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Physician burnout : a "meta-o-scopic" analysis

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PHYSICIAN BURNOUT: A "META-O-SCOPIC" ANALYSIS

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Dedication Page

For my grandpa

To the late William Lawrence Graham, the best grandpa a granddaughter could ever ask for. Although you are not here today to share in my success, I know you are looking down on me, guiding and congratulating me every step of the way.

Abstract

This study investigates the contradictions that exist within the physician burnout literature. Through the use of meta-analysis, physician burnout and its relationships to gender, medical specialty, age, illness, and satisfaction were analyzed. The results indicate that female physicians are more *emotionally exhausted* than male physicians and *depersonalization* is higher among male than female physicians. General practitioners report higher levels of *emotional exhaustion* than any other medical specialty. A low to moderate negative correlation exists between physician age and burnout, a moderate to substantial positive correlation exists between burnout and physician illness, and a moderate to substantial negative correlation exists between burnout and physician satisfaction. The results of this project heighten our awareness of the risks associated with being a physician, as well as extend a call to action so that effective and preventative measures can be implemented.

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BBQ – The Boudreau Burnout Questionnaire
BM – The Pines and Aronson Burnout Measure
DP – Depersonalization
EE – Emotional Exhaustion
F – Females
GHQ – The General Health Questionnaire
GP – General Practitioner(s)
PA – Personal Accomplishment
MBI-ES – The Maslach Burnout Inventory - Educator's Survey
MBI-GS – The Maslach Burnout Inventory – General Survey
MBI-HSS – The Maslach Burnout Inventory – Human Services Survey
MBI – The Maslach Burnout Inventory
M – Males
SMBM – The Shirom Burnout Measure
WRSI – The Work-Related Strain Inventory

Preamble

The health care system is a vital part of our everyday lives. It affects all of us individually, but it also affects our families, our friends, and virtually all Canadians. Whether a prescription is needed, an infection must be healed, a baby is born, a disease must be cured, a broken bone must be fixed, a life must be saved, or the life of someone is lost, the health care system is needed to provide the necessary services to prevent, aid, and support these and other medical and health-related situations that may arise.

Access to quality health care remains a distinguishing Canadian right. As tax payers, we are all entitled to use the health care system and its services. In return, we expect that when we need a medical service, we will be provided with the appropriate care, attention, and support we are entitled to and require. In the ideal world, this may be true, but in reality today, this is not the case. The current health care system is broken, and this is having a substantial impact on all of us, those we care about, and those around us.

The current shortage of Canadian physicians is playing a detrimental role in the health care system and is jeopardizing the quality of health care received. According to Gulli and Lunau (2008), one factor contributing to this shortage is the new generation of physicians; they are “simply unwilling to work the hours [their] predecessors did” (p. 63). A 2003 study conducted by the Canadian Institute for Health Information further supports this claim. The study shows that physicians aged 55 to 64 work 54 hours per week, and those physicians under the age of 35 work 47.3 hours per week, which is the lowest of any age group (Gulli & Lunau, 2008).

A second contributing factor to the current physician shortage is gender. Dr. Brian Day, past President of the Canadian Medical Association, compared the roles of male and female physicians, and argued that female physicians are not willing to work the same amount of hours or make the same contributions to the medical field as male physicians because of the role requirements of having a family (Gulli & Lunau, 2008).

Burnout is a third contributing factor to the poor quality of healthcare and the current physician shortage. It is having a negative effect particularly on female physicians, causing them in some cases to withdraw from the medical profession entirely (Gulli & Lunau, 2008).

As the population of Canada continues to age, and the new generations of physicians, increasingly female-dominated, enter the workforce, it seems reasonable to conclude that fewer hours will be worked and more patients will be left without a physician. Currently, Canada's health care system is facing a crisis, and it involves the physicians who may or may not be there for the patients in their life and death situations.

The Purpose of this Research

Building on this discussion of physician shortages and crises in the health care system, recent empirical research has shown that burnout exists and that it is associated with a plethora of negative outcomes. A substantial number of studies on physician burnout have also been published. The major problem with these studies is that, although they report significant effects, the findings have been contradictory. This is especially true for the standard demographic variables such as age, gender, martial status, or medical specialty. In an attempt to try and make sense of these contradictions, an investigation of the physician burnout literature is necessary. By employing a method

known as meta-analysis, developed by Glass (1976) and others (Hunter, Schmidt, & Jackson, 1982), this research project will attempt to clarify the apparent contradictions that exist in the physician burnout literature. In turn, this increase in clarity could be useful in helping to inform and justify any proposed policy and practice changes ultimately designed to improve physician health.

Chapter One
Literature Review

This chapter presents an investigation of the concept of burnout, and how it has been defined and measured in the research literature. A further exploration into the burnout literature and its association with physician follow. Next, several notable contradictions have been found in the physician burnout literature and these will be discussed in fair detail. In an attempt to reconcile the most important contradictions, a critical review of two methods, the narrative subjective review and meta-analysis will be presented. Finally, the set of research questions for this project will be offered.

The Literature on Burnout

How the Construct of Burnout Developed

Burnout has become a widely used and recognized term in our society over the last forty years. Burnout was originally thought of as a social problem, rather than as a scholarly construct (Schaufeli, Maslach, & Marek, 1993). Bradley (1969) made the first reference to burnout in the scientific literature with an article about probation officers who ran a community-based treatment program for juvenile delinquents. This article defined the term "*staff burnout*" (Bradley, 1969).

By the mid-1970s, research on burnout began to appear via scholarly articles mostly in the United States (for reviews see, Borritz, Bultmann, Rugulies, Christensen, Villadsen, & Kristensen, 2005; Schaufeli et al., 1993). Two notable contributors to this early literature on burnout were Herbert Freudenberger and Christina Maslach.

Herbert Freudenberger developed the first operational definition of burnout in 1974. He defined burnout as "to fail, wear out, [or] become exhausted because of excessive demands on energy, strength, and resources" (Freudenberger, 1974, as cited in

Perlman & Hartman, 1982, p. 284). Freudenberger was a psychiatrist who experienced signs and symptoms of exhaustion, emotional distress, and frustration with his own career (Goehring, Bouvier Gallacchi, Kunzi, & Bovier, 2005). He was employed at a New York Free Clinic that had young, motivated staff who dealt with drug addicts (Schaufeli & Buunk, 2003). Freudenberger observed that many of the volunteers he worked with experienced emotional exhaustion, a loss of motivation, a loss of commitment, a depletion of energy, mental, and physical symptoms (Schaufeli & Buunk, 2003; Schaufeli et al., 1993). He labeled this collection of symptoms "*burn-out*."

Schaufeli et al. (1993) and Schaufeli and Buunk (2003) discuss how Christina Maslach, a social psychology researcher, had become involved in the emerging study of burnout. They report that Maslach was interested in how people, employed in human services, dealt with emotional arousal on the job. Her primary interests focused on cognitive strategies such as "*detached concern*." In addition, she discovered that emotional arousal and cognitive strategies have important implications on a person's professional identity and job behavior. After discussing her research results with an attorney, Maslach found out that poverty lawyers in California described a process of cynicism, loss of commitment, and exhaustion in their co-workers; the lawyers called this occurrence *burnout*. Maslach and her associates later adopted the term "*burnout*" and popularized it for this collection of process and strategy factors.

These early efforts are both significant and complementary in that Freudenberger's approach focuses on assessment, prevention, and treatment, while Maslach favours a more theoretical, evidence-based approach (Schaufeli & Buunk, 2003).

The Early Literature on Burnout

From these earliest beginnings, the construct of burnout continued to gain prominence in both academic outlets and the popular press. The topic was featured prominently in fields such as education, nursing, criminal justice, mental health, and religion (Schaufeli et al., 1993). As scholarly and public interest in burnout grew in the late 1970s and early 1980s, individual workshops and organizational interventions also began to appear more regularly.

Notwithstanding such growth, the emerging field of burnout faced several major issues which hindered its development and progress (Maslach & Jackson, 1981; Schaufeli & Buunk, 2003; Schaufeli et al., 1993). One basic issue was that writers could not agree on a common definition of burnout. A second issue was that early research in the field of burnout was descriptive, not empirical, and relied mostly on unsystematic observations. In 1982, Perlman and Hartman reviewed forty-eight articles written on burnout from 1974 to 1981 and found that the majority of the articles contained ideas, suggestions, and proposals about what burnout is, the causes of burnout, and what measures should be taken to deal with burnout symptoms (Schaufeli et al., 1993). Only five articles were found that included any empirical data. One reason for the lack of early empirical research on burnout may be that practitioners at that time were more eager to learn and write about burnout than were most academic researchers.

The Empirical Phase of Burnout Literature

By the mid-1980s, however, a noticeable shift began to appear whereby the focus on burnout became more specific and empirically-based (Schaufeli et al., 1993). Many articles and books were being written on burnout that included models, interventions, and

methods for measuring burnout. According to Schaufeli and Enzmann (1998), seven trends were observed during this time.

1. The Maslach Burnout Inventory (MBI) became the most widely accepted measure of burnout (i.e., it was being used in over 90% of the empirical publications on burnout).
2. Burnout became global, beyond the United States.
3. Research on burnout became almost exclusively focused on people-oriented, human services practitioners.
4. Burnout research emphasized more on-the-job and organizational factors rather than individual factors.
5. Design methodologies improved.
6. Burnout research became linked to psychological theories.
7. Ultimately, the phase of investigation led to an increased interest in studying the full range of worker's well-being from the negative states (burnout) to the positive states (engagement) (Maslach, Schaufeli, & Leiter, 2001).

Measuring Burnout

Over the years, a plethora of burnout measures have been developed, such as the Burnout Measure (BM) by Pines and Aronson (Fields et al., 1995), the Shirom Burnout Measure (SMBM) (Vela-Bueno et al., 2008) and the Boudreau Burnout Questionnaire (BBQ) (Boudreau, Grieco, Cahoon, Robertson, & Wedel, 2006) to name a few. However, the most popular measure of burnout remains the Maslach Burnout Inventory (MBI) (Maslach, Jackson, & Leiter, 1996). According to Maslach and Jackson (1981),

the development of the MBI was based on the need for an instrument that could assess experienced burnout in a wide range of human service workers.

There are three basic versions of the MBI: the Human Services Survey (MBI-HSS), the Educator's Survey (MBI-ES), and the General Survey (MBI-GS). It should be noted that the earliest versions of the MBI used both frequency and intensity, 7-point (0-6) Likert scales, although with very few exceptions, only the frequency scale is now used. Both the Human Services Survey and the Educator's Survey consist of 22 questions and measure three dimensions or subscales of burnout: *emotional exhaustion*, *depersonalization*, and *personal accomplishment*. Both versions present 22 separate questions and ask the respondent to rate on a frequency scale, that ranges from "*Never*" to "*Always*," the feelings and attitudes associated with the specific burnout question. One difference between the Human Services Survey and the Educator's Survey is that the former uses the term "*recipients*" whereas the latter uses the term "*students*" (Schaufeli & Buunk, 2003).

For the MBI-HSS and the MBI-ES, the *emotional exhaustion* subscale consists of nine questions. *Emotional exhaustion* is defined as "feelings of being emotionally overextended and exhausted by one's work" (Rafferty, Lemkau, Purdy, & Rudisill, 1986, p. 488). It is characterized by tiredness, somatic symptoms, decreased emotional resources, and a feeling that a person has nothing left to offer to others (Maslach & Jackson, 1986). Previous studies have shown that *emotional exhaustion* is generally the result of physical exhaustion and stress caused by an individual's job (Wallace & Brinkerhoff, 1991). The *depersonalization* subscale consists of five questions. *Depersonalization* is defined as "an unfeeling and impersonal response toward recipients

of one's services" (Rafferty et al., 1986, p. 488). *Depersonalization* is characterized by attributes such as negative and cynical attitudes, loss of concern and feeling towards others, treating others as objects rather than as human beings, stereotyping, and a distancing of one's self, either physically or emotionally (Maslach & Jackson, 1986; Wallace & Brinkerhoff, 1991). The *personal accomplishment* subscale consists of eight questions. *Personal accomplishment* "assesses the feelings of competence and successful achievement in one's work with people" (Maslach & Jackson, 1996, p. 4). A lack of *personal accomplishment* is a symptom of burnout that is characterized by negative evaluations and attitudes towards one's self, lower job productivity, the feeling of inability to handle a job or task, and a sense of personal devaluation (Wallace & Brinkerhoff, 1991).

According to Maslach and Jackson (1996), the degree of burnout that an individual is experiencing is characterized as follows: a high degree of burnout is reflected by high scores on the *emotional exhaustion* and *depersonalization* subscales and a low score on the *personal accomplishment* subscale, an average degree of burnout is reflected by average scores on all three subscales, and a low degree of burnout is reflected by low scores on the *emotional exhaustion* and *depersonalization* subscales and a high score on the *personal accomplishment* subscale.

