compared to minorities, after controlling for other variables in the model. For example, Hispanic, Non-English Speakers were seen to have, on average, 0.016 fewer EAP visits relative to Whites ($p<0.001$).

In addition to the primary regressor of interest, race/ethnicity, gender was also found to have a statistically significant effect on EAP service use. Specifically, males were seen to have, on average, 0.041 fewer EAP visits than females in the sample ($p<0.001$). Age also had an impact on EAP service utilization. Relative to adults aged 18-24, adults aged 25-34, 35-44 and 45-54 had higher rates of EAP service use ($p<0.001$). Conversely, adults aged 55-64 had lower rates of EAP service use relative to adults aged 18-24 and this effect was statistically significant at the 5% level ($p=0.030$).

Adults with dependents greater than 5 years old (5-11 years old, 12-17 years old, greater than 18 years old) resulted in statistically significantly greater EAP service utilization relative to those who did not have dependents in each of those age groups. Education was shown to have a statistically significant impact on EAP service utilization. Specifically, those with a high school education or less (-0.024) or some college (-0.010) utilized fewer EAP visits ($p<0.001$) relative

to those with a bachelor's degree or higher. That is, relative to those with a bachelor's degree or higher, those with a high-school education or less had 0.024 less EAP visits, after controlling for other variables in the model. Each level of household-level income/net worth was shown to have higher EAP service utilization relative to the highest income/net worth category (High income ($150K+), very high net worth ($500K+)).

Adults enrolled in a carve-in plan were less likely (-0.014) to have EAP visits relative to those enrolled in a carve-out plan ($p<0.001$). Not surprisingly, there was a positive association between EAP limit amount and EAP service use ($p<0.001$). For each additional EAP visit allowed an additional 0.010 visits were observed. Similarly, there was a positive association between EAP penetration rate and EAP service use ($p<0.001$). The magnitude observed was considerably higher. That is, for each percentage point increase in EAP penetration rate, there was an additional 3.08 EAP visits observed.

Table 6. Single-equation linear model of EAP service use among commercially-insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Race/Ethnicity and Primary Language Used to Communicate			
White	Reference		
Asian, English Speaking	-0.030	0.005	0.000
Asian, Non-English Speaking	-0.047	0.009	0.000
Black	-0.007	0.003	0.006
Hispanic, English Speaking	-0.003	0.003	0.304
Hispanic, Non-English Speaking	-0.016	0.003	0.000
Male	-0.041	0.005	0.000
Age			
18-24	Reference		
25-34	0.017	0.003	0.000
35-44	0.023	0.004	0.000
45-54	0.007	0.003	0.000
55-64	-0.012	0.004	0.030
Spouse / Domestic Partner Covered	0.003	0.002	0.107
Number of Dependents Covered by Age			
Less than 5 years old	-0.001	0.002	0.617
5-11 years old	0.004	0.001	0.004
12-17 years old	0.010	0.002	0.000
Greater than 18 years old	0.003	0.001	0.002
Education			
High School or less	-0.024	0.004	0.000
Some college	-0.010	0.003	0.000
Associate degree	0.003	0.003	0.353
Bachelor's degree or higher	Reference		
Household-level Income / Net Worth[‡]			
Low income, very low net worth	0.041	0.005	0.000
Low income, low net worth	0.033	0.005	0.000
Low income, moderate to very high net worth	0.027	0.005	0.000
Moderate income, very low to low net worth	0.037	0.006	0.000
Moderate income, moderate net worth	0.021	0.003	0.000
Moderate income, high to very high net worth	0.016	0.003	0.000
High income, very low to high net worth	0.013	0.003	0.000
High income, very high net worth	Reference		

Table 6. Single-equation linear model of EAP service use among commercially-insured individuals with an EAP and behavioral health benefit[§] (continued)

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Carve-in status	-0.014	0.004	0.000
Behavioral Health Plan is "more managed" vs "less managed"	0.009	0.005	0.089
Provider Supply per 1,000 Members for the Given State and Year			
MD Rate	-0.007	0.005	0.222
MSW Rate	-0.002	0.001	0.090
PhD Rate	0.004	0.002	0.096
RN Rate	0.032	0.019	0.087
Non-Independent Licensed Provider Rate	0.001	0.002	0.430
EAP Limit Amount[¥]	0.010	0.001	0.000
EAP Penetration Rate*	3.080	0.146	0.000

[§]This model is a reduced-form model. The model also controls for state and industry, but those results are not shown here for brevity.
[†]β is the linear regression coefficient.
[††]The standard errors account for heteroskedasticity across employer clusters.
[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)
[¥]EAP Limit Amount represents the annual number of EAP visits allowed
*EAP Penetration Rate represents the proportion of EAP users at the employer level

Two-part Model Analysis

When comparing the results from the unconditional marginal effects to those from the single-equation linear model, the findings are quite comparable in magnitude and direction. This suggests it is appropriate to move forward with the naïve OLS results. **Table 7** outlines the results of the two-part model including the risk differences (RD) from the choice model, conditional difference and the unconditional difference. The detailed results are located in **Table** 16.

The marginal effects for each racial/ethnic group suggest that, when accounting for the large spike in zeroes in the dependent variable (i.e. EAP visits) using a two-part model, the results support that Hypothesis A-1 is correct. That is, Whites are more likely to utilize EAP services than minorities, after controlling for other variables in the model. For example, among the entire sample, Blacks on average had 0.007 fewer EAP visits than Whites, controlling for all other factors in the model. This unconditional difference between the racial/ethnic groups was statistically significant given the bounds of the 95% confidence intervals do not include the null value of 0 [bias-corrected 95% CI: -0.008, -0.002]. This value is comparable in both magnitude and direction to the beta coefficient from the naïve OLS (-0.007). The unconditional differences for each racial/ethnic group relative to Whites ranged from -0.042 (Asian, Non-English Speaking) to -0.007 (Black). Each point estimate was statistically significant as the bias-corrected 95% CI did not include the null value of 0, except for Hispanic, English Speaking [bias-corrected 95% CI: -0.009, -0.000].

The first regression, or the choice model, models the probability of any EAP service use. The results from the first regression suggest similar findings to the overall results. That is,

minorities are less likely to utilize EAP services. For example, the probability of any EAP visits was 0.007 percentage points lower for Asian, English-Speakers relative to Whites, controlling for all other factors in the model [bias-corrected 95% CI: -0.008, -0.006]. This risk difference appears to be statistically significant as the confidence interval did not cross zero.

The second regression, or the conditional regression, suggests that minorities who have used EAP services, on average, have fewer EAP visits than Whites who have used any services. For example, Asian, Non-English Speakers who utilized EAP services were found to have 0.283 fewer EAP visits than Whites who had any EAP visits, after controlling for other variables in the model [bias-corrected 95% CI: -0.633, -0.067].

Table 7. Two-part model of EAP service use among commercially-insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	Choice Model* (Bias-Corrected 95% CI)	Conditional Difference (Bias-Corrected 95% CI)	Unconditional Difference (Bias-Corrected 95% CI)
White	Reference		
Asian, English Speaking	-0.007 (-0.008, -0.006)	-0.058 (-0.029, -0.246)	-0.027 (-0.030, -0.020)
Asian, Non-English Speaking	-0.010 (-0.011, -0.010)	-0.283 (-0.633, -0.067)	-0.042 (-0.930, -0.001)
Black	-0.001 (-0.002, 0.000)	-0.219 (-0.274, 0.095)	-0.007 (-0.008, -0.002)
Hispanic, English Speaking	-0.001 (-0.002, -0.000)	-0.027 (-0.150, 0.086)	-0.005 (-0.009, -0.000)
Hispanic, Non-English Speaking	-0.004 (-0.005, -0.004)	-0.112 (-0.194, 0.014)	-0.018 (-0.020, -0.013)

[§]This model is a reduced-form model. The model also controls for other variables, but those results are not shown here for brevity.
*Risk difference

Analysis of Diagnosis Categories

Table 8 below outlines the results of the conditional regression with two different model specifications: one without controlling for diagnosis categories and the other controlling for diagnosis categories. As summarized above, the results using the original model specifications (i.e. diagnosis categories are not controlled for) suggest Asian, English Speakers and Asian, Non-English Speakers had statistically significantly lower number of EAP visits relative to Whites, after controlling for other variables in the model.

When compared to the model results where diagnosis categories are controlled for, the significant and non-significant findings differ. The results from the model that controls for diagnosis categories suggest that among those who utilize EAP services, the intensity of EAP service use among users is generally lower for minorities relative to Whites, after controlling for other variables in the model. However, these results are only statistically significant among Blacks and Hispanic, Non-English Speakers as the 95% bias-corrected confidence intervals do not cross 0.