The MBI-General Survey (MBI-GS) consists of a 16-item questionnaire which measures burnout on three subscales that are equivalent to those of the Human Services Survey and the Educator's Survey. These include *exhaustion*, *cynicism*, and *professional efficacy*. Each item of the MBI-GS is rated on a seven-point (0-6) Likert scale which measures the frequency, from "*Never*" to "*Always*," with which feelings and attitudes

associated with burnout are experienced. The *exhaustion* subscale, similar to the *emotional exhaustion* subscale, consists of five items and refers to emotional and physical fatigue (Maslach et al., 1996). The *cynicism* subscale, similar to the *depersonalization* subscale, consists of five items and reflects an indifference or distant attitude towards work (Maslach et al., 1996). The *professional efficacy* subscale, similar to the *personal accomplishment* subscale, consists of six items. It also includes both social and nonsocial aspects of a lack of occupational accomplishments (Maslach et al., 1996).

The Burnout Literature Today

From its earliest conceptual and empirical beginnings, the study of burnout has continued to expand and develop. Research on the topic has spread globally and extended to occupations such as politics, sports, and management (Schaufeli et al., 1993). Research on burnout has also broadened to include job factors such as workload, role ambiguity, and role conflict, and demographic variables such as age, gender, and marital status. Today, the construct of burnout is widely acknowledged due to its effects on occupations, cultures, and countries alike (Boudreau et al., 2006).

The Literature on Physician Burnout

For this project, the occupation of choice is physician. Many of the research studies that have been conducted on physician burnout report significant, albeit contradictory findings. Consider for example, the different causes of physician burnout: frustration, a sense of failure, insufficient personal time, insufficient vacation time, psychiatric problems, drug or alcohol problems, workload, scheduling, inability to communicate freely with patients, feeling overloaded, feeling poorly managed and resourced, dealing with patients, individual characteristics such as insomnia, low satisfaction with physician

supervision, staff dismissals, union disputes, and weekly work hours (e.g., Bell, Davison, & Sefcik, 2002; Deckard, Meterko, & Field, 1994; Doan-Wiggins, Zun, Cooper, Meyers, & Chen, 1995; Gabbe, Melville, Mandel, & Walker, 2002; Nirel, Shirom, Ismail, 2004; Priebe, Fakhoury, Hoffmann, & Powell, 2005; Ramirez, Graham, Richards, Cull, & Gregory, 1996; Schweitzer, 1994; Whippen & Canellos, 1991).

Other contradictions found in the physician burnout literature associated with gender, medical specialty, age, marital status, years of experience, number of hours worked, and practice locale are also apparent. In Table 1, a sampler of published contradicting studies for gender, medical specialty, and age is given.

From these results, one is left wondering what can be concluded about standard demographic predictors and physician burnout. Things become even more unclear when the discussion of other factors is expanded. Consider the findings below.

Additional Factors Associated with Physician Burnout

Additional demographic variables associated with burnout among physicians include marital status, years of experience, and practice locale. Velamoor, Kazarian, Persad, and Silcox (2000) reported that *married* or physicians in a committed relationship have higher levels of burnout than *single* physicians, whereas Doan-Wiggins et al. (1995) found that burnout was more frequent among *single* than *married* participants.

In terms of years of experience, Albino, Aguero, Martinez, and Vega (2002) found that seniority was associated with high levels of burnout, while Bargellini, Babieri, Rovesti, Vivoli, Roncaglia, and Borella (2000) found that years of experience was not a significant predictor of burnout.

Table 1. The Relationships and Differences Associated with Age, Gender, Medical Specialty and Burnout

Gender Differences		
Gender and Emotional Exhaustion (ee)		
Male physicians have higher levels of ee than female physicians	***Female physicians have higher levels of ee than male physicians***	***There is no difference between the levels of ee for male or female physicians***
Goh, Cameron, and Mark (1999) Woodside, Miller, Floyd, Ramsey McGowen, and Pfortmiller (2008)	Linzer et al. (2001) Adam, Gyorffy, and Susanszky (2008)	Grassi and Magnani (2000) Prins et al. (2007)
Gender and Depersonalization (dp)		
Male physicians have higher levels of dp than female physicians	***Female physicians have higher levels of dp than male physicians***	***There is no difference between the levels of dp for male or female physicians***
Goh et al. (1999) Prins et al. (2007)	Lemkau, Rafferty, Purdy, and Rudisill (1987) Michels, Probst, Godenick, and Palesch (2003)	Geurts, Rutte, and Peeters (1999) Kuerer et al. (2007)

Table 1. The Relationships and Differences Associated with Age, Gender, Medical Specialty and Burnout (continued)

Medical Specialty		
Medical Specialty and Emotional Exhaustion (ee)		
General Practitioners and Specialists report higher levels of ee than Residents	***Residents report higher levels of ee than General Practitioners and Specialists***	***There is no difference between the levels of ee for General Practitioners and Specialists or Residents***
Revicki, May, and Whitley (1991)	Gelfand et al. (2004) Sargent, Sotile, Sotile, Rubash, and Barrack (2004)	None found
General Pracitioners report higher levels of ee than all physician types	***Specialists report higher levels of ee than all physician types***	***There is no difference between the levels of ee reported across physician type***
Ozyurt, Hayran, and Sur (2006) Wu, Zhu, Li, Wang, and Wang (2008)	Akroyd, Caison, and Adams (2002) Renzi, Tabolli, Ianni, Di Pietro, and Puddu (2005)	None found
Age and Burnout		
Positive Relationship	***Negative Relationship***	***No Relationship***
Ramirez et al. (1996) Sobreques et al. (2003)	Mirvis, Graney, and Osborne Kilpatrick (1999) Spickard, Gabbe, and Christensen (2002)	Bargellini et al. (2000) West et al. (2006)

Finally, physicians who practice in rural settings have been found to report higher levels of burnout than those who practice in urban settings (Goehring et al., 2005; Rondeau, Francescutti, & Cummings, 2006; Thommasen, Lavanchy, Connelly, Berkowitz, Grzybowski, 2001). To date, no published research studies report that physicians in an urban setting experience higher burnout levels than their rural counterparts.

Two Methods/One Choice

In order to clarify the apparent contradictions that have been identified in the physician burnout literature, two possible methods need to be considered. These methods are the narrative subjective review and meta-analysis.

The Narrative Subjective Review

Before the method of meta-analysis emerged, researchers tried to understand and draw conclusions from several research literatures on a particular topic through a method called the narrative subjective review. This method has been used by researchers in the past, because of its flexibility in integrating results from both quantitative and qualitative methods and procedures (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005). However, several drawbacks also make it a difficult method to employ. According to Hunter and Schmidt (2004), this method has produced conflicting research findings, created too much information for researchers to process, and has led to the most relevant studies in a field or topic area often being discarded. A narrative subjective review, written by Maslach et al. (2001) on job burnout in the *Annual Review of Psychology* is a good example of both the pros and cons of using this method.

In the late-1970s, a new method was developed that combined findings from different studies on the same subject (Hunter & Schmidt, 2004). This method was referred to as meta-analysis.

Meta-Analysis

The introduction of the method of meta-analysis, developed by Glass in 1976, has proven to be an unqualified success. The term meta-analysis was chosen to "suggest the analysis of analyses" (Glass, 1977, p. 352). It referred to "the statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings" (Glass, 1976, p. 3). The intent of meta-analysis was "not to pretend to [create] any great insight or discovery, but rather to draw attention to the need to think differently than we [did] about reviewing and integrating research" (Glass, 1976, p. 6). Glass (1977) claimed that "the meta-analysis of research on a topic [was] directed toward a quantitative aggregation of findings and the description of the relationships among findings and characteristics of the studies" (p. 362).

Benefits of Meta-Analysis to Research

In addition to the contributions of Glass (1976), two other notable contributors to the research area of meta-analysis are Hunter and Schmidt (1982). Beginning with the publication of their book, Hunter and Schmidt (1982) have made invaluable contributions to the growing meta-analysis movement. The second edition of their book, published in 2004, serves as the basis for the following discussion in support of the meta-analysis approach.

The method of meta-analysis has helped in a variety of ways. It has provided a basis for theory development by integrating research findings across studies and has

improved the method for synthesizing and integrating research literatures. It has helped to reveal simple patterns of relationships that exist within research literature, research findings have become less conflicting because useful and sound conclusions can be drawn from existing research, clearer directions for future research needs are being provided, and new knowledge and answers to questions that could not be found or answered in individual studies have emerged. All in all, it has helped to answer important questions in definitive ways (Hunter & Schmidt, 2004).

The introduction of the method of meta-analysis has also impacted the fields of psychology, medicine, finance, marketing, sociology, and wildlife management, to name a few. Prior to the introduction of meta-analysis, authors of textbooks were faced with large quantities of conflicting studies on a single question. They had to arbitrarily select a small number of studies from the literature and base a textbook on conclusions from only these few studies. Today, most conclusions found in textbooks are based on analyses of research studies via the method of meta-analyses (Myers, 1991). This has made the information found in textbooks more accurate, especially in the field of psychology.

Another field of research that has benefited from the introduction of meta-analysis is the field of medicine. Thomas Chalmers argued for meta-analysis to be applied to medical research. According to Hunter and Schmidt (2004), his approach alleviated several problems that existed within the medical field such as information overload and "the inability of the vast, scattered, and unfocused medical research literature to provide guidance to practitioners" (p. 28).

Thomas Chalmers was also one of the leaders associated with the establishment of the Cochrane Collaboration which is an organization that applies meta-analysis in

medical research. The Cochrane Collaboration posts results on updated meta-analyses on the internet for researchers and medical practitioners to use. This provides information on current research trends and improves decision making in the medical field. The introduction of meta-analysis to the medical field has also led to hundreds of meta-analyses being published in leading medical research journals such as the *Journal of the American Medical Association* (Hunter & Schmidt, 2004).

Beyond the fields of psychology and medicine, the method of meta-analysis has continued to develop in many of the social science subdisciplines. Such growth and acceptance is most obvious when you examine recent published meta-analyses on topics such as the causes and effects of stress in teachers, job perception and attitudes, burnout, suicide rates among physicians, sexual orientation and handedness in men and women, physician gender effects in medical communication, and the discriminability of rapists from non-sex offenders (i.e., Brewer & Shapard, 2004; Halbesleben, 2006; Lalumière, Blanchard, & Zucker, 2000; Lalumière & Quinsey, 1994; Lee & Ashforth, 1996; Montgomery & Rupp, 2005; Roter, Hall, & Aoki, 2002; Schernhammer & Colditz, 2004; Thoresen, Kaplan, Barsky, Warren, & de Chermont, 2003).

The Increasing Use of Meta-Analysis

The use of meta-analysis has grown rapidly since its debut in the late 1970s. From 1974 to 1998, Hunter and Schmidt (2004) reported that over 835 meta-analyses were published. In 1999, over 2500 internet hits were reported. In 2004, this total grew to over 522,000 hits on the internet (Hunter & Schmidt, 2004). Today, an internet search of meta-analysis on the internet yields anywhere from 3,740,000 to 3,900,000 hits!

Criticisms Associated With Meta-Analysis

Although the methods of meta-analysis can control sampling error and other artifacts, as well as provide a solid foundation for conclusions, there are some criticisms regarding this method. According to Hunter and Schmidt (2004), there has been some concern that the method of meta-analysis "may be killing the motivation and incentive to conduct primary research studies" (p. 21). There have also been reports that the method of meta-analysis has clearly acknowledged the fact that "no single primary study can ever resolve an issue or answer a question" (Hunter & Schmidt, 2004, p. 21). Meta-analysis has also been criticized because it does not directly generate or develop theory (Hunter & Schmidt, 2004). Despite these criticisms, the acceptance and use of meta-analysis has replaced the standard narrative review as the method of choice for summarizing any relevant research literature.

Final Thoughts on Meta-Analysis

Over two decades ago, Robert L. Bangert-Drowns (1986) made a very strong statement about the method of meta-analysis:

> "meta-analysis is not a fad. It is rooted in the fundamental values of the scientific enterprise: replicability, quantification, causal and correlational analysis. Valuable information is needlessly scattered in individual studies. The ability of social scientists to deliver generalizable answers to basic questions of policy is too serious a concern to allow us to treat research integration lightly. The potential benefits of meta-analysis method seem enormous." (p. 398).

Bangert-Drowns claim rings true today. Meta-analysis is an extremely valuable method and approach. It allows today's researchers to obtain more complete and accurate

information on a given topic rather than simply reporting the results of individual studies. Through evaluation, synthesis, and analysis of bias in several studies at the same time, researchers can employ meta-analysis in a systematic and powerful manner for the greater benefit and advancement of science (Hunter & Schmidt, 2004).

Based on this conceptual and methodological review, the current project focuses on the following research questions:

Research Questions

1. Is there an overall relationship between the gender of physicians and experienced burnout?
    a) Is there a gender difference associated with the burnout dimension of *emotional exhaustion*?
    b) Is there a gender difference associated with the burnout dimension of *depersonalization*?
2. Is there an overall relationship between the medical specialty of physicians and physician burnout?
3. Is there an overall relationship between the age of physicians and physician burnout?
4. Is there an overall relationship between the illness of physicians and physician burnout?
5. Is there an overall relationship between the satisfaction of physicians and physician burnout?

Chapter Two
Methodology

This chapter discusses the methodological approach of meta-analysis which has been used in this research project to help clarify the apparent contradictions within the physician burnout literature. A detailed account of the use of inclusion and exclusion criteria, the literature search for eligible studies, the data extraction process, and the statistical analysis procedures employed are explained below.

Inclusion and Exclusion Criteria

A number of criteria were used to determine which studies would be included in this meta-analysis project. Firstly, the study must pertain to physician burnout. Secondly, the study must contain quantitative methods to support the research findings and use a quantitative analysis of empirical data. Thirdly, the sample used in the study must include practicing physicians, such as general practitioners, specialists, or other physician types. However, the sample used in the study was not limited to only practicing physicians and may also include studies that use residents and medical students as participants. Fourthly, in terms of the burnout measure(s) reported in each study, this meta-analysis was not limited to only those studies which utilized the Maslach Burnout Inventory (MBI). Studies that used the Shirom Burnout Measure (SMBM), the Pines and Aronson Burnout Measure (BM), the Boudreau Burnout Questionnaire (BBQ), or any other measure for that matter were also included. Lastly, to be included in this meta-analysis project, the study must have been published in English.

Due to the time and cost constraints associated with identifying and obtaining the "grey literature," such as conference abstracts, thesis/dissertation abstracts, government

reports, technical reports, and unpublished studies, a decision was made to include only published studies in this meta-analysis project.

Literature Search of Eligible Studies

The literature search for this project began by reviewing databases created by Boudreau and Nakashima (2002) and Boudreau (2005a, 2005b). From these databases, over 11,000 references were identified. Based on the criteria outlined in the previous section, a total of 54 articles pertaining to physician burnout were selected from these databases. As well, an electronic search was conducted using databases such as *CINAHL Plus with Full Text, ProQuest Nursing and Allied Health Source, Nursing and Allied Health Database, Health Source: Nursing/Academic Edition, Health Reference Center Academic, Academic OneFile, Academic Search Complete, General OneFile, ABI/INFORM Global, Social Sciences Citation Index (SSCI), Medline, Web of Science (ISI), Health and Wellness Resource Centre, CBCA Complete, JSTOR, Wiley InterScience, Psychology and Behavioural Sciences Collection, and PsycINFO* to further identify studies that had been conducted on physician burnout from the years 2006 to 2008. The following keywords were used in the search: physician burnout, doctor burnout, resident burnout, and medical student burnout. A Boolean strategy using AND and OR (physician AND burnout, physician OR burnout, physician(s) AND burnout, physician(s) OR burnout, doctor AND burnout, doctor OR burnout, doctor(s) AND burnout, doctor(s) OR burnout, resident AND burnout, resident OR burnout, medical student AND burnout, and medical student OR burnout) was used to refine the searches and ensure that a complete literature search was conducted. From this electronic database search, an additional 49 articles were obtained. According to Rosenthal, Cooper, and

Hedges (1994), restricting a literature search to only computerized databases can lead to almost 50% of published studies being missed. Therefore, to correct for possible studies being missed, the reference lists of all 103 articles were manually searched to locate any additional articles on physician burnout that may have been missed in the electronic search. From the manual search, an additional five articles on physician burnout were obtained. Therefore, a total sample of 108 published studies were identified for this project.

When two or more studies reported data on the same population, the study with the largest sample and the most information reported was consistently selected. A total of 10 studies were omitted for this reason.

In total, 98 published studies served as the primary sample for this meta-analysis research project. They were read and coded by the researcher and two research assistants.

Data Extraction

Several meetings with the researcher and project committee members took place to discuss the training procedure that the coders would participate in. The data extraction was independently done by three coders. The coders were the researcher and two research assistants. To ensure consistency, each research assistant was provided with a training manual (Appendix A) outlining the general purpose of the project along with detailed instructions on how to code each article according to the selected criteria. Following the distribution of the training manual, each research assistant independently participated in a one-hour training session with the researcher. During the training session, two studies were provided as examples to help illustrate the data coding process. Next, each research

assistant was given two additional studies and asked to code them. Finally, each coder independently coded the same set of 94 published studies.

Each coder extracted the following data from all the studies that met the eligibility criteria: author(s), date of publication, country in which the study took place, total number of participants (N), total number of males and females in each study, physician type including general practitioner/family physician, specialist, other physician type (not classified as a general practitioner/family physician or specialist), resident, and medical student, type of burnout measure, year of burnout measure, number of items in burnout measure, health measure (such as the General Health Questionnaire [GHQ]), satisfaction measure (e.g., job satisfaction), age of participants including mean, standard deviation, and range, reliability of burnout measure (Cronbach's alpha [α] or other type of reliability), mean and standard deviation scores of the Maslach Burnout Inventory (MBI) subscales (*emotional exhaustion*, *depersonalization*, & *personal accomplishment*) by gender and medical specialty, and, if another burnout measure other than the MBI was used, coders were asked to report scores by gender and medical specialty as well.

Reliability of the Coders

Based on the 98 published studies, inter-rater reliability was calculated using the Kappa statistic **(**κ) which measures the percentage agreement between the coders and takes into account the agreement occurring by chance (McGinn, Wyer, Newman, Keitz, Leipzig, & Guyatt, 2004). The overall Kappa **(**κ) for this study was 0.94 which indicates a high level of agreement. Any inconsistencies or errors were resolved by general consensus and appropriate changes were made by the researcher and a committee member.

As this project continued, the researcher obtained an additional 12 articles and coded them independently without any assistance from the research assistants. Therefore, a total of 110 published studies were obtained for inclusion in this research project. As a final check for the reliable extraction of data, all 110 studies were reviewed by the researcher and a member of the project committee.

It should be noted that the procedures outlined above are more stringent than what is typically done for most published meta-analyses.

The Study Sample

The 110 published studies is a very diverse sample representing a total N of 52,677 physicians. It includes physician types such as general practitioners, various specialists, residents, and medical students from Canada, the United States, China, South Africa, the United Kingdom, Australia, Italy, Israel, Finland, Switzerland, Sweden, Greece, Croatia, New Zealand, Japan, and Turkey.

Figure 1 shows the number of published studies by year of publication. Appendix B provides a complete reference list of all 110 published studies.

Statistical Analysis

The software used for this project was the Comprehensive Meta-Analysis Version 2 software developed by Borenstein, Hedges, Higgins, and Rothstein (2005). The *d* statistic of effect size (Cohen, 1988) was calculated for each relevant comparison. The *d* statistic is defined as the difference between two means divided by a pooled standard deviation (Lalumière & Quinsey, 1994). Each analysis included independent samples. For all analyses, the studies were weighted by sample size. The differences across the studies were tested with the 95% confidence interval. The *d* statistic was found to be

significant if the lower and upper limits of the 95% confidence interval did not include zero.

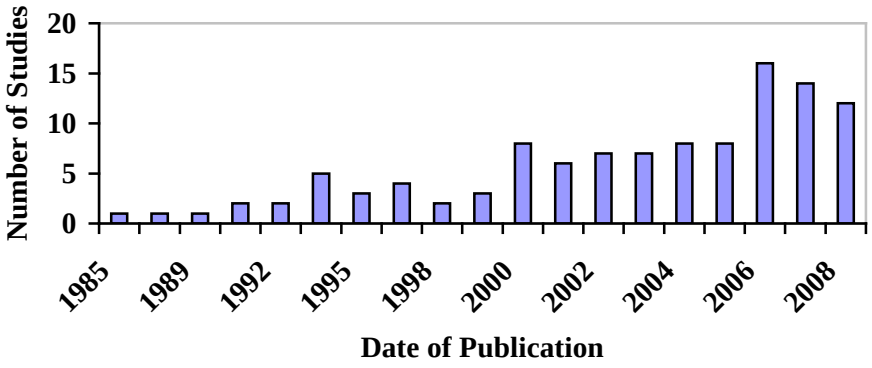


Figure 1. Published Studies by Year

Fixed versus Random Effects Models

Meta-analyses can be conducted on effect sizes using both fixed and random effects models. The fixed effects model assumes that no moderators exist in the relationships between the predictor variable and the criterion variable (Puts, McDaniel, Jordan, & Breedlove, 2008). The random effects model considers the presence of moderators as a possibility (Puts et al., 2008). The random effects model was deemed the most appropriate for this project. Therefore, only the results from the random effects model are reported for each of the meta-analyses conducted.

Gender and Burnout

For the meta-analyses on gender and burnout, the *d* statistic was defined as the difference between male and female *emotional exhaustion* or *depersonalization* means divided by their pooled standard deviations. For this measure of effect size, if the *emotional exhaustion* means and standard deviations are used, an overall positive

Cohen's *d* value indicates that male physicians have higher levels of *emotional exhaustion* (i.e., burnout) than female physicians. A negative Cohen's *d* value indicates the reverse. Also, for this measure of effect size, if the *depersonalization* means and standard deviations are used, an overall positive Cohen's *d* indicates that male physicians have higher levels of *depersonalization* than their female counterparts. A negative Cohen's *d* value indicates the reverse.

Medical Specialty and Burnout

General Practitioners versus Specialists

For the meta-analysis on medical specialty and burnout, the *d* statistic was defined as the difference between the *emotional exhaustion* means of general practitioners and specialists divided by their pooled standard deviations. For this measure of effect size, if the *emotional exhaustion* means and standard deviations are used, an overall positive Cohen's *d* value indicates that general practitioners have higher levels of *emotional exhaustion* than specialists. A negative Cohen's *d* value indicates the reverse.

Specialists versus General Practitioners, Other Physicians, and Residents

For the meta-analysis on medical specialty and burnout, the *d* statistic was defined as the difference between the *emotional exhaustion* means of specialists and physician types such as general practitioners, other, and residents divided by their pooled standard deviations. If the *emotional exhaustion* means and standard deviations are used, an overall positive Cohen's *d* value indicates that specialists have higher levels of *emotional exhaustion* than physician types such as general practitioners, other physicians, and residents. A negative Cohen's *d* value indicates the reverse.

General Practitioners and Specialists versus Residents

For the meta-analysis on medical specialty and burnout, the *d* statistic was defined as the difference between the *emotional exhaustion* means of general practitioners and specialists versus residents divided by their pooled standard deviations. If the *emotional exhaustion* means and standard deviations are used, an overall positive Cohen's *d* value indicates that general practitioners and specialists have higher levels of *emotional exhaustion* than residents. A negative Cohen's *d* value indicates the reverse.

General Practitioners versus Specialists, Other Physicians, and Residents

For the meta-analysis on medical specialty and burnout, the *d* statistic was defined as the difference between the *emotional exhaustion* means of general practitioners and physician types such as specialists, other physicians, and residents divided by their pooled standard deviations. For this measure of effect size, if the *emotional exhaustion* means and standard deviations are used, an overall positive Cohen's *d* value indicates that general practitioners have higher levels of *emotional exhaustion* than physician types such as specialists, other physicians, and residents. A negative Cohen's *d* value indicates the reverse.

Effect Size

According to Cohen (1988), a small effect size ranges between 0.2 and 0.3, a medium effect size is around 0.5, and a large effect size is between 0.8 and 1.0. Ninety-five percent confidence intervals were also calculated and presented for each analysis.

The Q Statistic (Test of Heterogeneity)

The *Q* statistic (test of heterogeneity) was calculated for the grouping of published studies used in each meta-analysis. Using the *Q* statistic, a *p-value* of less than 0.05

confirms the null hypothesis that the effect sizes are homogenous, can be rejected. This suggests that the variations in effect sizes are due to the influence of one or more moderator variables, and not just sampling error (Jespersen, Lalumière, & Seto, 2008).

Correlations

Meta-analyses on available studies reporting correlations between age and burnout, illness and burnout, and satisfaction and burnout were run and analyzed using 95% confidence intervals and the *Q* statistic (test of heterogeneity). A correlation indicates the strength of the relationship between two variables. According to Cohen (1988), the strength of correlations can be categorized as trivial (0.01 to 0.09), low to moderate (0.10 to 0.29), moderate to substantial (0.30 to 0.49), substantial to very strong (0.50 to 0.69), very strong (0.70 to 0.89), and near perfect (0.90 to 0.99).