Table 8. Conditional regression of EAP service use (with and without controlling for diagnosis categories) among commercially-insured individuals with an EAP and behavioral health benefit[§]

Race/Ethnicity and Primary Language Used to Communicate	Without Controlling for Diagnosis Category		Controlling for Diagnosis Category	
	Conditional Difference	95% Bias-Corrected CI	Conditional Difference	95% Bias-Corrected CI
White	Reference			
Asian, English Speaking	-0.058*	-0.029, -0.246	0.049	-0.144, 0.222
Asian, Non-English Speaking	-0.283*	-0.633, -0.067	-0.071	-0.215, 0.134
Black	-0.219	-0.274, 0.095	-0.174*	-0.262, -0.092
Hispanic, English Speaking	-0.027	-0.150, 0.086	-0.023	-0.118, 0.065
Hispanic, Non-English Speaking	-0.112	-0.194, 0.014	-0.007*	-2.980, -0.122

[§]This model is a reduced-form model. The model also controls for other variables, but those results are not shown here for brevity.
*95% Bias-Corrected Confidence Interval does not include the null value of 0

Do EAP services serve as a complement or a substitute for behavioral health services, after controlling for other variables in the model?

Single-equation Linear Model

The results from the single-equation linear model for outpatient behavioral health treatment are presented in **Table 9** below. The results suggest that Hypothesis B-1, rather than the competing hypothesis, is true. That is, after controlling for other variables in the model, there is a positive association between number of EAP services used and outpatient behavioral health treatment ($p<0.001$). Specifically, each additional EAP visit was associated with an additional 0.752 outpatient behavioral health visits, controlling for all other factors in the model.

Not surprisingly, race/ethnicity also appears to be a statistically significant predictor of behavioral health treatment. Similar to the results for EAP service use, minorities were less likely to utilize behavioral health services relative to Whites. Other sociodemographic factors, such as gender, income and education were all key predictors of behavioral health service utilization. Conversely, behavioral health plan factors (i.e provider supply, level of plan management and carve-in status) did not have a statistically significant impact on behavioral health service utilization among this sample of commercially-insured adults with access to both EAP and behavioral health services.

Table 9. Single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Annual Number of EAP Visits	0.752	0.070	0.000
Race/Ethnicity and Primary Language Used to Communicate			
White	Reference		
Asian, English Speaking	-0.317	0.033	0.000
Asian, Non-English Speaking	-0.492	0.039	0.000
Black	-0.212	0.045	0.000
Hispanic, English Speaking	-0.145	0.027	0.000
Hispanic, Non-English Speaking	-0.249	0.019	0.000
Male	-0.281	0.017	0.000
Age			
18-24	Reference		
25-34	0.204	0.031	0.000
35-44	0.313	0.038	0.000
45-54	0.288	0.038	0.000
55-64	0.222	0.033	0.000
Spouse / Domestic Partner Covered	-0.052	0.020	0.011
Number of Dependents Covered by Age			
Less than 5 years old	-0.035	0.014	0.012
5-11	0.007	0.008	0.408
12-17	-0.007	0.008	0.370
Greater than 18 years old	-0.018	0.007	0.009
Education			
High School or less	-0.468	0.046	0.000
Some college	-0.342	0.038	0.000
Associate degree	-0.244	0.030	0.000
Bachelor's degree or higher	Reference		
Household-level Income / Net Worth[‡]			
Low income, very low net worth	0.209	0.036	0.000
Low income, low net worth	0.193	0.031	0.000
Low income, moderate to very high net worth	0.179	0.031	0.000
Moderate income, very low to low net worth	0.227	0.037	0.000
Moderate income, moderate net worth	0.139	0.026	0.000
Moderate income, high to very high net worth	0.134	0.022	0.000
High income, very low to high net worth	0.100	0.031	0.001
High income, very high net worth	Reference		

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Table 9. Single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit[§] (continued)

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Carve-in status	-0.085	0.096	0.378
Behavioral Health Plan is "more managed" vs "less managed"	0.117	0.129	0.367
Provider Supply per 1,000 Members for the Given State and Year			
MD Rate	-0.053	0.039	0.182
MSW Rate	0.002	0.015	0.885
PhD Rate	0.007	0.018	0.686
RN Rate	0.060	0.189	0.751
Non-Independent Licensed Provider Rate	-0.003	0.009	0.694

[§]The model also controls for state and industry, but those results are not shown here for brevity

[†]β is the linear regression coefficient.

[††]The standard errors account for heteroskedasticity across employer clusters.

[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)

Instrumental Variable Analysis

The results from the Generalized Method of Moments (GMM) IV model are presented in **Table 10** below. When accounting for the possible endogenous relationship between EAP service use and behavioral health service use, EAP service use was still shown to be utilized as a complement – rather than a substitute – for behavioral health service, after controlling for other variables in the model. Although, it is important to note that, unlike in the single-equation linear model, it is no longer statistically significant at the α=0.05 level.

In relation to race/ethnicity, when compared to the results from the naïve OLS, minorities were still seen to have lower rates of behavioral health service utilization relative to Whites in the sample using the IV analysis. The magnitudes and directions are comparable. For example, in the IV analysis, Blacks were seen to have, on average, 0.206 fewer behavioral health services relative to Whites, after controlling for other variables in the model (p-value <0.001). In the naïve OLS analysis, it was estimated that Blacks were seen to have, on average, 0.212 fewer behavioral health services relative to Whites, after controlling for other variables in the model. This pattern was observed for each of the other racial/ethnic groups. Thus, despite controlling for the potential endogenous relationship between EAP service use and behavioral health service use by employing an IV analysis, minorities were still seen to have lower rates of behavioral health services relative to Whites.

Other sociodemographic factors (gender, age, education and income) were key predictors of behavioral health service utilization as well. Again, behavioral health plan factors (e.g. level of management and carve-in status) were not statistically significant in predicting behavioral health service use.

The results from the instrumental variable tests are outlined in **Table 11**. Overall, the results of the instrumental variable tests suggest that the instruments, both jointly and separately, empirically satisfy the tests validating them as strong instruments. The results of the tests for each of the instruments separately are not summarized in the text for brevity but are outlined in the table. The conclusions from each of the relevant tests using each of the instruments separately are comparable.

The non-zero causal effect assumption was evaluated using multiple tests. The results from the F-Test of Joint Significance of Excluded Instruments demonstrate that the instruments satisfy the non-zero causal effect assumption. That is, the result of the test suggests the null hypothesis should be rejected ($p<0.001$) and that, as a group, the instruments are jointly related to the endogenous regressor. The Kleibergen-Paap LM rk Test of Underidentification was employed to evaluate if the model was identified. That is, if the instruments are relevant and satisfy the non-zero causal effect assumption. Rejecting the null hypothesis suggests the equation is identified. In this analysis the p-value was <0.001 suggesting the null hypothesis should be rejected.

The Kleibergen-Paap LM rk Test of Weak Identification empirically tests if the correlations between the instruments and the endogenous regressor are sufficiently large that the instruments are not considered to be unacceptably weak. Instead of a p-value, the test statistic is compared to the Stock-Yogo critical value of 19.93 at the 10% maximal IV size cutoff. The results of the test in this analysis are well above the cutoff, thus it can be concluded that the estimator is not weakly identified.

The results from the Hansen J Chi-Square Test of Overidentification suggest the exclusion restriction assumption was satisfied. The null hypothesis for the test is that the instruments are uncorrelated with the residuals in the outcome equation ((Hansen, 1982). The observed p-value was not significant (p=0.768), thus the null hypothesis should be rejected, and it can be concluded that the instrument set is valid.

Although the results of the instrumental variable testing the empirical validity of the instruments suggest the instruments are not weak, the result of the Chi-Square Test of Endogeneity – utilizing both instruments – was not statistically significant (p=0.339). This suggests that the null hypothesis should not be rejected. That is, the estimated relationship between the hypothesized regressor and the outcome of interest does not suffer from endogeneity bias. The same conclusion may be drawn when each of the two instruments were used separately. Since the results of the test suggest there are no systematic differences between OLS and IV coefficients, the standard OLS is preferred since it is more efficient than the IV model.

Table 10. GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Number of EAP Visits	0.478	0.745	0.523
Race/Ethnicity and Primary Language Used to Communicate			
White	Reference		
Asian, English Speaking	-0.325	0.041	0.000
Asian, Non-English Speaking	-0.494	0.062	0.000
Black	-0.206	0.049	0.000
Hispanic, English Speaking	-0.146	0.035	0.000
Hispanic, Non-English Speaking	-0.276	0.094	0.003
Male	-0.294	0.035	0.000
Age			
18-24	Reference		
25-34	0.214	0.031	0.000
35-44	0.319	0.040	0.000
45-54	0.283	0.039	0.000
55-64	0.212	0.034	0.000
Spouse / Domestic Partner Covered	-0.050	0.025	0.048
Number of Dependents Covered by Age			
Less than 5 years old	-0.036	0.014	0.010
5-11	0.007	0.010	0.500
12-17	-0.005	0.016	0.734
Greater than 18 years old	-0.014	0.008	0.097
Education			
High School or less	-0.487	0.049	0.000
Some college	-0.351	0.038	0.000
Associate degree	-0.249	0.032	0.000
Bachelor's degree or higher	Reference		
Household-level Income / Net Worth[‡]			
Low income, very low net worth	0.205	0.062	0.001
Low income, low net worth	0.185	0.065	0.004
Low income, moderate to very high net worth	0.171	0.052	0.001
Moderate income, very low to low net worth	0.230	0.052	0.000
Moderate income, moderate net worth	0.141	0.036	0.000
Moderate income, high to very high net worth	0.134	0.030	0.000
High income, very low to high net worth	0.098	0.034	0.004
High income, very high net worth	Reference		

Table 10. GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit[§] (continued)