Publication Biases

One criticism of the method of meta-analysis is the occurrence of publication biases. One general rule of thumb (Rosenthal, 1984) to detect if publication biases are present in a meta-analysis is to use the calculation $5K+10$, where K is the number of studies. This rule states that if the fail-safe N exceeds $5K+10$, publication biases are not present (Zangaro & Soeken, 2007). Beyond this rule of thumb, measures such as a funnel plot of precision, the Begg and Mazumdar's rank correlation test, Duval and Tweedie's trim and fill, and Egger's regression intercept, can be used to detect the presence of publication biases in the results of a meta-analysis (Borenstein et al., 2005).

For the purpose of the present discussion, three measures of publication biases are presented for each meta-anlaysis. These include:

1. A funnel plot of precision

2. The Begg and Mazumdar's rank correlation test
3. Rosenthal's fail-safe N test

A funnel plot of precision is the most traditional form of detecting publication bias (Borenstein et al., 2005). Normally, large studies appear near the top of the graph and cluster near the mean effect size. Smaller studies appear near the bottom of the graph. If publication biases are present, the bottom of the funnel plot of precision would show a higher concentration of studies on one side of the mean than the other (Borenstein et al., 2005). If publication biases are not present, the studies will be distributed symmetrically in relation to the combined effect size.

The Begg and Mazumdar's rank correlation test reports the rank correlation or Kendall's tau between the standardized effect size and the standard errors of these effects (Borenstein et al., 2005). If publication biases are present, a significant correlation would occur and high standard errors would be associated with larger effect sizes (Borenstein et al., 2005).

Rosenthal's fail-safe N test calculates the number of missing studies, with a mean effect of zero, which would have to be added to a meta-analysis to produce an overall effect that is not significant (Borenstein et al., 2005).

The results and measures of publication bias for each meta-analysis are presented next.

Chapter Three
Results

This chapter presents results from the eleven analyses that were conducted for this project. These analyses examined the variables of physician gender and burnout, medical specialty and burnout, as well as the correlations between burnout and physician age, illness, and job satisfaction.

Measures of Burnout

Approximately 84% of the 110 published studies identified for this project used the MBI burnout measure. When determining the level of internal consistency, many of the studies reported Cronbach's alpha (α) values for each subscale of the MBI (i.e., *emotional exhaustion*, *depersonalization*, and *personal accomplishment*). Although these are highly reliable measures, the reliability values were not included as part of the meta-analytic calculations conducted for this project. Instead, the average Cronbach's alpha (α) values for each subscale of the MBI were calculated across all the studies. The overall Cronbach's alpha (α) for the *emotional exhaustion* subscale was 0.86, the overall Cronbach's alpha (α) for the *depersonalization* subscale was 0.73, and the overall Cronbach's alpha (α) for the *personal accomplishment* subscale was 0.72.

Emotional Exhaustion and Gender

Meta-Analysis 1: Emotional Exhaustion and Gender (From All Possible Burnout Measures)

The first meta-analysis completed was on *emotional exhaustion* and physician gender. The analysis was conducted using any available measure of burnout that reported mean scores of *emotional exhaustion* for both male and female physicians. The burnout measures used for this meta-analysis included the Maslach Burnout Inventory – Human

Services Survey (MBI-HSS), the Pines and Aronson Burnout Measure (BM), the Boudreau Burnout Questionnaire (BBQ), and the Shirom Burnout Measure (SMBM). A total of 20 independent studies were used for this meta-analysis. One of the 20 studies reported information for four distinct samples (Kushnir, Levhar, & Cohen, 2004). Two of the 20 studies reported information for two distinct samples (Grassi & Magnani, 2000; Olkinoura et al., 1990). A total of 14 of the 20 studies reported mean scores for the *emotional exhaustion* subscale. The remaining six studies reported percentages rather than mean scores for the *emotional exhaustion* subscale (Gabbe et al., 2002; Goehring et al., 2005; Goldberg et al., 1996; Kuerer et al., 2007; McPhillips, Stanton, Zukerman, & Stapleton, 2007; Vela-Bueno et al., 2008).

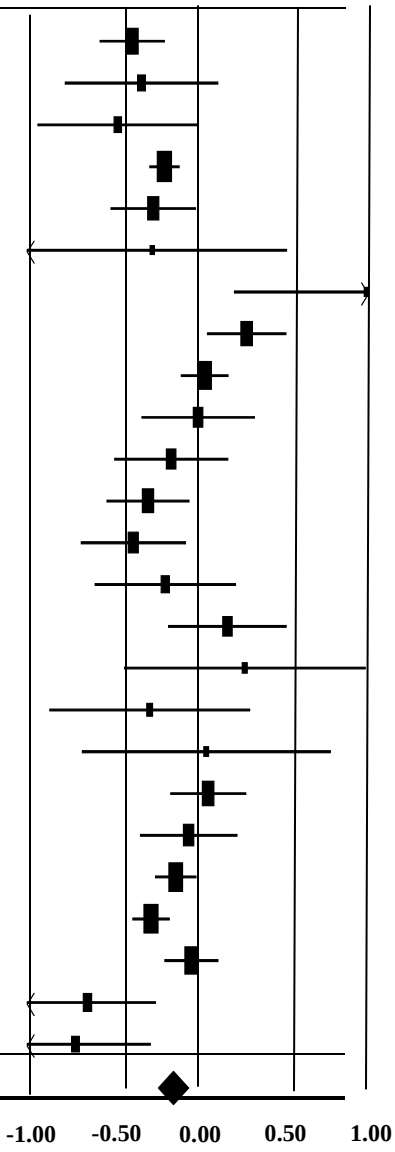
For these six studies, the percentages of male and female physicians who reported high levels of *emotional exhaustion* were converted to a numerical value by multiplying each percentage by the total number (N) of male and female physicians in each study. For example, in the Gabbe et al. (2002) study, a total N of 110 male physicians participated. From this sample, 55% reported high levels of *emotional exhaustion*. This percentage was multiplied by the total N (110), and 61 out of the 110 male physicians were found to report high levels of *emotional exhaustion*. In the same study, a total N of 9 female physicians participated; 67% of them reported high levels of *emotional exhaustion*. Using the same procedure as above, it was found that 6 out of the 9 female physicians reported high levels of *emotional exhaustion*. The conversion from percentages to numerical values for the five remaining studies was conducted using the same method respectively. From these calculations, an effect size for each study was obtained using the Cohort 2x2 (Events) data entry method in the Comprehensive Meta-Analysis Version 2 software.

For this meta-analysis of *emotional exhaustion* and physician gender, the total number of subjects, *N*, is 9098 (5767 M, 3331 F) across the 25 samples. All of the subjects used in this meta-analysis are of various physician types including general practitioners, specialists, other physicians, and residents. The overall Cohen's *d* is -0.14, with a 95% confidence interval of -0.23 to -0.06. According to Cohen's (1988) criteria, the overall effect size is small, albeit significant. Examination of the data in all 20 independent studies/25 samples, shown in Table 2, indicates a significant overall effect size ($z = -3.17$) in the negative direction ($p < 0.05$). Thus, female physicians report higher scores of *emotional exhaustion* than their male counterparts. It should also be noted that the effect sizes are heterogeneous, $Q\ (24) = 70.17$, $p < 0.05$. This means that the differences across the studies are due to moderator variables and not just sampling error.

Publication Bias. Results from the three measures of publication bias used for this meta-analysis on *emotional exhaustion* (using all possible measures of burnout) and physician gender are offered next. Figure 2 represents the funnel plot of precision for this analysis. The studies appear to be distributed symmetrically in relation to the combined effect size. The Begg and Mazumdar rank correlation method reports a Kendall's tau with continuity correction of 0.02. The relationship between the effect sizes and the standard error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 162. This means that an additional 162 "null" studies would have to be obtained in order for the effect to not be significant. It exceeds Rosenthal's rule of thumb total ($5K+10 = 110$). Collectively, these findings suggest there is no evident publication bias in this meta-analysis.

Table 2. Emotional Exhaustion and Gender (From All Possible Burnout Measures)

Study Name	*Physician Type*	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Adam et al. (2008)	GP	-0.38	-0.57	-0.19	
Alacacioglu et al. (2008)	Specialist	-0.33	-0.78	0.13	
Bargellini et al. (2000)	Specialist	-0.46	-0.94	0.01	
Boudreau et al. (2006)	GP	-0.19	-0.28	-0.10	
Fields et al. (1995)	Specialist	-0.26	-0.51	-0.00	
Gabbe et al. (2002)	Specialist	-0.26	-1.05	0.53	
Goehring et al. (2005)	Other	0.99	0.22	1.77	
Goh et al. (1999)	Specialist	0.29	0.06	0.53	
Goldberg et al. (1996)	Specialist	0.05	-0.10	0.19	
Grassi et al. (2000)	GP	0.01	-0.33	0.34	
Grassi et al. (2000)	Other	-0.15	-0.49	0.19	
Kuerer et al. (2007)	Specialist	-0.29	-0.53	-0.04	
Kushnir et al. (2004)	GP	-0.37	-0.68	-0.06	
Kushnir et al. (2004)	GP	-0.19	-0.60	0.23	
Kushnir et al. (2004)	Specialist	0.18	-0.17	0.53	
Kushnir et al. (2004)	Specialist	0.28	-0.43	0.99	
Lemkau et al. (1987)	GP	-0.28	-0.87	0.31	
McPhillips et al. (2007)	Specialist	0.06	-0.68	0.79	
Michels et al. (2003)	Resident	0.07	-0.16	0.29	
Morais et al. (2006)	Specialist	-0.05	-0.34	0.24	
Olkinuora et al. (1992)	Specialist	-0.12	-0.25	-0.00	
Olkinoura et al. (1992)	GP	-0.27	-0.38	-0.16	
Ozyurt et al. (2006)	Various	-0.03	-0.19	0.13	
Tosevski et al. (2006)	GP	-0.64	-1.05	-0.24	
Vela-Bueno et al. (2008)	Other	-0.71	-1.16	-0.27	
Overall		**-0.14**	**-0.23**	**-0.06**	



Meta-Analysis 2: Emotional Exhaustion and Gender (MBI-HSS Burnout Measure Only)

A second meta-analysis was conducted in an attempt to account for the different types of measures that might be contributing to the heterogeneity found in the first meta-analysis. In this meta-analysis, only the *emotional exhaustion* subscale scores of the Maslach Burnout Inventory – Human Services Survey (MBI-HSS) were used.

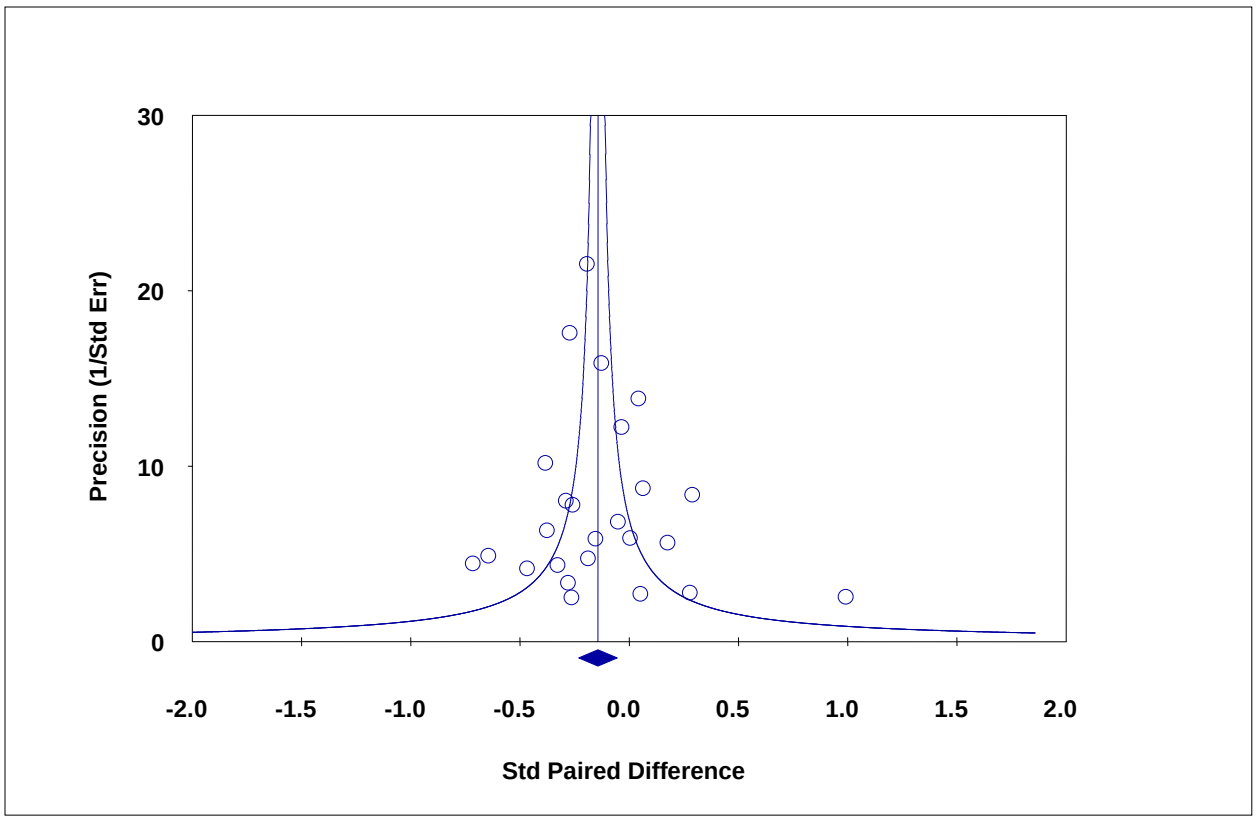


Figure 2. Funnel Plot of Precision for Emotional Exhaustion and Gender (From All Possible Burnout Measures)

A total of 16 independent studies were included in this meta-analysis. One of the studies reported information for two distinct samples (Grassi et al., 2000). A total of 10 of the 16 studies reported mean scores for the *emotional exhaustion* subscale. Six of the 16 studies reported percentages rather than mean scores for the *emotional exhaustion* subscale (Gabbe et al., 2002; Goehring et al., 2005; Goldberg et al., 1996; Kuerer et al., 2007; McPhillips et al., 2007; Vela-Bueno et al., 2008). For these six studies, the percentages of male and female physicians who reported high levels of *emotional exhaustion* were converted to a numerical value by multiplying each percentage by the total number (N) of male and female physicians in each study. From these calculations,

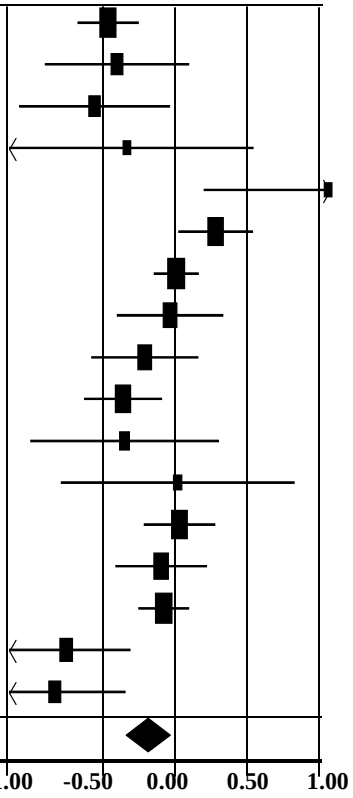
an effect size for each study was obtained using the Cohort 2x2 (Events) data entry method in the Comprehensive Meta-Analysis Version 2 software.

For this meta-analysis on *emotional exhaustion* and gender, the total number of subjects, *N*, is 3781 (2410 M, 1371 F) across the 17 samples. All of the subjects used in this meta-analysis are of various physician types, including general practitioners, specialists, other physicians, and residents. The overall Cohen's *d* is -0.14, with a 95% confidence interval of -0.27 to -0.00. According to Cohen's (1988) criteria, the overall effect size is small, very near significant, and heterogeneous, Q (16) = 53.97, $p < 0.05$. The results for all 16 independent studies/17 samples are shown in Table 3. A complete account of the moderator variables contributing to the differences across the studies in this meta-analysis remains incomplete. Even after adjusting for type of burnout measure used, the meta-analysis still has a high degree of heterogeneity across the remaining 16 studies.

Publication Bias. Figure 3 represents the funnel plot of precision for this meta-analysis. The studies appear to be distributed symmetrically in relation to the combined effect size. The Begg and Mazumdar rank correlation method reports a Kendall's tau with continuity correction of -0.11. The relationship between the effect sizes and the standard error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 25. This means that an additional 25 "null" studies would have to be obtained in order for the effect to not be significant. This value is less than the $5K+10$ rule of thumb, suggesting that publication bias might exist. Arguably, these combined results suggest that there is no publication bias evident in this meta-analysis on *emotional exhaustion* (using only the MBI-HSS burnout measure) and gender.

Table 3. Emotional Exhaustion and Gender (MBI-HSS Burnout Measure Only)

Study Name	*Physician Type*	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Adam et al. (2008)	GP	-0.38	-0.57	-0.19	
Alacacioglu et al. (2008)	Specialist	-0.33	-0.78	0.13	
Bargellini et al. (2000)	Specialist	-0.46	-0.94	0.01	
Gabbe et al. (2002)	Specialist	-0.26	-1.05	0.53	
Goehring et al. (2005)	Other	0.99	0.22	1.77	
Goh et al. (1999)	Specialist	0.29	0.06	0.53	
Goldberg et al. (1996)	Specialist	0.05	-0.10	0.19	
Grassi et al. (2000)	GP	0.01	-0.33	0.34	
Grassi et al. (2000)	Other	-0.15	-0.49	0.19	
Kuerer et al. (2007)	Specialist	-0.29	-0.53	-0.04	
Lemkau et al. (1987)	GP	-0.28	-0.87	0.31	
McPhillips et al. (2007)	Specialist	0.06	-0.68	0.79	
Michels et al. (2003)	Resident	0.07	-0.16	0.29	
Morais et al. (2006)	Specialist	-0.05	-0.34	0.24	
Ozyurt et al. (2006)	Various	-0.03	-0.19	0.13	
Tosevski et al. (2006)	GP	-0.64	-1.05	-0.24	
Vela-Bueno et al. (2008)	Other	-0.71	-1.16	-0.27	
Overall		**-0.14**	**-0.27**	**-0.00**	



Depersonalization and Gender

Meta-Analysis 3: Depersonalization and Gender (From All Possible Burnout Measures)

The third meta-analysis was on *depersonalization* and physician gender using all possible measures of burnout that reported separate mean scores of *depersonalization* for males and females. The burnout measures used for this meta-analysis included the Maslach Burnout Inventory – Human Services Survey (MBI-HSS), the Maslach Burnout Inventory – General Survey (MBI-GS), the Boudreau Burnout Questionnaire (BBQ), and the Shirom Burnout Measure (SMBM). All of the scores reported were obtained from the *depersonalization* subscale of each measure. A total of 13 independent studies were included in this meta-analysis.

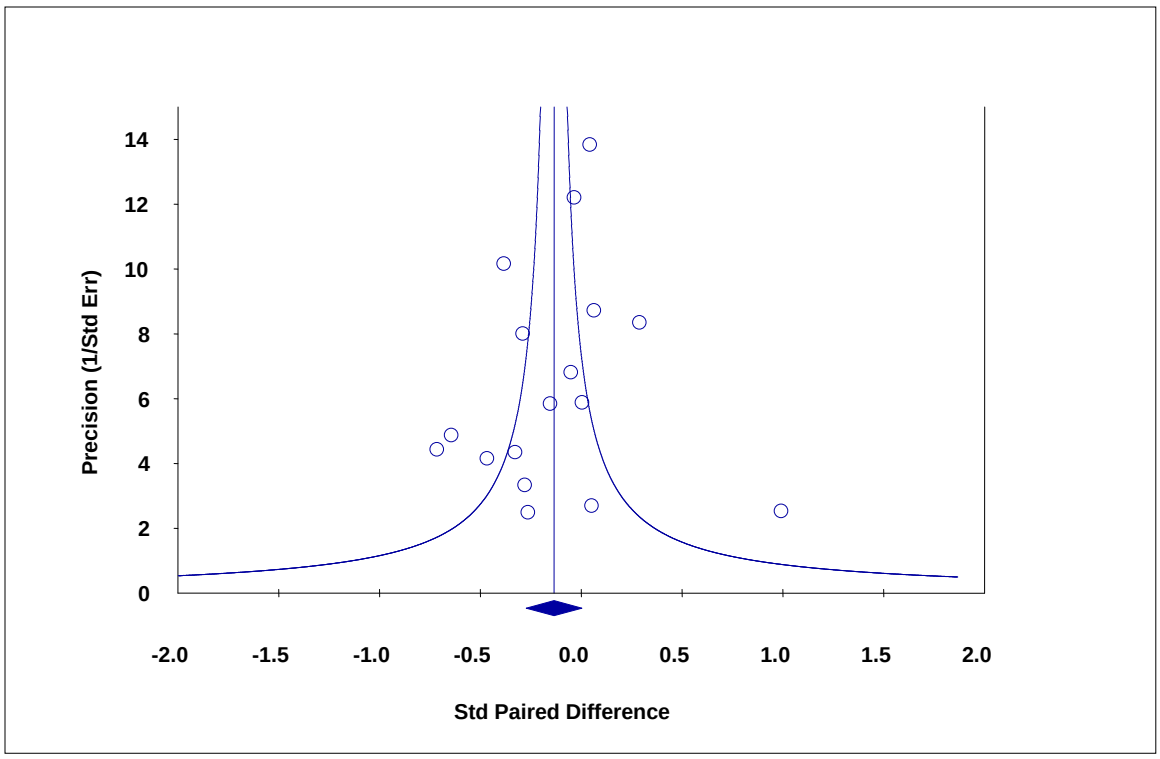


Figure 3. Funnel Plot of Precision for Emotional Exhaustion and Gender (MBI-HSS Burnout Measure Only)

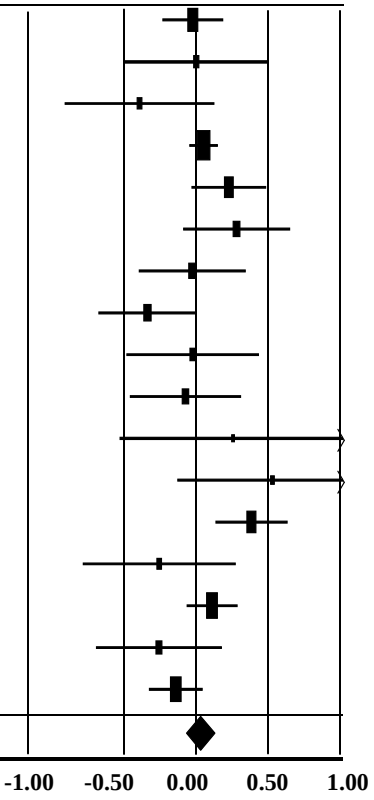
One of these studies reported information for four distinct samples (Kushnir, Levhar, & Cohen, 2004). One of these studies reported information for two distinct samples (Grassi et al., 2000).

For this meta-analysis of *depersonalization* and physician gender, the total number of subjects, *N*, is 5650 (3461 M, 2189 F) across the 17 samples. All of the subjects used in this meta-analysis are of various physician types including general practitioners, specialists, other physicians, and residents. No medical students were included in this meta-analysis. The overall Cohen's *d* is 0.10, with a 95% confidence interval of 0.02 to 0.19. According to Cohen's (1988) criteria, the overall effect size is small and significant. Examination of the data across 13 independent studies/17 samples, shown in Table 4, indicates a significant overall effect size ($z = 2.30$) in the positive

direction ($p < 0.05$). Thus, male physicians report higher scores of *depersonalization* than their female counterparts. The overall effect size is heterogeneous, Q (16) = 28.36, $p <$ 0.05. This means that the differences across studies is due to moderator variables and not just sampling error.

Table 4. Depersonalization and Gender (From All Possible Burnout Measures)

Study Name	*Physician Type*	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Adam et al. (2008)	GP	0.06	-0.13	0.25	
Alacacioglu et al. (2008)	Specialist	0.08	-0.37	0.53	
Bargellini et al. (2000)	Specialist	-0.27	-0.74	0.20	
Boudreau et al. (2006)	GP	0.13	0.04	0.22	
Goh et al. (1999)	Specialist	0.29	0.05	0.52	
Grassi et al. (2000)	GP	0.33	-0.00	0.67	
Grassi et al. (2000)	Other	0.06	-0.28	0.39	
Kushnir et al. (2004)	GP	-0.22	-0.53	0.09	
Kushnir et al. (2004)	GP	0.06	-0.36	0.48	
Kushnir et al. (2004)	Specialist	0.01	-0.34	0.36	
Kushnir et al. (2004)	Specialist	0.31	-0.40	1.02	
Lemkau et al. (1987)	GP	0.56	-0.04	1.15	
Michels et al. (2003)	Resident	0.43	0.20	0.65	
Morais et al. (2006)	Specialist	-0.15	-0.63	0.33	
Ozyurt et al. (2006)	Various	0.18	0.02	0.34	
Tosevski et al. (2006)	GP	-0.15	-0.55	0.24	
Wu et al. (2008)	GP	-0.05	-0.22	0.12	
Overall		**0.10**	**0.02**	**0.19**	



Publication Bias. The three measures of publication bias used for this meta-analysis on *depersonalization* (using all possible measures of burnout) and physician gender are presented next. Figure 4 represents the funnel plot of precision for this analysis. The studies appear to be distributed symmetrically in relation to the combined effect size. The Begg and Mazumdar rank correlation method reports a Kendall's tau with continuity correction of -0.02. The relationship between the effect sizes and the standard

error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 26. This means that an additional 26 "null" studies would have to be obtained in order for the effect to not be significant. This value is less than the 5*K*+10 rule of thumb, suggesting that publication bias might exist. Arguably, these combined results suggest that there is no publication bias evident in this third meta-analysis.