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Carve-in status	-0.074	0.112	0.510
Behavioral Health Plan is "more managed" vs "less managed"	0.058	0.102	0.570
Provider Supply per 1,000 Members for the Given State and Year			
MD Rate	-0.037	0.052	0.471
MSW Rate	-0.010	0.010	0.302
PhD Rate	0.021	0.017	0.221
RN Rate	0.089	0.199	0.655
Non-Independent Licensed Provider Rate	0.002	0.013	0.871

[§]The model also controls for state and industry, but those results are not shown here brevity.
[†]β is the linear regression coefficient.
[††]The standard errors account for heteroskedasticity across employer clusters.
[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)

Table 11. Instrumental variable test results*,†

Test Name	EAP Limit Amount and EAP Penetration Rate	EAP Limit Amount	EAP Penetration Rate	Interpretation of Rejection of Null
	Test Stat (p-value)	**Test Stat (p-value)**	**Test Stat (p-value)**	
F-Test of Joint Significance of Excluded Instruments H_0: Coefficients are jointly equal to zero H_A: At least one coefficient is not equal to zero	**369.98 (p<0.001)**	**183.19 (p<0.001)**	**445.98 (p<0.001)**	Rejecting the null means that, as a group, the instruments are jointly related to the endogenous regressor.
Kleibergen-Paap LM rk Test of Underidentification H_0: The equation is underidentified H_A: The equation is identified	**40.552 (p<0.001)**	**35.129 (p<0.001)**	**8.848 (0.003)**	Rejecting the null means that the model is identified.
Kleibergen-Paap LM rk Test of Weak Identification† H_0: The estimator is weakly identified H_A: The estimator is not weakly identified	**400.56**	**203.18**	**445.37**	Rejecting the null means that the correlations between the instruments and the endogenous regressor are sufficiently large that the instruments are not considered to be unacceptably weak, i.e. the bias is not considered to be unacceptably large

Table 11. Instrumental variable test results*,† (continued)

Test Name	EAP Limit Amount and EAP Penetration Rate	EAP Limit Amount	EAP Penetration Rate	Interpretation of Rejection of Null
	Test Stat (p-value)	**Test Stat (p-value)**	**Test Stat (p-value)**	
Hansen J Chi-Square Test of Overidentification H_0: Instruments are uncorrelated with the residuals in the outcome equation H_A: Instruments are not uncorrelated with the residuals in the outcome equation	0.087 (0.768)	--	--	Rejecting the null means that the instrument set is not valid because one or more of the instruments are correlated with the residuals in the outcome equation.
Chi-Square Test of Endogeneity H_0: EAP service use is exogenous H_A: EAP service use is endogenous	0.913 (0.339)	0.339 (0.561)	0.283 (0.595)	Rejecting the null implies that the estimated relationship between the hypothesized regressor and the outcome of interest suffers from endogeneity bias.

*Bolded results indicate the null hypothesis was rejected.
†Table adapted from (Grinshteyn, 2013)
§Instead of a p-value, this test statistic is compared to the Stock-Yogo critical value of 19.93 at the 10% maximal IV size cutoff. This cutoff may be too low as the critical value cutoff assumes i.i.d. errors.

To what extent is the relationship between EAP service use and behavioral health services use moderated by race/ethnicity?

Single-equation Linear Model

The abbreviated results of the naïve OLS model are outlined in **Table 12** below. The more detailed results are outlined in **Table 17** in the **Appendix B**. The results from the stratified single-equation linear model suggest that EAP service use serves as a complement for behavioral health services use – rather than a substitute – for each of the racial/ethnic groups. That is, there is a positive association between EAP service use and behavioral health service use ($p<0.001$). Since we can conclude that EAP services serve as a complement, we can conclude that the following version of Hypothesis C-1 applies:

- **Hypothesis C-1:** Assuming EAP services serve as a complement to behavioral health services, the increase in behavioral health treatment among individuals who obtained EAP services will be higher among Whites compared to minorities, after controlling for other variables in the model.

Most of the magnitudes for the beta coefficients for each of the non-White racial/ethnic groups appear to be larger than the magnitude for Whites ($\beta=0.756$). The exception is Asian, English Speakers. For Whites, for each additional EAP service used, 0.756 additional behavioral health service visits were made ($p<0.001$). For Blacks, for example, for each additional EAP service used, 0.728 additional behavioral health service visits were made. However, the magnitude of the impact of EAP service utilization on behavioral health services use appears to be comparable between each racial/ethnic group. Specifically, the 95% confidence intervals appear to overlap for each group.

Table 12. Single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§]

Race/Ethnicity and Primary Language Used to Communicate	Number of EAP Visits β[†] (95% Confidence Interval)	Robust SE[††]	p-value
White	0.756 (0.611, 0.902)	0.074	0.000
Asian, English Speaker	0.849 (0.491, 1.207)	0.181	0.000
Asian, Non-English Speaker	0.809 (0.585, 1.032)	0.113	0.000
Black	0.728 (0.500, 0.956)	0.116	0.000
Hispanic, English Speaker	0.781 (0.632, 0.930)	0.075	0.000
Hispanic, Non-English Speaker	0.636 (0.472, 0.800)	0.083	0.000

[§]The model also controls for other variables in the model, but those results are not shown here for brevity.
[†]β is the linear regression coefficient.
[††]The standard errors account for heteroskedasticity across employer clusters.

Interaction Analysis

The results of the single-equation linear model that includes interaction term for race/ethnicity and number of EAP visits are listed in **Table 13.** The interaction terms were not statistically significant at the α=0.05 level, except the interaction term for Hispanic, Non-English Speakers, which was marginally significant (p=0.049). This suggests that the increase in behavioral health treatment does not statistically differ between racial/ethnic groups, after controlling for other variables in the model.

As summarized previously, when evaluating the main effects of race/ethnicity, minorities, on average, have lower levels of behavioral health treatment relative to Whites. The results of this analysis suggest, for example, Blacks, on average, would expect to have 0.206 fewer outpatient behavioral health visits relative to Whites, after controlling for other variables in the model (p<0.001). When evaluating the interaction terms, it appears that for each additional EAP visit, Whites are expected to obtain an additional 0.744 outpatient behavioral health visits, while Hispanic, Non-English Speakers are expected to obtain an additional 0.633 outpatient behavioral health visits. This effect was marginally significant (p=0.049). However, as mentioned, the other interaction terms were not statistically significant.

Table 13. Single-equation linear model (including interaction terms) for outpatient behavioral health treatment among commercially insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Number of EAP Visits	0.744	0.084	0.000
Race/Ethnicity and Primary Language Used to Communicate			
White	Reference		
Asian, English Speaking	-0.324	0.032	0.000
Asian, Non-English Speaking	-0.486	0.041	0.000
Black	-0.206	0.046	0.000
Hispanic, English Speaking	-0.141	0.029	0.000
Hispanic, Non-English Speaking	-0.236	0.024	0.000
Interaction Terms			
Number of EAP Visits * Asian, English Speaking	0.131	0.207	0.526
Number of EAP Visits * Asian, Non-English Speaking	0.064	0.141	0.649
Number of EAP Visits * Black	-0.014	0.061	0.823
Number of EAP Visits * Hispanic, English Speaking	0.033	0.076	0.667
Number of EAP Visits * Hispanic, Non-English Speaking	-0.133	0.067	0.049
Male	-0.283	.0176	0.000
Age			
18-24	Reference		
25-34	0.208	0.031	0.000
35-44	0.310	0.040	0.000
45-54	0.280	0.039	0.000
55-64	0.216	0.034	0.000
Spouse / Domestic Partner Covered	-0.048	0.021	0.027
Number of Dependents Covered by Age			
Less than 5 years old	-0.035	0.014	0.013
5-11	0.006	0.008	0.436
12-17	-0.006	0.008	0.450
Greater than 18 years old	-0.014	0.007	0.053
Education			
High School or less	-0.347	0.039	0.000
Some college	-0.249	0.032	0.000
Associate degree	-0.472	0.048	0.000
Bachelor's degree or higher	Reference		

Table 13. Single-equation linear model (including interaction terms) for outpatient behavioral health treatment among commercially insured individuals with an EAP and behavioral health benefit [§] (continued)

Variable (n=1,364,568)	β[†]	Robust SE[††]	p-value
Household-level Income / Net Worth[‡]			
Low income, very low net worth	0.095	0.031	0.003
Low income, low net worth	0.132	0.022	0.000
Low income, moderate to very high net worth	0.137	0.028	0.000
Moderate income, very low to low net worth	0.223	0.037	0.000
Moderate income, moderate net worth	0.170	0.033	0.000
Moderate income, high to very high net worth	0.186	0.034	0.000
High income, very low to high net worth	0.200	0.036	0.000
High income, very high net worth	Reference		
Carve-in status	-0.048	0.091	0.596
Behavioral Health Plan is "more managed" vs "less managed"	0.057	0.102	0.578
Provider Supply per 1,000 Members for the Given State and Year			
MD Rate	-0.024	0.032	0.457
MSW Rate	-0.008	0.009	0.354
PhD Rate	0.016	0.012	0.186
RN Rate	0.039	0.144	0.790
Non-Independent Licensed Provider Rate	0.001	0.012	0.923
EAP Limit Amount*	-0.008	0.013	0.555
EAP Penetration Rate**	-1.019	1.676	0.544

[§]The model also controls for state and industry, but those results are not shown here brevity.
[†]β is the linear regression coefficient.
[††]The standard errors account for heteroskedasticity across employer clusters.
[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)
[*]EAP Limit Amount represents the annual number of EAP visits allowed
[**]EAP Penetration Rate represents the proportion of EAP users at the employer level

Instrumental Variable Analysis

The abbreviated results of the instrumental variable model are outlined in **Table 14** below. The detailed results of the instrumental variable model are outlined in **Table 18** in **Appendix B.** After attempting to mitigate the anticipated endogenous relationship between EAP service use and behavioral health service use by executing an instrumental variable model, the statistically significant relationship between EAP service use and behavioral health service use does not appear to hold for any of the racial/ethnic groups, after controlling for other variables in the model.