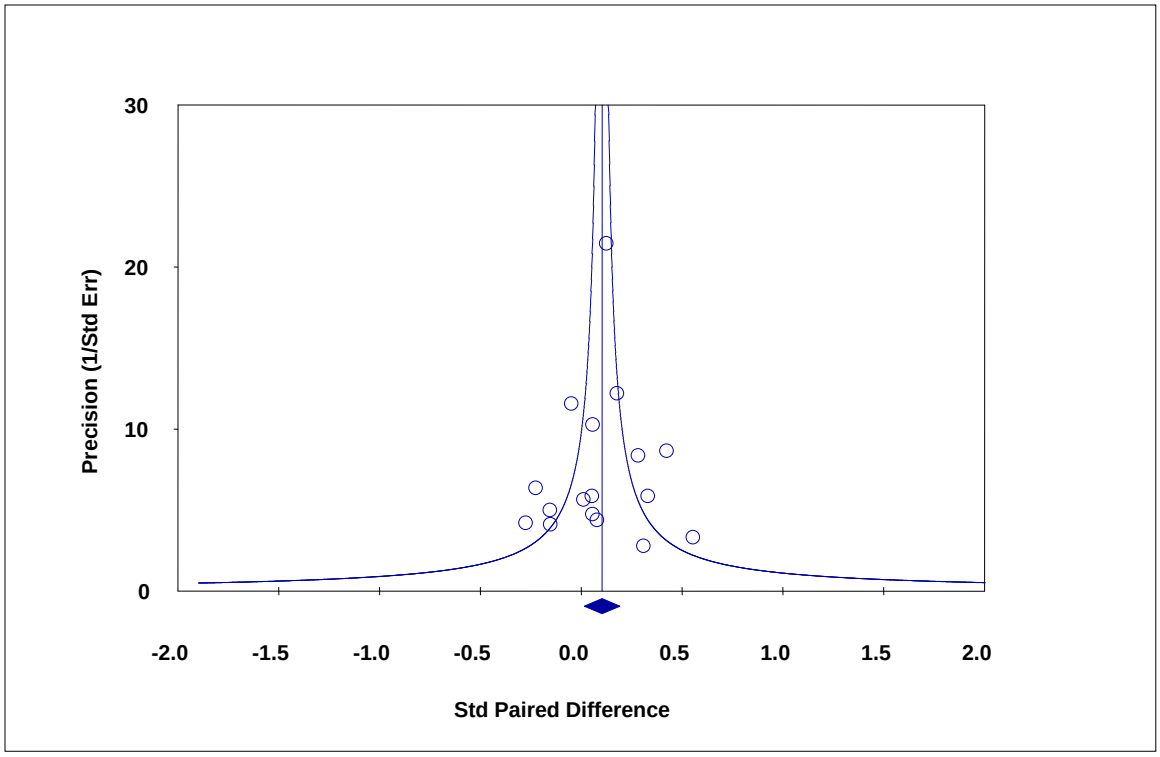


Figure 4. Funnel Plot of Precision for Depersonalization and Gender (From All Possible Burnout Measures)

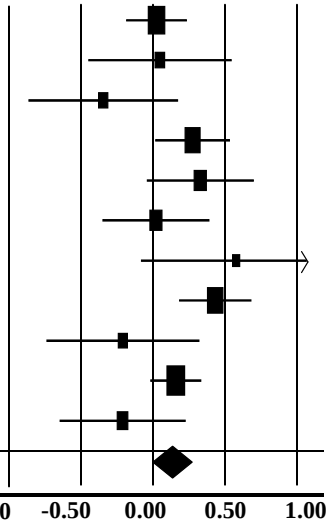
Meta-Analysis 4: Depersonalization and Gender (MBI-HSS Burnout Measure Only)

In an attempt to account for the heterogeneity found in the third meta-analysis, a fourth meta-analysis was completed on *depersonalization* and physician gender. This meta-analysis used only the *depersonalization* subscale scores from the MBI-HSS measure. A total of 10 independent studies were included in this meta-analysis. One of these studies reported information for two distinct samples (Grassi et al., 2000).

For this meta-analysis on *depersonalization* and physician gender, the total number of subjects, *N*, is 2630 (1556 M, 1074F) across the 11 samples. All of the subjects used in this meta-analysis are of various physician types including general practitioners, specialists, other physicians, and residents. No medical students were included in this meta-analysis. The overall Cohen's *d* is 0.16, with a 95% confidence interval of 0.03 to 0.28. According to Cohen's (1988) criteria, the overall effect size, similar to meta-analysis three, is small and statistically significant. Examination of the data in all 10 independent studies/11 samples, shown in Table 5, indicates a significant overall effect size (z = 2.47) in the positive direction ($p < 0.05$). Therefore, it can be concluded that male physicians report higher scores of *depersonalization* than their female counterparts. The effect sizes of this fourth meta-analysis are homogeneous, $Q(10) = 17.88$, $p > 0.05$ meaning that any differences across studies are due to sampling error.

Table 5. Depersonalization and Gender (MBI-HSS Burnout Measure Only)

Study Name	*Physician Type*	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Adam et al. (2008)	GP	0.06	-0.13	0.25	
Alacacioglu et al. (2008)	Specialist	0.08	-0.37	0.53	
Bargellini et al. (2000)	Specialist	-0.27	-0.74	0.20	
Goh et al. (1999)	Specialist	0.29	0.05	0.52	
Grassi et al. (2000)	GP	0.33	-0.00	0.67	
Grassi et al. (2000)	Other	0.06	-0.28	0.39	
Lemkau et al. (1987)	GP	0.56	-0.04	1.15	
Michels et al. (2003)	Resident	0.43	0.20	0.65	
Morais et al. (2006)	Specialist	-0.15	-0.63	0.33	
Ozyurt et al. (2006)	Various	0.18	0.02	0.34	
Tosevski et al. (2006)	GP	-0.15	-0.55	0.24	
Overall		**0.16**	**0.03**	**0.28**	



Publication Bias. The three measures of publication bias used for this meta-analysis on *depersonalization* (using only the MBI-HSS burnout measure) and physician gender are presented next. Figure 5 represents the funnel plot of precision for this analysis. The studies appear to be distributed symmetrically in relation to the combined effect size. The Begg and Mazumdar rank correlation method reports a Kendall's tau with continuity correction of -0.22. The relationship between the effect sizes and the standard error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 20. This means that an additional 20 "null" studies would have to be obtained in order for the effect to not be significant. This value is less than the $5K+10$ rule of thumb, suggesting that publication bias might exist. Arguably, these combined results suggest that there is no publication bias evident in this fourth meta-analysis.

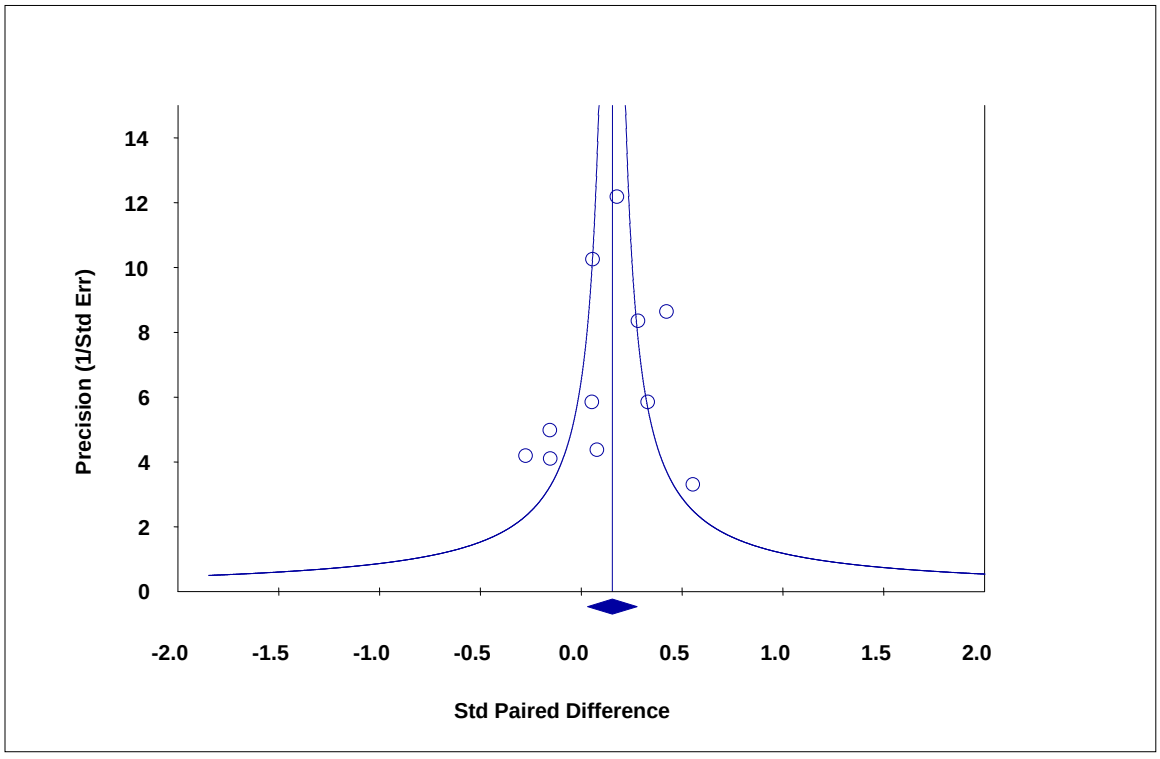


Figure 5. Funnel Plot of Precision for Depersonalization and Gender (MBI-HSS Burnout Measure Only)

Medical Specialty and Burnout

Several specialties exist within the field of medicine, and it is difficult to determine what medical specialty is most prone to burnout. In an attempt to develop a clearer understanding on this issue, a series of meta-analyses focusing on medical specialty and burnout will be presented. For the first and last meta-analyses in this section, the three measures of publication bias were also performed.

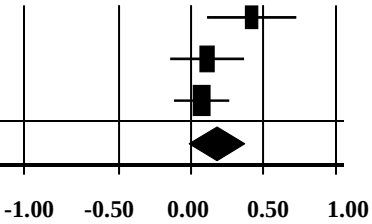
Meta-Analysis 5: Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

The fifth meta-analysis was on *emotional exhaustion* and medical specialty. It was conducted using all possible measures of burnout. The burnout measures used in this meta-analysis were the Maslach Burnout Inventory – Human Services Survey (MBI-HSS) and the Maslach Burnout Inventory – General Survey (MBI-GS). This meta-analysis compared the burnout levels of general practitioners versus specialists. A total of 3 independent studies were included.

For this meta-analysis of *emotional exhaustion* and medical specialty (general practitioners versus specialists) the total number of subjects, *N*, is 1174 (374 GPs & 800 Specialists) across the 3 studies. The overall Cohen's *d* is 0.19, with a 95% confidence interval of 0.02 to 0.37. According to Cohen's (1988) criteria, the overall effect size was small, yet significant. Examination of the data in all 3 studies, shown in Table 6, indicates a significant overall effect size ($z = 2.18$) in the positive direction ($p < 0.05$), indicating that general practitioners report higher levels of *emotional exhaustion* than specialists. The effect sizes are homogeneous Q (2) = 3.58, $p > 0.05$, meaning that any differences across studies are due to sampling error.

Table 6. Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

Study Name	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Ozyurt et al. (2006)	0.41	0.13	0.70	
Rohland et al. (2004)	0.14	-0.10	0.37	
Wu et al. (2008)	0.10	-0.07	0.28	
Overall	**0.19**	**0.02**	**0.37**	



Publication Bias. Figure 6 represents the funnel plot of precision for this meta-analysis on *emotional exhaustion* (using all possible measures of burnout) and medical specialty. The studies appear to be distributed symmetrically in relation to the combined effect size.