Table 14. GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§]

Race/Ethnicity and Primary Language Used to Communicate	Number of EAP Visits β[†] (95% Confidence Interval)	Robust SE[††]	p-value
White	0.561 (-1.057, 2.180)	0.826	0.794
Black	0.249 (-1.618. 2.116)	0.953	0.769
Asian, English Speaker	1.840 (-0.853, 4.534)	1.375	0.181
Asian, Non-English Speaker	1.062 (-0.679, 2.802)	0.888	0.232
Hispanic, English Speaker	-0.011 (-0.954, 0.931)	0.481	0.981
Hispanic, Non-English Speaker	-0.250 (-1.524, 1.022)	0.652	0.702

[§]The model also controls for other variables in the model, but those results are not shown here.
[†]β is the linear regression coefficient.
[††]The standard errors account for heteroskedasticity across employer clusters.

The results from the instrumental variable tests for each of the stratified models are outlined in **Table 15**. For each analysis, the same conclusions drawn from the analysis for the second research question still hold. Overall, the results of the instrumental variable tests suggest that, if it were preferable to move forward with the IV model rather than the OLS, the instruments, both jointly and separately, empirically satisfy the tests validating them as strong instruments. The results of the tests for each of the instruments separately are not summarized in the text for brevity but are outlined in the table below. The conclusions from each of the relevant tests using each of the instruments separately are comparable.

The non-zero causal effect assumption was evaluated using multiple tests. The results from the F-Test of Joint Significance of Excluded Instruments demonstrate that the instruments satisfy the non-zero causal effect assumption. That is, the result of the test suggests the null hypothesis should be rejected ($p<0.001$) and that, as a group, the instruments are jointly related to the endogenous regressor. The Kleibergen-Paap LM rk Test of Underidentification was employed to evaluate if the model was identified. That is, if the instruments are relevant and satisfy the non-zero causal effect assumption. Rejecting the null hypothesis suggests the equation is identified. In this analysis the p-value was <0.001 suggesting the null hypothesis should be rejected.

The Kleibergen-Paap LM rk Test of Weak Identification empirically tests if the correlations between the instruments and the endogenous regressor are sufficiently large that the instruments are not considered to be unacceptably weak. Instead of a p-value, the test statistic is compared to the Stock-Yogo critical value of 19.93 at the 10% maximal IV size cutoff. The results of the test in this analysis are well above the cutoff, thus it can be concluded that the

estimator is not weakly identified except among the Asian, Non-English Speakers where the test statistics was less than the cutoff (16.92).

The results from the Hansen J Chi-Square Test of Overidentification suggest the exclusion restriction assumption was satisfied. The null hypothesis for the test is that the instruments are uncorrelated with the residuals in the outcome equation (Hansen, 1982). The observed p-value was not significant (p=0.768), thus the null hypothesis should be rejected, and it can be concluded that the instrument set is valid.

Although the results of the instrumental variable testing the empirical validity of the instruments suggest the instruments are not weak, the result of the Chi-Square Test of Endogeneity – utilizing both instruments – was not statistically significant. This suggests that the null hypothesis should not be rejected. That is, the estimated relationship between the hypothesized regressor and the outcome of interest does not suffer from endogeneity bias. The same conclusion may be drawn when each of the two instruments were used separately. Since the results of the test suggest there are no systematic differences between OLS and IV coefficients, the standard OLS is preferred since it is more efficient than the IV model.

Table 15. Instrumental variable test results for stratified analyses*,†

Test	White	Black	Asian, English Speaker	Asian, Non-English Speaker	Hispanic, English Speaker	Hispanic, Non-English Speaker	Interpretation of Rejection of Null
	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	
F-Test of Joint Significance of Excluded Instruments H_0: Coefficients are jointly equal to zero H_A: At least one coefficient is not equal to zero	**552.11 (p<0.001)**	**25.52 (p<0.001)**	**16.10 (p<0.001)**	**111.20 (p<0.001)**	**35.23 (p<0001)**	**31.45 (p<0001)**	Rejecting the null means that, as a group, the instruments are jointly related to the endogenous regressor.
Kleibergen-Paap LM rk Test of Underidentification H_0: The equation is underidentified H_A: The equation is identified	**39.743 (p<0.001)**	**29.592 (p<0.001)**	**17.275 (p<0.001)**	**12.015 (0.0025)**	**29.875 (p<0.001)**	**25.033 (p<0.001)**	Rejecting the null means that the model is identified.

Table 15. Instrumental variable test results for stratified analyses*,† (continued)

Test	White	Black	Asian, English Speaker	Asian, Non-English Speaker	Hispanic, English Speaker	Hispanic, Non-English Speaker	Interpretation of Rejection of Null
	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	
Kleibergen-Paap LM rk Test of Weak Identification† H_0: The estimator is weakly identified H_A: The estimator is not weakly identified	**547.26**	**104.26**	**23.51**	16.92	**32.18**	**32.55**	Rejecting the null means that the correlations between the instruments and the endogenous regressor are sufficiently large that the instruments are not considered to be unacceptably weak, i.e. the bias is not considered to be unacceptably large

Table 15. Instrumental variable test results for stratified analyses*,† (continued)

Test	White	Black	Asian, English Speaker	Asian, Non-English Speaker	Hispanic, English Speaker	Hispanic, Non-English Speaker	Interpretation of Rejection of Null
	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	Test Stat (p-value)	
Hansen J Chi-Square Test of Overidentification H_0: Instruments are uncorrelated with the residuals in the outcome equation H_A: Instruments are not uncorrelated with the residuals in the outcome equation	0.277 (0.599)	0.308 (0.579)	0.990 (0.320)	0.013 (0.910)	1.767 (0.184)	1.956 (0.162)	Rejecting the null means that the instrument set is not valid because one or more of the instruments are correlated with the residuals in the outcome equation.
Chi-Square Test of Endogeneity H_0: EAP service use is exogenous H_A: EAP service use is endogenous	1.120 (0.290)	0.013 (0.908)	0.893 (0.345)	0.950 (0.330)	1.162 (0.281)	0.004 (0.950)	Rejecting the null implies that the estimated relationship between the hypothesized regressor and the outcome of interest suffers from endogeneity bias.

*Bolded results indicate the null hypothesis was rejected.
†Table adapted from (Grinshteyn, 2013)
§Instead of a p-value, this test statistic is compared to the Stock-Yogo critical value of 19.93 at the 10% maximal IV size cutoff. This cutoff may be too low as the critical value cutoff assumes i.i.d. errors.

Chapter VII. Discussion

EAP service utilization was about 2% in the sample. This suggests there may be a considerable amount of underutilization of these free EAP services among commercially-insured employees who have access to both EAP services and behavioral health services. Though, when compared to the EAP utilization rates reported in the literature, this rate does not differ vastly. A survey of 26 EAP vendors estimated an overall EAP utilization rate to be about 6% (Taranowski and Mahieu, 2013). However, the utilization rate ranged from 1.3% to 13%, suggesting that a rate of 2% is in the expected range of utilization.

The results from the first research question exploring the role of race/ethnicity in EAP service utilization suggest minorities were less likely to utilize these services relative to Whites. The results from the single-equation linear model suggest that, although the absolute differences in magnitudes were not extremely large, there were large relative differences in EAP service use by race/ethnicity. For example, the predicted number of EAP visits if the sample were all White would be 0.070. The predicted number of EAP visits if the sample were all Asian, English Speakers would be 0.041. The absolute difference in EAP visits would only be 0.029; however, this equates to a 42% relative reduction. Minorities suffer from behavioral health problems at similar rates as Whites; however, their problems are more pervasive (Cook et al., 2014; Mays et al., 2018). Therefore, it is unclear why minorities would not utilize these services at comparable rates to those of Whites.

This supports the notion that access to private insurance is an important step but is not itself sufficient in leveling the field across racial/ethnic groups (McGuire and Miranda, 2008). Strategies to increase minority participation in EAP services may be beneficial. From an

employer perspective, underutilization of EAP services is a key identification of the potential improvements that can be made to increase awareness and allure of utilizing EAP services. Carchietta (2015) recently reported strategies for improving EAP service utilization including marketing strategies, program education and reinforcement, ensuring confidentiality, improved availability of services and the introduction of annual meetings with EAP staff to (Carchietta, 2015).

Two key predictors of EAP service utilization were an individual's EAP limit amount and the EAP penetration rate (i.e. proportion of EAP users at the employer level). This suggests that increasing the number of EAP visits allowed may increase EAP service utilization. From both an employee and employer perspective, this may promote additional use of these low-cost, accessible services prior to transitioning to traditional behavioral health services. The mean EAP limit amount in the sample was 4.8 visits and the mean number of EAP visits per employee who utilized EAP services was 3.6. This suggests individuals that are utilizing the EAP services are taking advantage of most of their limit.

The positive association between EAP penetration rate and EAP service utilization suggests that an increase in EAP utilization at the employer level results in higher rates of EAP service utilization at an employee level. This association may result from reduced perceived stigma. In other words, if a large proportion of employees are already utilizing EAP services, other employees may perceive less stigma associated with using the services themselves. From a methodological perspective, these two variables were found to be empirically strong instruments. Researchers in search of potential instruments for EAP use may explore these variables as potential options.

An additional finding was the positive association between EAP service use and behavioral health service use. That is, among this sample of commercially-insured adults with access to both an EAP and behavioral health treatment, EAP services are viewed as a complement – rather than a substitute – of behavioral health treatment. This suggests that EAPs are effective in linking people to behavioral health care, a core component of EAPs (P. M. Roman and Blum, 1985). This aligns with the conclusions from Merrick and colleagues (2010) where they found that, in 2004, individuals in an integrated health plan – including both traditional behavioral health services and EAP services – used more outpatient mental health and substance abuse treatment than those who only had access to behavioral health treatment (E. L. Merrick et al., 2010). However, the results do not align with the findings from the Hodgkin study where they found that EAP services were utilized as a substitute for behavioral health treatment (Hodgkin et al., 2010). This difference may be due to the fact that Hodgkin and colleagues (2010) evaluated the association between EAP coverage – rather than EAP service use – and behavioral health services utilization.

The results from the third research question found that, among all racial/ethnic groups, EAP service use served as a complement of behavioral health services. When the magnitudes of the values associated with EAP service use were compared, the values for each racial/ethnic group fell within each of their 95% confidence intervals. These results generally align with those from the interaction analysis. This provides insight into the help-seeking behavior of each group. Specifically, commercially-insured adults with access to both EAP services and behavioral health services in this sample demonstrated a comparable complementary use of both types of services across racial/ethnic groups. Due to the potential perceived stigma associated with

traditional behavioral health services, it appears that EAPs may offer a destigmatized avenue to obtain behavioral health treatment – free of charge. If minorities can be encouraged to utilize these services, this could be helpful in ameliorating behavioral health disparities as this may increase behavioral health treatment.

Taking the results from each of the three research questions together, it is evident that more effort into increasing minority participation in EAP services may, in turn, result in greater utilization of behavioral health services. The evidence suggests that minorities underutilize behavioral health services more than Whites do (Cook et al., 2014). Combining that stylized fact with the finding that EAP services and behavioral health services are complementary provides an argument for increasing EAP service utilization as a mechanism for increasing behavioral health treatment.

This dissertation contributes to the limited available EAP evidence with a focus on two key areas of research in the EAP field: the study of EAP users and their subsequent use of behavioral health services. These areas of research are important as EAP services are widely offered to employees as a component of their health benefit package (Sciegaj et al., 2001). Although evaluations of these topics were popular in earlier years, recent evaluations of EAPs have lagged in recent years. Evidence suggests that EAPs have evolved in recent years (Sandys, 2015), in part, due to increased consolidation and pressure for increased cost-effectiveness tactics (Courtois et al., 2005). Due to the current paucity of high-quality research in the EAP field, this dissertation provides an updated evaluation of contemporary EAPs.

This dissertation has some important limitations. Although the data consist of a diverse and large patient population from all 50 states, the data are for a convenience sample drawn from one

managed behavioral health organization. Therefore, the generalizability of the results may be limited. However, when compared to data estimated by the Kaiser Family Foundation estimated using the Census Bureau's American Community Survey in 2017, the distribution of race/ethnicity was comparable (Berchick, Hood, and Barnett, 2018). Additionally, the study was limited to individuals with at least 12 months of continuous enrollment. Based on the limitations of the dataset, it is unclear why someone would leave or change health insurance. There is the potential for omitted variable bias if individuals are leaving their health plan in a systematic way that is associated with EAP service or behavioral health service use. It can be assumed that this is unlikely.

It is important to note that this dissertation does not explore other factors that influence racial/ethnic disparities in behavioral health treatment. For example, a commonly cited barrier to initiating and maintaining behavioral health treatment is the limited accessibility of minority behavioral health practitioners (McGuire and Miranda, 2008). The results of a qualitative study completed by Newhill and colleagues found that African Americans perceived the mental health care system as being staffed primarily by Whites and they often felt marginalized partially due to communication barriers and misaligned backgrounds (Newhill and Harris, 2007).

Additionally, there are specific limitations to note regarding the sociodemographic data utilized in this dissertation. First, it is important to note that the sociodemographic data (i.e. race/ethnicity/language, education, income/net worth) are self-reported. Although it is likely that self-reported race/ethnicity/language are less likely to suffer from measurement error, income/net worth may not be as robust and may be subject to measurement error due to the likely sensitivity to the variable. Further, the race/ethnicity/language variable combines two constructs – namely

race/ethnicity and preferred language spoken. The data for this variable were aggregated to satisfy Optum's confidentiality requirements for providing the sociodemographic data. The aggregation of the variable allowed for inferences to be made about various racial/ethnic groups and the preferred language spoken. For example, the results from the first research question suggest there are greater differences in EAP service use between Hispanic, non-English Speakers and Whites than between Hispanic, English Speakers and Whites. Lastly, there was a high rate of missing sociodemographic data among the sample. The descriptive statistics comparing the full sample and the subsample of those with commercial marketing data suggest there are not key differences in the samples.

The scope of this dissertation did not allow for the exploration of the heterogenous within-group differences that may be present within racial/ethnic groups. Researchers have noted that there are specific, key differences between individuals within a racial/ethnic group (V. M. Mays, Ponce, Washington, and Cochran, 2003). For example, evidence suggests there are key differences between foreign-born and native-born adults (Dey and Lucas, 2006). Researchers have also found several significant differences when comparing Mexicans to other Hispanic-Latino subgroups. (Harris, Edlund, and Larson, 2005). Although this dissertation did not have the ability to explore this concept deeper, future research should attempt to understand this topic further.

Despite the limitations outlined, this dissertation outlined the racial/ethnic differences in EAP service use among a national sample of commercially-insured employees who have access to both EAP services and behavioral health services. It also confirmed the complementary relationship between EAP service and behavioral health services. This relationship was seen

among each racial/ethnic group, suggesting the value of EAP services in facilitating subsequent behavioral health treatment.

This dissertation elucidated key concepts that are of interest to researchers in the field; however, there are many areas this research can continue to explore. For example, there is a growing trend towards increased integration between multiple employer-sponsored programs (Attridge, 2012). Future research could explore the potential synergistic impact of employees having access to multiple types of employer-sponsored programs (e.g. EAP and Work/Life programs). This concept may be explored as a possible avenue to specifically explore the potential benefit among racial/ethnic minorities.

Additionally, further research could explore the costs associated with increased behavioral health care use due to EAP service utilization. As noted, when evaluating the potential return-on-investment of EAPs, analyses frequently consider the economic benefit of increased productivity and reduced absenteeism, but often neglect to consider the potential increases in behavioral health service treatment in recent years (Attridge et al., 2009). Although employees do not have to pay to utilize EAP services, employers may provide the resources (e.g. the staff and administrative infrastructure) or the premium to deliver these services. At face value, insurance coverage for those who have EAP and behavioral health care coverage is typically structured to favor EAP service use as it requires no copayment. Future research may explore the potential cost offsets associated with utilizing EAP services and in conjunction with behavioral health services. It would also be important to estimate if there are racial/ethnic differences in the potential cost offsets to better understand how to maximize EAPs.

Although there is limited recent data available describing how to potentially increase minority participation in EAPs, Gray and Lanier outlined specific considerations when designing an EAP that will meet the needs of Black clients (Gray and Lanier, 1985). A key suggestion offered by the authors was to consider racial and cultural issues in the design and implementation of EAPs in order to increase participation by Black employees. Additionally, due to the association between EAP limit amount and EAP penetration rate and utilization of EAP services, increasing the EAP limit amount and implementing options to increase EAP use at the employer level could be beneficial in increasing EAP visits by minorities. Increasing the EAP penetration rate may improve the perception of stigma associated with EAP services, particularly among minorities.

APPENDICES

Appendix A. Utilization Variable Definitions

Notes about Codes:
(1) CPT code descriptions come from the 2014 AMA CPT manual, professional edition. Note: For CPT codes, a plus (+) indicates an add-on code, a type of code that is listed separately in addition to the code for the primary service.

(2) HCPCS code descriptions come from the 2014 AMA HCPCS Level II manual, professional edition.