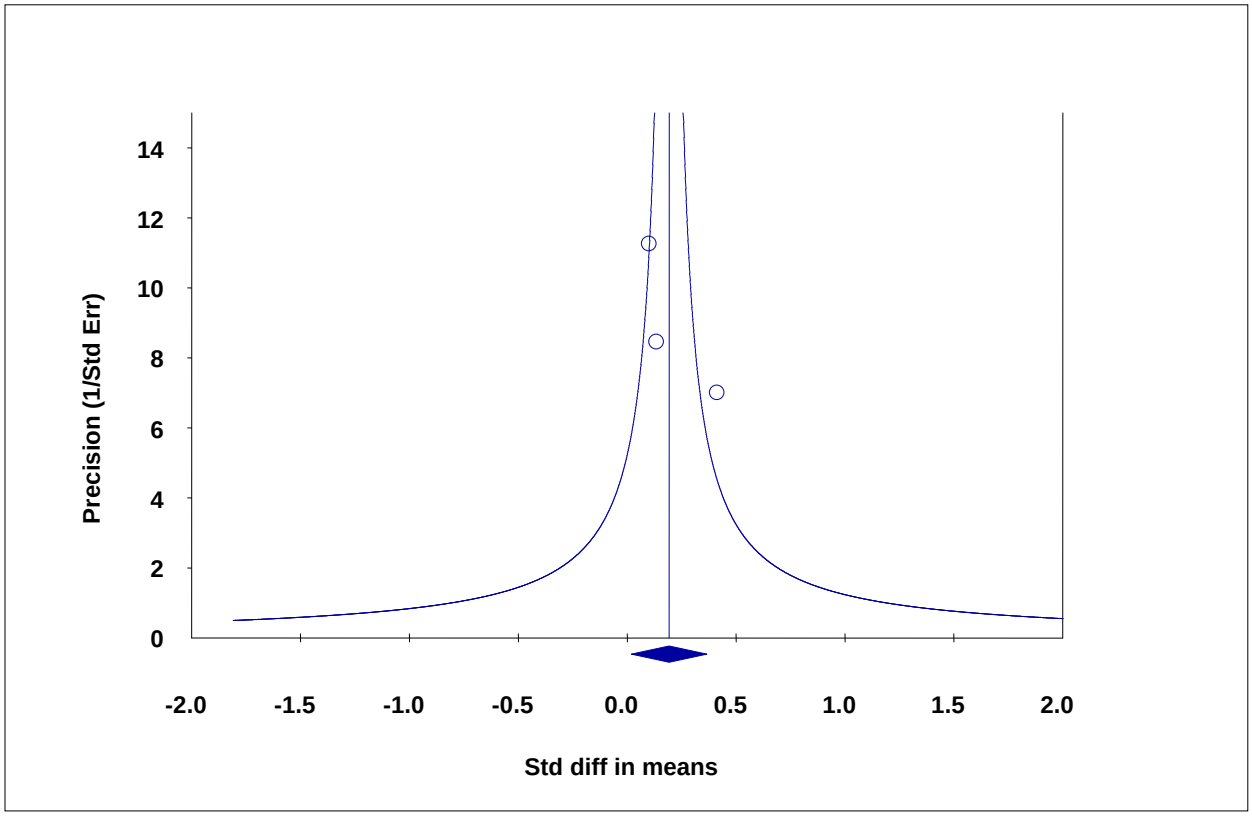


Figure 6. Funnel Plot of Precision for Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

The Begg and Mazumdar rank correlation method reports a Kendall's tau with continuity correction of 0.15. The relationship between the effect sizes and the standard error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 5. This means that an additional 5 "null" studies would have to be obtained in order for the effect to not be significant. This value is less than the $5K+10$ rule of thumb, suggesting that publication bias might exist. Arguably, these combined results suggest that there is no publication bias evident in this meta-analysis.

Meta-Analysis 6: Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

The sixth meta-analysis compared specialists versus all physician types (general practitioners, other physicians, and residents). It was conducted using all possible measures of burnout. The burnout measures used in this meta-analysis were the MBI-HSS and MBI-GS. The overall effect size ($z = -1.24$) for the 10 studies was not significant ($p > 0.05$).

Meta-Analysis 7: Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

A seventh meta-analysis was conducted on general practitioners and specialists versus residents. It was conducted using all possible measures of burnout. The burnout measures used in this meta-analysis were the MBI-HSS and the Work-Related Strain Inventory (WRSI). The overall effect size ($z = -1.19$) for the four studies was not significant ($p > 0.05$).

Meta-Analysis 8: Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

An eighth meta-analysis was conducted that compared general practitioners versus all physician types (specialists, other physicians, & residents). It was conducted using all possible measures of burnout. The burnout measures used in this meta-analysis were the MBI-HSS, the MBI-GS, and the Work-Related Strain Inventory (WRSI). A total of 5 independent studies were included.

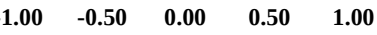
For this meta-analysis of *emotional exhaustion* and medical specialty (general practitioners versus all physician types) the total number of subjects, *N*, is 2632 (852 GPs, 997 Specialists, 146 Other, and 637 Residents) across the 5 studies. The overall Cohen's *d* is 0.26, with a 95% confidence interval of 0.11 to 0.40. According to Cohen's (1988) criteria, the overall effect size was small and significant. Examination of the data in all 5 studies, shown in Table 7, indicates a significant overall effect size ($z = 3.46$) in the positive direction ($p < 0.05$), indicating that general practitioners are more burned out when compared to physician types such as specialists, other physicians, and residents. The effect sizes are heterogeneous, $Q\ (4) = 10.62$, $p < 0.05$. This means that the differences across the studies are due to moderator variables and not just sampling error. Due to the small number of studies, no further meta-analyses were conducted on *emotional exhaustion* and medical specialty.

Publication Bias. Figure 7 represents the funnel plot of precision for this meta-analysis on *emotional exhaustion* (using all possible measures of burnout) and medical specialty. The studies appear to be distributed symmetrically in relation to the combined effect size. The Begg and Mazumdar rank correlation method reports a Kendall's tau with

continuity correction of 0.00. The relationship between the effect sizes and the standard error of the effects is not significant ($p > 0.05$). Lastly, Rosenthal's fail-safe N is 40. This means that an additional 40 "null" studies would have to be obtained in order for the effect to not be significant. It exceeds Rosenthal's rule of thumb total ($5K+10 = 35$). Arguably, these results suggest that there is no publication bias evident in this meta-analysis.

Table 7. Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

Study Name	*Cohen's d*	*Lower Limit*	*Upper Limit*	*Cohen's d and 95% Confidence Intervals*
Grassi et al. (2000)	0.22	-0.00	0.44	
Ozyurt et al. (2006)	0.41	0.13	0.70	
Revicki et al. (1991)	0.42	0.28	0.56	
Rohland et al. (2004)	0.14	-0.10	0.37	
Wu et al. (2008)	0.10	-0.07	0.28	
Overall	**0.26**	**0.11**	**0.40**	



Correlations

According to Hunter and Schmidt (2004), "the goal of a meta-analysis of correlations is a description of the distribution of actual correlations between a given independent and a given dependent variable" (p. 33). For this project, three additional meta-analyses were conducted on the correlations between burnout and physician age, burnout and physician illness, and burnout and physician satisfaction.

It should be noted that physician illness was defined by key words such as general health, resilience, self-perceived health, sick days, anxiety, physical health, and alexithymia which is defined as a state of deficiency in understanding, processing, or

describing emotions. All of these indicators of health and illness were coded in a consistent direction, such that a higher score indicated greater illness.

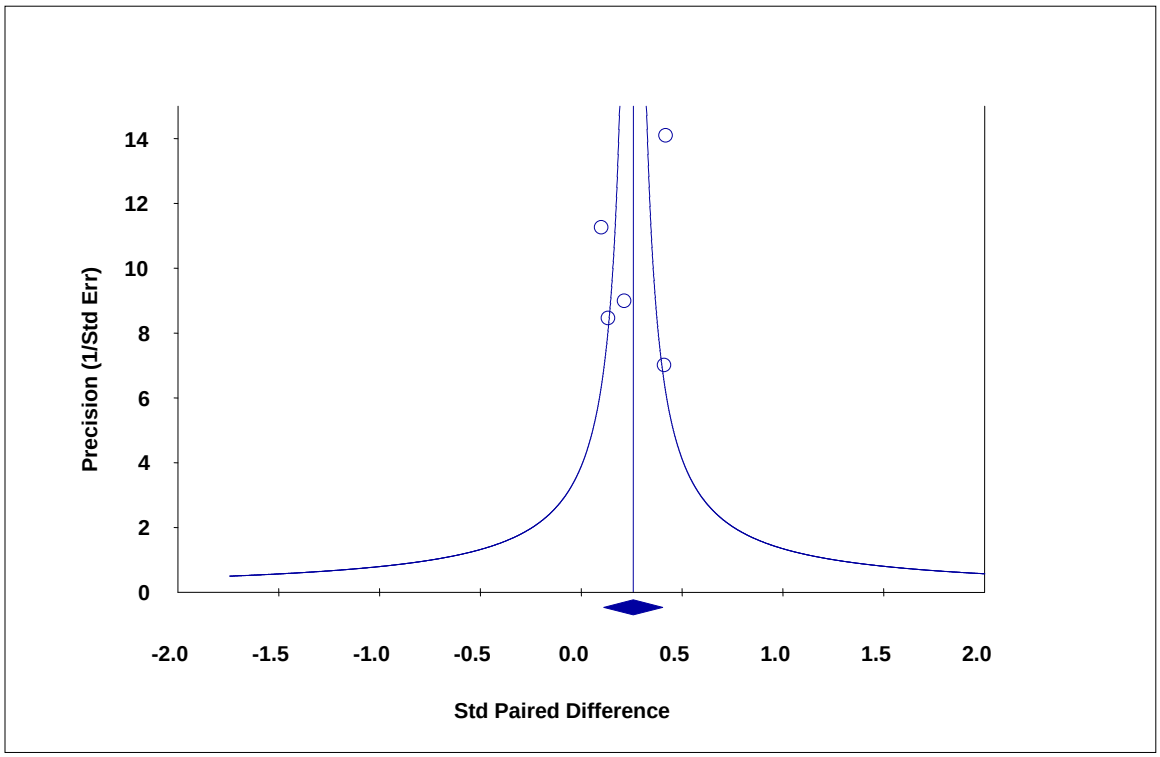


Figure 7. Funnel Plot of Precision for Emotional Exhaustion and Medical Specialty (From All Possible Burnout Measures)

It should also be noted that satisfaction was defined by key words such as job satisfaction, satisfaction with one's supervisor, and satisfaction with the balance of one's personal and professional life.

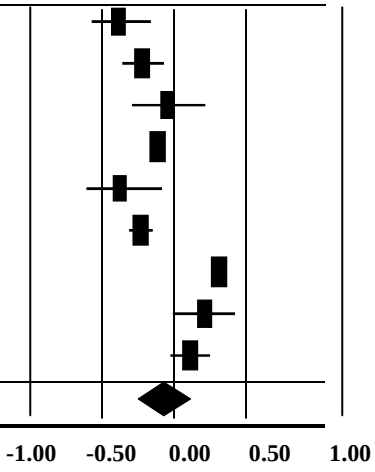
With the exception of two studies (Revicki et al., 1991 uses the Work-Related Strain Inventory [WRSI]; Boudreau et al., 2006 uses the Boudreau Burnout Questionnaire [BBQ]), all of the correlational studies used in meta-analyses nine to eleven used the MBI-HSS as their measure of burnout.

Meta-Analysis 9: Burnout and Age

A total of 9 studies are included in this meta-analysis. The total number of subjects, *N*, is 5729. All of the subjects used in this meta-analysis are of various physician types including general practitioners, specialists, and other physicians. The overall correlation between burnout and physician age among all of the studies is -0.14, indicating a low to moderate correlation (Cohen, 1988). The 95% confidence interval is -0.30 to 0.03. The overall effect size is not significant ($p > 0.05$) and heterogeneous, $Q(8) = 228.15$, $p < 0.05$. Table 8 offers a detailed account of the correlations and confidence intervals across all nine independent studies.