(3) Revenue code descriptions come from the American Hospital Association UB-04 Data Specifications Manual 2014 Single-User Annual Subscription License PDF e-book. After the license expired, definitions came from the claims procedure code description variable "clm_net_proc_desc" and two online resources:
http://www.bcbsil.com/labor/pdf/code_manual/revenue_codes.pdf
http://www.cbs.state.or.us/wcd/operations/edi/revenue_codes.pdf

Notes about Derived Level of Care (DLOC): This variable ("clm_net_dloc_txt") is used to define our utilization variables and our inpatient/outpatient expenditure variables. There are 11 values for this variable. Summary of information about these 11 levels of care:

1. **Professional Services:** Inpatient.
2. **Acute Inpatient**: Inpatient.
3. **Residential:** Inpatient.
4. **Recovery Home:** Inpatient.
5. **Day Treatment**: Inpatient.
6. **Structured Outpatient**: Outpatient.
7. **Outpatient**: Outpatient. A derived unit of 1 for this LOC represents 1 visit. Used for 5 Outpatient Utilization Variables [(1) individual psychotherapy, (2) family psychotherapy, (3) group psychotherapy, (4) medication management, (5) assessment/diagnostic evaluation]; and (6) Outpatient expenditure variables.
8. **Medication Services**: Outpatient. A derived unit of 1 for this LOC represents 1 visit. Used for 5 Outpatient Utilization Variables [(1) individual psychotherapy, (2) family psychotherapy, (3) group psychotherapy, (4) medication management, (5) assessment/diagnostic evaluation] and (6) Outpatient expenditure variables.
9. **Ancillary**: Outpatient.
10. **ECT**: Outpatient.
11. **EAP**: Outpatient.

/**********/

I. Outpatient Services: Utilization variables below are defined by counting the service units of claims with a derived level of care = "Outpatient" or "Medication Services", and with specific procedure codes listed below.

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1. Number of outpatient individual psychotherapy visits only:
   - CPT codes
     - **90804, 90806, 90808** - Psychiatry: Psychiatric Diagnostic procedures: 90804-90809 have been deleted. To report, see psychotherapy codes 90832, 90834, 90837, or add-on codes when performed with an evaluation and management service. From 1999 CPT Manual: Office or other outpatient facility: Insight oriented, behavior modifying and/or supportive psychotherapy.
     - **90810, 90812, 90814** – Psychiatry: Psychiatric Diagnostic procedures: 90810-90815 have been deleted. To report interactive psychotherapy, report +90785 in conjunction with psychotherapy codes 90832, 90834, 90837, or add-on codes when performed with an evaluation and management service. From 1999 CPT Manual: Office or other outpatient facility: interactive psychotherapy.
     - **90832, 90834**, **90837**-- Psychiatry: Psychotherapy: Psychotherapy, 30, 45, 60 minutes with patient and/or family member
     - **+90833, +90836, +90838** - Psychiatry: Psychotherapy: Psychotherapy, 30, 45, 60 minutes with patient and/or family member when performed with an evaluation and management service (list separately in addition to the code for primary procedure).
     - **90839** - Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Psychotherapy for Crisis; first 60 minutes.
     - **+90840** - Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Psychotherapy for Crisis; each additional 30 minutes (list separately in addition to code for primary service).
     - **90844** - From 1999 CPT Manual: 90844 has been deleted. To report, see 90806, 90807, 90818 [IP], 90819 [IP].
     - **90845** - Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Psychoanalysis
     - **90855** - From 1999 CPT Manual: 90855 has been deleted. To report, see 90810-90815, and 90823-90829 [IP].
     - **90875, 90876** - Psychiatry: Other Psychiatric Services or Procedures: Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying, or supportive psychotherapy).
   - HCPCS code **H0004**: Behavioral health counseling and therapy, per 15 minutes.
   - Revenue code **914**/**0914**: BEHAVIORAL HEALTH SERVICES, INDIVIDUAL THERAPY

2. Number of outpatient family psychotherapy visits:
   - CPT codes
     - **90846** - Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Family psychotherapy (without the patient present)
     - **90847**- Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Family psychotherapy (conjoint psychotherapy) (with the patient present)

- **90849 -** Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Multiple-family group psychotherapy.
- Revenue code **916**/**0916**: BEHAVIORAL HEALTH SERVICES, FAMILY THERAPY

3. Number of outpatient group psychotherapy visits:
   - CPT codes
     - **90853 -** Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: Group psychotherapy (other than of a multiple-family group)
     - **90857 -** Psychiatry: Other Psychotherapy – Psychotherapy for Crisis: 90857 has been deleted. To report, use +90785 in conjunction with 90853.
   - HCPCS code **H0005**: Alcohol and/or drug services; group counseling by a clinician
   - Revenue code **915**/**0915**: BEHAVIORAL HEALTH SERVICES, GROUP THERAPY

4. Number of outpatient medication management visits, with or without psychotherapy:
   - CPT codes
     - **90792** - Psychiatry: Psychiatric Diagnostic Procedures. Psychiatric diagnostic evaluation with medical services.
     - **90805, 90807, 90809** – Psychiatry: Psychiatric Diagnostic procedures: 90804-90809 have been deleted. To report, see psychotherapy codes 90832, 90834, 90837, or add-on codes when performed with an evaluation and management service. From 1999 CPT Manual: Office or other outpatient facility: Insight oriented, behavior modifying and/or supportive psychotherapy with medical evaluation and management services.
     - **90811, 90813, 90815** - Psychiatry: Psychiatric Diagnostic procedures: 90810-90815 have been deleted. To report interactive psychotherapy, report +90785 in conjunction with psychotherapy codes 90832, 90834, 90837, or add-on codes when performed with an evaluation and management service. From 1999 CPT Manual: Office or other outpatient facility: interactive psychotherapy: with medical evaluation and management services.
     - **90862 -** Psychiatry: Other Psychiatric Services or Procedures: 90862 [pharmacologic management] has been deleted. To report, see +90863 or EandM service codes 99201-99255 [OP and IP], 99281-99285 [Emergency Department], 99304-99337 [Nursing Facility], 99341-99350 [Home Visit].
     - **+90863** - Psychiatry: Other Psychiatric Services or Procedures: pharmacologic management, including prescription and review of medication, when performed with psychotherapy services (list separately in addition to the code for primary procedure).
       i. (Use +90863 in conjunction with 90832, 90834, 90837)
       ii. (For pharmacologic management with psychotherapy services performed by a physician or other qualified health care professional who may report evaluation and management codes, use the appropriate EandM codes 99201-99255 [OP and IP], 99281-99285 [Emergency Department], 99304-99337 [Nursing Facility], 99341-99350 [Home Visit] and the appropriate psychotherapy with EandM service +90833, +90836, +90838)
     - **99201-99205** –Evaluation and management. Office or other outpatient services. New patient
     b. **99211-99215** - Evaluation and management. Office or other outpatient services. Established patient.
     c. **99241-99245** – Evaluation and Management. Consultations. Office or Other Outpatient Consultations.

5. Number of outpatient diagnostic evaluation visits:
    - CPT codes
        - **90791** – Psychiatry: Psychiatric Diagnostic Procedures. Psychiatric diagnostic evaluation
        - **90792 -** Psychiatry: Psychiatric Diagnostic Procedures. Psychiatric diagnostic evaluation with medical services.
        - **90801 and 90802** - Psychiatry: Psychiatric Diagnostic Procedures: 90801 and 90802 have been deleted. To report diagnostic evaluations, see 90791, 90792. From 1999 CPT manual: Psychiatric diagnostic interview examination and Interactive psychiatric diagnostic interview examination, respectively.
        - **96100** – deleted. From 1999 CPT manual: Psychological testing.
        - **96101, 96102, 96103** – Central Nervous System Assessments/Tests (eg, Neuro-Cognitive, Mental Status, Speech Testing): Psychological testing - administered by psychologist, technician, and computer, respectively.
        - **96117** – deleted. From 1999 CPT: Neuropsychological testing battery.
        - **96118, 96119, 96120** – Central Nervous System Assessments/Tests: Neuropsychological testing - administered by psychologist, technician, and computer, respectively.
    - HCPCS codes
        - **H0002** – Behavioral health screening to determine eligibility for admission to treatment program.
        - **H0031** – Mental health assessment, by non-physician
        - **H0032 -** Mental health service plan development, by non-physician
        - **H2000** – Comprehensive multidisciplinary evaluation

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II. EAP Services: Utilization variables below are defined by counting the service units of claims with a derived level of care = “EAP”, and with specific procedure codes listed below.

/**********/

6. Number of EAP individual psychotherapy services: see codes specified in #1.
7. Number of EAP family psychotherapy services: see codes specified in #2.
8. Number of EAP group psychotherapy services: see codes specified in #3.
9. Number of EAP medication management services: see codes specified in #4.
10. Number of EAP diagnostic evaluation services: see codes specified in #5.

Appendix B. Detailed Results

Table 16. Detailed two-part model of EAP service use among commercially-insured individuals with an EAP and behavioral health benefit[§]

Variable (n=1,364,568)	Choice Model (p-value)*	Conditional Difference (p-value)*	Unconditional Difference (p-value)*
Race/Ethnicity and Primary Language Used to Communicate			
White	Reference		
Asian, English Speaking	-0.008 (0.000)	-0.058 (0.000)	-0.027 (0.000)
Asian, Non-English Speaking	-0.011 (0.000)	-0.283 (0.000)	-0.042 (0.000)
Black	-0.001 (0.241)	-0.219 (0.159)	-0.007 (0.001)
Hispanic, English Speaking	-0.001 (0.037)	-0.027 (0.539)	-0.005 (0.307)
Hispanic, Non-English Speaking	-0.005 (0.000)	-0.112 (0.239)	-0.018 (0.000)
Male	-0.012 (0.000)	0.001 (0.977)	-0.041 (0.000)
Age			
18-24	Reference		
25-34	0.005 (0.000)	-0.040 (0.662)	0.018 (0.000)
35-44	0.006 (0.000)	0.038 (0.663)	0.022 (0.000)
45-54	0.002 (0.024)	0.038 (0.682)	0.008 (0.032)
55-64	-0.003 (0.000)	-0.023 (0.825)	-0.012 (0.001)
Spouse / Domestic Partner Covered	0.001 (0.116)	0.040 (0.303)	0.003 (0.057)
Number of Dependents Covered by Age			
Less than 5 years old	0.001 (0.102)	-0.082 (0.014)	0.001 (0.651)
5-11	0.002 (0.000)	-0.065 (0.016)	0.004 (0.001)
12-17	0.003 (0.000)	-0.033 (0.120)	0.009 (0.000)
Greater than 18 years old	0.001 (0.000)	-0.067 (0.014)	0.003 (0.004)
Education			
High School or less	-0.007 (0.000)	-0.115 (0.002)	-0.027 (0.000)
Some college	-0.003 (0.000)	-0.048 (0.191)	-0.012 (0.000)
Associate degree	0.000 (0.667)	-0.021 (0.636)	0.001 (0.790)
Bachelor's degree or higher	Reference		

Table 16. Detailed two-part model of EAP service use among commercially-insured individuals with an EAP and behavioral health benefit[§] (continued)

Variable (n=1,364,568)	Choice Model (p-value)	Conditional Difference (p-value)	Unconditional Difference (p-value)
Household-level Income / Net Worth[‡]			
Low income, very low net worth	0.003 (0.000)	0.019 (0.727)	0.011 (0.000)
Low income, low net worth	0.003 (0.000)	0.110 (0.067)	0.013 (0.000)
Low income, moderate to very high net worth	0.005 (0.000)	0.069 (0.193)	0.018 (0.000)
Moderate income, very low to low net worth	0.009 (0.000)	0.142 (0.018)	0.034 (0.000)
Moderate income, moderate net worth	0.006 (0.000)	0.116 (0.052)	0.023 (0.000)
Moderate income, high to very high net worth	0.008 (0.000)	0.102 (0.108)	0.030 (0.000)
High income, very low to high net worth	0.011 (0.000)	0.062 (0.360)	0.039 (0.000)
High income, very high net worth	Reference		
Carve-in status	-0.004 (0.005)	-0.131 (0.032)	-0.015 (0.001)
Behavioral Health Plan is "more managed" vs "less managed"	0.002 (0.138)	0.079 (0.099)	0.008 (0.042)
Provider Supply			
MD Rate	-0.000 (0.988)	0.007 (0.964)	-0.001 (0.941)
MSW Rate	-0.000 (0.370)	-0.000 (0.991)	-0.001 (0.393)
PhD Rate	0.000 (0.873)	0.057 (0.263)	0.003 (0.367)
RN Rate	0.002 (0.714)	-0.146 (0.696)	0.004 (0.827)
Non-Independent Licensed Provider Rate	0.000 (0.667)	0.031 (0.401)	0.001 (0.427)
EAP Limit Amount[¥]	0.002 (0.000)	-1.063 (0.056)	0.015 (0.000)
EAP Penetration Rate[¥¥]	0.355 (0.000)	0.450 (0.000)	1.217 (0.000)

[§]This model is a reduced-form model. The model also controls for state and industry, but those results are not shown here for brevity.

[*]Represents the discrete change from the base level.

[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)

[¥]EAP Limit Amount represents the annual number of EAP visits allowed

[¥¥]EAP Penetration Rate represents the proportion of EAP users at the employer level

Table 17. Detailed single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§]

Variable	White β[†] (Robust SE)[††]	Black β[†] (Robust SE)[††]	Asian, English Speaker β[†] (Robust SE)[††]	Asian, Non-English Speaker β[†] (Robust SE)[††]	Hispanic, English Speaker β[†] (Robust SE)[††]	Hispanic, Non-English Speaker β[†] (Robust SE)[††]
Number of EAP Visits	0.756 (0.074)***	0.728 (0.116)***	0.849 (0.1814)***	0.809 (0.113)***	0.781 (0.075)***	0.636 (0.083)***
Male	-0.306 (0.020)***	-0.202 (0.025)***	-0.211 (0.093)*	-0.217 (0.088)*	-0.26 (0.041)***	-0.213 (0.033)***
Age						
18-24	Reference					
25-34	0.232 (0.045)***	0.166 (0.046)***	0.182 (0.140)	-0.187 (0.255)	0.219 (0.065)***	0.134 (0.046)**
35-44	0.353 (0.051)***	0.232 (0.053)***	0.360 (0.149)*	-0.242 (0.275)	0.435 (0.105)***	0.182 (0.058)**
45-54	0.316 (0.050)***	0.258 (0.055)***	0.386 (0.155)*	-0.227 (0.257)	0.379 (0.099)***	0.114 (0.045)*
55-64	0.254 (0.040)***	0.197 (0.079)*	0.265 (0.180)	-0.301 (0.259)	0.263 (0.100)**	0.073 (0.057)
Spouse / Domestic Partner Covered	-0.068 (0.025)	0.032 (0.025)	-0.122 (0.059)*	-0.013 (0.060)	-0.010 (0.056)	-0.036 (0.042)

Table 17. Detailed single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§] (continued)

Variable	White β[†] (Robust SE)[††]	Black β[†] (Robust SE)[††]	Asian, English Speaker β[†] (Robust SE)[††]	Asian, Non-English Speaker β[†] (Robust SE)[††]	Hispanic, English Speaker β[†] (Robust SE)[††]	Hispanic, Non-English Speaker β[†] (Robust SE)[††]
Number of Dependents Covered by Age						
Less than 5 years old	-0.042 (0.018)	0.028 (0.031)	-0.031 (0.067)	0.012 (0.043)	-0.018 (0.067)	-0.076 (0.021)***
5-11	0.014 (0.010)	-0.011 (0.024)	0.017 (0.037)	-0.054 (0.027)*	-0.061 (0.029)*	0.022 (0.018)
12-17	-0.003 (0.010)	-0.026 (0.016)	-0.019 (0.040)	0.047 (0.037)	-0.092 (0.047)	0.030 (0.025)
Greater than 18 years old	-0.010 (0.010)	-0.028 (0.014)	-0.016 (0.055)	-0.006 (0.026)	-0.098 (0.028)***	-0.007 (0.017)
Education						
High School or less	-0.502 (0.048)**	-0.409 (0.082)***	-0.330 (0.115)**	-0.132 (0.092)	-0.335 (0.108)**	-0.321 (0.084)***
Some college	-0.362 (0.041)***	-0.352 (0.066)***	-0.194 (0.114)	-0.106 (0.058)	-0.277 (0.081)**	-0.266 (0.075)**
Associate degree	-0.264 (0.037)***	-0.270 (0.099)**	-0.178 (0.074)**	-0.075 (0.059)	-0.118 (0.083)	-0.219 (0.103)*
Bachelor's degree or higher	Reference					

Table 17. Detailed single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§] (continued)

Variable	White β[†] (Robust SE)[††]	Black β[†] (Robust SE)[††]	Asian, English Speaker β[†] (Robust SE)[††]	Asian, Non-English Speaker β[†] (Robust SE)[††]	Hispanic, English Speaker β[†] (Robust SE)[††]	Hispanic, Non-English Speaker β[†] (Robust SE)[††]
Household-level Income / Net Worth[‡]						
Low income, very low net worth	0.267 (0.044)***	-0.072 (0.128)	0.015 (0.134)	0.282 (0.110)*	0.071 (0.101)	-0.069 (0.123)
Low income, low net worth	0.255 (0.042)***	-0.048 (0.121)	-0.102 (0.130)	0.103 (0.086)	0.076 (0.090)	-0.162 (0.130)
Low income, moderate to very high net worth	0.210 (0.033)***	-0.030 (0.121)	0.141 (0.169)	0.159 (0.111)	0.012 (0.085)	-0.105 (0.114)
Moderate income, very low to low net worth	0.292 (0.048)***	-0.083 (0.123)	-0.112 (0.166)	0.136 (0.086)	0.049 (0.091)	-0.079 (0.112)
Moderate income, moderate net worth	0.172 (0.028)***	-0.101 (0.137)	-0.033 (0.092)	0.128 (0.080)	0.096 (0.094)	-0.121 (0.123)
Moderate income, high to very high net worth	0.166 (0.029)***	-0.044 (0.122)	-0.115 (0.081)	0.070 (0.056)	0.028 (0.076)	-0.049 (0.123)
High income, very low to high net worth	0.119 (0.032)***	-0.096 (0.141)	-0.056 (0.108)	0.221 (0.143)	0.126 (0.110)	-0.109 (0.113)
High income, very high net worth	Reference					
Carve-in status	-0.067 (0.106)	-0.129 (0.084)	-0.114 (0.128)	-0.053 (0.063)	-0.234 (0.121)	-0.112 (0.078)
Plan is "more managed" vs "less managed"	0.114 (0.140)	0.061 (0.095)	0.069 (0.121)	-0.027 (0.074)	0.303 (0.154)	0.205 (0.090)*

Table 17. Detailed single-equation linear model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity[§] (continued)

Variable	White β[†] (Robust SE)[††]	Black β[†] (Robust SE)[††]	Asian, English Speaker β[†] (Robust SE)[††]	Asian, Non-English Speaker β[†] (Robust SE)[††]	Hispanic, English Speaker β[†] (Robust SE)[††]	Hispanic, Non-English Speaker β[†] (Robust SE)[††]
Provider Supply per 1,000 Members for the Given State and Year						
MD Rate	-0.082 (0.044)	0.031 (0.093)	-0.055 (0.076)	-0.063 (0.088)	0.164 (0.145)	-0.130 (0.143)
MSW Rate	0.003 (0.015)	-0.008 (0.018)	-0.008 (0.028)	0.013 (0.027)	0.027 (0.025)	-0.033 (0.024)
PhD Rate	0.012 (0.017)	0.007 (0.023)	0.017 (0.038)	0.002 (0.042)	-0.058 (0.040)	0.000 (0.034)
RN Rate	0.088 (0.173)	0.076 (0.328)	0.306 (0.428)	-0.124 (0.417)	-0.922 (0.650)	1.073 (0.606)
Non-Independent Licensed Provider Rate	0.016 (0.013)	-0.156 (0.060)*	0.001 (0.021)	0.066 (0.055)	-0.047 (0.030)	-0.006 (0.020)

[†]β is the linear regression coefficient.

[††]The standard errors account for heteroskedasticity across employer clusters.

[‡]Low income (<$75K), very low net worth (<$25K)
Low income (<$75K), low net worth ($25-$100K)
Low income (<$75K), moderate to very high net worth ($100K+)
Moderate income ($75-$150K), very low to low high net worth ($0-99K)
Moderate income ($75-150K), moderate net worth ($100-$249K)
Moderate income ($75-$150K), high to very high net worth ($250K)
High income ($150K); very low to high net worth ($0-$499K)
High income ($150K+), very high net worth ($500K+)

*p-value<0.05, **p-value<0.01, ***p-value<0.001

Table 18. Detailed GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity

Variable	White β† (Robust SE)††	Black β† (Robust SE)††	Asian, English Speaker β† (Robust SE)††	Asian, Non-English Speaker β† (Robust SE)††	Hispanic, English Speaker β† (Robust SE)††	Hispanic, Non-English Speaker β† (Robust SE)††
Number of EAP Visits	0.561 (0.826)	1.062 (0.888)	0.249 (0.953)	1.840 (1.375)	-0.011 (0.481)	-0.250 (0.652)
Male	-0.320 (0.038)***	-0.193 (0.041)***	-0.203 (0.098)*	-0.194 (0.096)*	-0.282 (0.053)***	-0.230 (0.040)***
Age						
18-24	Reference					
25-34	0.248 (0.046)***	0.160 (0.056)**	0.174 (0.142)	-0.225 (0.270)	0.218 (0.067)**	0.133 (0.054)*
35-44	0.363 (0.053)***	0.224 (0.062)***	0.342 (0.153)*	-0.290 (0.290)	0.449 (0.108)***	0.168 (0.068)*
45-54	0.316 (0.051)***	0.244 (0.060)***	0.378 (0.155)*	-0.258 (0.266)	0.356 (0.102)***	0.092 (0.056)
55-64	0.248 (0.044)***	0.191 (0.079)*	0.279 (0.175)	-0.318 (0.266)	0.214 (0.099)*	0.064 (0.068)
Spouse / Domestic Partner Covered	-0.068 (0.030)*	0.030 (0.029)	-0.131 (0.060)*	-0.002 (0.064)	-0.015 (0.055)	-0.009 (0.040)

Table 18. Details for the GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity (continued)

Variable	White β† (Robust SE)††	Black β† (Robust SE)††	Asian, English Speaker β† (Robust SE)††	Asian, Non-English Speaker β† (Robust SE)††	Hispanic, English Speaker β† (Robust SE)††	Hispanic, Non-English Speaker β† (Robust SE)††
Number of Dependents Covered by Age						
Less than 5 years old	-0.038 (0.020)	0.018 (0.036)	-0.020 (0.068)	0.012 (0.046)	-0.023 (0.070)	-0.083 (0.022)***
5-11	0.015 (0.012)	-0.017 (0.021)	0.021 (0.039)	-0.047 (0.031)	-0.064 (0.030)*	0.029 (0.021)
12-17	0.000 (0.013)	-0.022 (0.016)	0.005 (0.037)	0.042 (0.039)	-0.084 (0.050)	0.058 (0.032)
Greater than 18 years old	-0.003 (0.010)	-0.023 (0.015)	-0.032 (0.051)	-0.012 (0.02)	-0.082 (0.030)**	-0.011 (0.017)
Education						
High School or less	-0.534 (0.057)***	-0.415 (0.079)***	-0.324 (0.125)**	-0.142 (0.090)	-0.377 (0.117)**	-0.316 (0.085)***
Some college	-0.373 (0.042)***	-0.345 (0.075)***	-0.209 (0.108)	-0.132 (0.072)	-0.302 (0.088)**	-0.269 (0.077)***
Associate degree	-0.271 (0.039)***	-0.260 (0.104)*	-0.184 (0.079)*	-0.085 (0.064)	-0.109 (0.081)	-0.226 (0.091)*
Bachelor's degree or higher	Reference					

Table 18. Details for the GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity (continued)

Variable	White β† (Robust SE)††	Black β† (Robust SE)††	Asian, English Speaker β† (Robust SE)††	Asian, Non-English Speaker β† (Robust SE)††	Hispanic, English Speaker β† (Robust SE)††	Hispanic, Non-English Speaker β† (Robust SE)††
Household-level Income / Net Worth‡						
Low income, very low net worth	0.256 (0.072)***	-0.109 (0.128)	0.009 (0.140)	0.255 (0.098)**	0.114 (0.110)	-0.002 (0.142)
Low income, low net worth	0.236 (0.074)**	-0.097 (0.132)	-0.068 (0.137)	0.010 (0.092)	0.102 (0.094)	-0.084 (0.148)
Low income, moderate to very high net worth	0.193 (0.064)**	-0.068 (0.121)	0.097 (0.164)	0.143 (0.114)	0.051 (0.091)	-0.060 (0.126)
Moderate income, very low to low net worth	0.290 (0.062)***	-0.122 (0.119)	-0.067 (0.191)	0.131 (0.090)	0.107 (0.097)	-0.016 (0.131)
Moderate income, moderate net worth	0.170 (0.040)***	-0.133 (0.131)	-0.031 (0.010)	0.127 (0.087)	0.108 (0.100)	-0.072 (0.136)
Moderate income, high to very high net worth	0.164 (0.038)***	-0.081 (0.124)	-0.094 (0.089)	0.058 (0.058)	0.040 (0.077)	-0.014 (0.139)
High income, very low to high net worth	0.114 (0.037)**	-0.136 (0.135)	-0.035 (0.123)	0.205 (0.150)	0.170 (0.120)	-0.0851 (0.122)
High income, very high net worth	Reference					

Table 18. Details for the GMM IV model for outpatient behavioral health treatment among commercially-insured individuals with an EAP and behavioral health benefit stratified by race/ethnicity (continued)

Variable	White β† (Robust SE)††	Black β† (Robust SE)††	Asian, English Speaker β† (Robust SE)††	Asian, Non-English Speaker β† (Robust SE)††	Hispanic, English Speaker β† (Robust SE)††	Hispanic, Non-English Speaker β† (Robust SE)††
Carve-in status	-0.070 (0.118)	-0.192 (0.121)	-0.030 (0.134)	-0.003 (0.066)	-0.130 (0.121)	0.014 (0.100)
Plan is "more managed" vs "less managed"	0.048 (0.114)	0.048 (0.097)	0.032 (0.099)	-0.053 (0.082)	0.199 (0.106)	0.151 (0.056)**
Provider Supply per 1,000 Members for the Given State and Year						
MD Rate	-0.064 (0.058)	-0.087 (0.179)	-0.092 (0.085)	-0.032 (0.137)	0.209 (0.131)	-0.003 (0.143)
MSW Rate	-0.010 (0.010)	-0.015 (0.016)	-0.038 (0.042)	0.019 (0.055)	0.009 (0.027)	-0.028 (0.029)
PhD Rate	0.026 (0.018)	0.050 (0.049)	0.056 (0.057)	-0.006 (0.081)	-0.039 (0.043)	-0.034 (0.042)
RN Rate	0.139 (0.204)	0.166 (0.358)	0.595 (0.489)	-0.253 (0.690)	-0.923 (0.567)	0.769 (0.602)
Non-Independent Licensed Provider Rate	0.022 (0.016)	-0.100 (0.061)	0.001 (0.028)	0.068 (0.055)	-0.086 (0.025)**	0.011 (0.028)

§The model also controls for other variables in the state and industry, but those results are not shown here.

†β is the linear regression coefficient.

††The standard errors account for heteroskedasticity across employer clusters.

*p-value<0.05, **p-value<0.01, ***p-value<0.001

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