Table 8. Correlations of Burnout with Age

Study Name	*Correlation*	*Lower Limit*	*Upper Limit*	*Correlation and 95% Confidence Intervals*
Alacacioglu et al. (2008)	-0.41	-0.59	-0.21	
Anderson et al. (2000)	-0.27	-0.40	-0.13	
Bargellini et al. (2000)	-0.11	-0.34	0.13	
Boudreau et al. (2006)	-0.17	-0.21	-0.13	
Bruce et al. (2005)	-0.41	-0.62	-0.15	
Campbell et al. (2001)	-0.28	-0.35	-0.20	
Deckard et al. (1992)	0.21	0.17	0.25	
Glasberg et al. (2007)	0.12	-0.08	0.31	
Kirwan et al. (1995)	0.03	-0.10	0.16	
Overall	**-0.14**	**-0.30**	**0.03**	



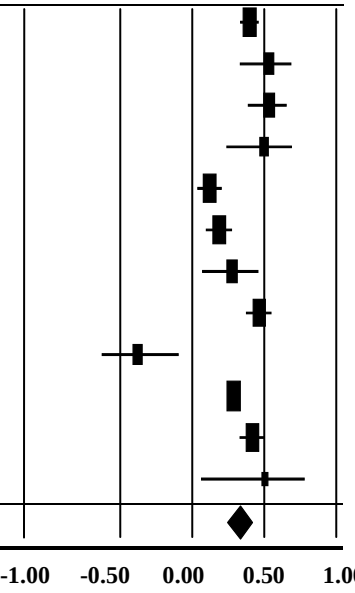
Meta-Analysis 10: Burnout and Illness

A total of 12 studies are included in this meta-analysis. The total number of subjects, *N*, is 6484. All of the subjects used in this meta-analysis are of various physician types, including general practitioners, specialists, other physicians, residents, and medical students. The overall correlation between burnout and physician illness across all studies

is 0.38, with a 95% confidence interval of 0.30 to 0.45. The overall effect size was significant ($p < 0.05$) indicating a moderate to substantial correlation between burnout and physician illness. The overall effect size is also heterogeneous, Q (11) = 79.06, $p < 0.05$. Table 9 offers a detailed account of the correlations and confidence intervals across all 12 studies.

Table 9. Correlations of Burnout with Illness

Study Name	*Correlation*	*Lower Limit*	*Upper Limit*	*Correlation and 95% Confidence Intervals*
Asai et al. (2007)	0.44	0.38	0.50	
Bargellini et al. (2000)	0.56	0.38	0.70	
Bressi et al. (2008)	0.56	0.43	0.67	
Bruce et al. (2005)	0.53	0.29	0.71	
Campbell et al. (2001)	0.19	0.11	0.27	
Daly et al. (2002)	0.25	0.16	0.33	
Glasberg et al. (2007)	0.33	0.14	0.50	
Grassi et al. (2000)	0.50	0.41	0.58	
Hammer et al. (1985)	-0.26	-0.49	-0.00	
Korkeila et al. (2003)	0.34	0.31	0.37	
McManus et al. (2002)	0.46	0.37	0.53	
Sargent et al. (2004)	0.54	0.13	0.79	
Overall	**0.38**	**0.30**	**0.45**	



Meta-Analysis 11: Burnout and Satisfaction

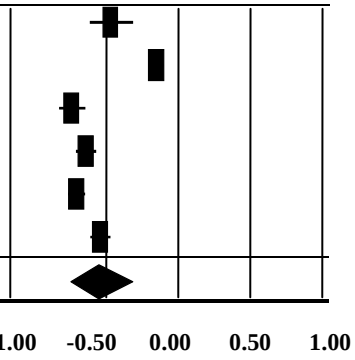
A total of 6 studies are included in this meta-analysis. The total number of subjects, *N*, is 3984. All of the participants used in this meta-analysis are of various physician types including general practitioners, specialists, other physicians, and residents. The overall correlation between burnout and job satisfaction across all studies is -0.42, indicating a moderate to substantial negative relationship. The 95% confidence interval is -0.60 to -0.21. The overall effect size is significant ($p < 0.05$) and

heterogeneous, Q (5) = 247.05, $p < 0.05$. Table 10 presents a detailed account of the correlations and confidence intervals across all six studies.

Publication Bias. The three measures of publication bias: the funnel plot of precision, the Begg and Mazumdar rank correlation method, and Rosenthal's fail-safe N were calculated for the three correlational meta-analyses. Overall, the results strongly support the claim that there is no publication biases present in any of the correlational meta-analyses for burnout and physician age, burnout and physician illness, and burnout and physician satisfaction. Complete publication bias results for each of the three meta-analyses are not reported here but are available on request.

Table 10. Correlations of Burnout with Satisfaction

Study Name	***Correlation***	***Lower Limit***	***Upper Limit***	***Correlation and 95% Confidence Intervals***
Bell et al. (2002)	-0.35	-0.48	-0.20	
Deckard et al. (1992)	-0.06	-0.11	-0.01	
Deckard et al. (1994)	-0.59	-0.67	-0.50	
Golub et al. (2007)	-0.50	-0.56	-0.43	
Ozyurt et al. (2006)	-0.56	-0.61	-0.50	
Revicki et al. (1991)	-0.41	-0.47	-0.34	
Overall	**-0.42**	**-0.60**	**-0.21**	



Chapter Four
Discussion

The primary goal of this research study is to help clarify our understanding of physician burnout with a view to inform future practice and policy decisions that can ultimately help heal the healers.

Table 11 offers a summary of the research questions and empirical results obtained in this project.

The theoretical, methodological, and practical considerations of each research question are discussed, followed by a review of the limitations of the project, and possible directions for future research.

Considerations

Emotional Exhaustion and Gender

Emotional exhaustion is defined as "feelings of being emotionally overextended and exhausted by one's work" (Rafferty et al., 1986, p. 488). Two meta-analyses completed on gender and *emotional exhaustion* confirmed that female physicians are more at risk to *emotional exhaustion* than male physicians. Several factors causing higher levels of *emotional exhaustion* for female physicians could be time pressures, work and patient demands, lower income, and the conflict of trying to balance a career and a family.

Time pressures are often greater for female physicians than for male physicians. It has been reported that, on average, female physicians need 36% more time to provide quality care for new patients and consultations as compared to 21% for male physicians (McMurray et al., 2000).

Table 11. Summary of Research Questions and Results

Research Questions	*Results*
1. Is there an overall relationship between the gender of physicians and experienced burnout?	Yes, an association between the gender of physicians and experienced burnout exists.
a) Is there a gender difference associated with the burnout dimension of *emotional exhaustion*?	Yes, female physicians report higher levels of *emotional exhaustion* than male physicians.
b) Is there a gender difference associated with the burnout dimension of *depersonalization*?	Yes, male physicians report higher levels of *depersonalization* than female physicians.
2. Is there an overall relationship between the medical specialty of physicians and physician burnout?	A partial relationship exists between medical specialty and physician burnout. General practitioners were found to experience higher burnout when compared to specialists and other physicians such as residents.
3. Is there an overall relationship between the age of physicians and physician burnout?	Somewhat. A near significant low to moderate negative correlation between the age of physicians and physician burnout was found.
4. Is there an overall relationship between the illness of physicians and physician burnout?	Yes, a moderate to substantial positive correlation between the illness of physicians and physician burnout was found.
5. Is there an overall relationship between the satisfaction of physicians and physician burnout?	Yes, a moderate to substantial negative correlation between the satisfaction of physicians and physician burnout was found.

A second factor contributing to the high levels of *emotional exhaustion* for female physicians appears to be work and patient demands. McMurray et al. (2000) reported that

female physicians have significantly less control of daily work practices, including volume of patient load, details of office scheduling, and selecting physicians for referrals, when compared to male physicians (McMurray et al., 2000). These demands increase the odds of burnout among female physicians by 12% to 15% for every additional five hours that they work over and above a forty-hour work week (McMurray et al., 2000; Spickard et al., 2002).

A third contributing factor to the high levels of *emotional exhaustion* found among female physicians is most certainly their level of income. The mean income of a female physician is approximately $22,000 less than what male physicians are paid (McMurray et al., 2000). Not only do lower income levels among female physicians lead to higher levels of *emotional exhaustion*, but it also causes female physicians to withdraw from the medical profession.

A fourth contributing factor is the struggle for female physicians to balance a career and a family. The traditional role of women is to stay at home and raise a family. However, some women choose to pursue a career outside of the home. As more female physicians enter the medical field, the struggles with their desire to pursue a career and maintain a family life can lead to burnout.

What we know is that burnout is associated with many negative factors that affect both individuals and organizations. We also know that female physicians are more at risk to the symptoms of burnout than their male counterparts due to the contributing factors discussed above. Beyond these contributing factors is another troubling concern associated with burnout among female physicians; the attempt to commit suicide.

In a study conducted by Olkinuora et al. (1990), it was found that female physicians are more likely to commit suicide than their male counterparts. Similar findings were reported in a meta-analysis conducted by Schernhammer and Colditz (2004) on the suicide rates among physicians.

Juxtaposed with these results is the inevitable growth of the female demographic in medicine. Since the 1970s, the number of women who have chosen medicine as a profession has increased (Langwell, 1982). In 1998, 23% of all United States practicing physicians were female (Spickard et al., 2002). By 2010, this percentage is expected to increase to 30%, and 50% or more of all medical students are expected to be female (Spickard et al., 2002). It has been predicted that by 2015, the medical profession will consist of 40% female physicians (Gulli & Lunau, 2008). Interestingly, in Canada, the majority of students enrolled at all seventeen medical schools are female (Gulli & Lunau, 2008).

As the number of females entering the medical field continues to increase, and given what we know from this research, we need to be more proactive in educating females early on in medical school on how to handle the pressures and demands of being a physician, while maintaining a healthy lifestyle. If medical schools implement specific policies such as promoting the importance of mental health in the curriculum, encouraging a caring organizational culture within the medical school, identifying suitable professionals to provide assistance to medical students with social and psychological problems, and assisting medical students to obtain good medical and psychological care (Tennant, 2002), the high levels of *emotional exhaustion* found among female physicians will likely decrease and the number of females who withdraw from the

medial profession will also decrease. This will be good for both physicians and their patients.

Depersonalization and Gender

Arguably, the traditional way to measure burnout is to look at the *emotional exhaustion* subscale scores. However, some authors have linked the subscale of *depersonalization* to burnout. According to the Phase Model Approach to burnout, the "slippery slope" to advanced burnout can begin with symptoms of *depersonalization* (Golembiewski, Munzrider, & Stevenson, 1986). As previously discussed, de*personalization* is defined as "an unfeeling and impersonal response toward recipients of one's services" (Rafferty et al., 1986, p. 488).

The two meta-analyses on gender and *depersonalization* conducted for this project confirmed that male physicians report higher levels of *depersonalization* than their female counterparts. This finding reinforces the popular view that males are less empathetic than females. Females learn at an early age in life how to show concern and feelings towards others. They are often put in nurturing and helping roles in which they utilize these skills. On the other hand, males are found to be less empathetic and generally distance themselves from others, either physically or emotionally. In order for males, particularly male physicians, to become less depersonalized, a couple of simple suggestions can be offered.

For one, male physicians can try to better identify with others, such as patients or co-workers. By doing this, they will have the opportunity to achieve a better sense of the needs and feelings of others. As well, encouragement and advice from female physicians regarding empathy may also be helpful. Males are generally going to be less empathetic

than females. However, by following the suggestions above, the high levels of *depersonalization* that male physicians report may be reduced. This may ultimately help male physicians from getting on that "slippery slope" of burnout too quickly.

Medical Specialty and Burnout

There is a great deal of debate regarding burnout and medical specialty within the physician burnout literature. Very little empirical research has been conducted which compares the differences across specialties. However, what we do know is that general practitioners are more at risk to burnout than physician types such as specialists, other physicians, and residents. One can only begin to speculate as to the reasons why this finding occurred. Maybe it has to do with general practitioners being the first point of contact for patients requiring medical attention. The patient demands for general practitioners are very high and, with an overwhelming amount of daily patient visits, it is understandable why this might lead to *exhaustion* more quickly in this physician group.

Within the physician burnout literature and from some preliminary results from this project, younger physicians appear to be at greater risk to burnout than older physicians. One can extrapolate and argue this finding to conclude that residents and medical students could be more prone to burnout than any other physician type. It is important for future researchers to conduct studies on residents and medical students and compare and monitor their burnout levels with practicing physicians such as general practitioners or specialists.

Additional Factors

Illness, poor health, and job dissatisfaction are other contributing factors linked to physician burnout. This is a major concern to patients who seek medical attention,

because physicians with poor health and low job satisfaction provide a lower quality of care. In order to ensure that the quality of patient care does not suffer, the implementation of physician health programs is necessary. Physicians need to be adaptive to their work setting and need to be introduced to the support systems within their organization (Crampton, Hodge, Mishra, & Price, 1995). Through the implementation of physician health programs, physician health will improve and greater job satisfaction will be realized. A physician health program can be effective for both individual physicians and the organizations that they work for. The benefits of implementing such programs include the identification of major stressors such as psychological issues, family problems, relationship problems, substance abuse disorders, psychiatric or psychological problems, as well as financial, career, and work stress problems (Crampton et al., 1995; Shuttleworth, 2004).

Although there are no simple answers to resolving the stress and burnout issues that occur in the medical field, a long-term vision approach must be adopted in order to identify the early signs and symptoms of physician stress and burnout. With proper solutions implemented, the number of physicians who experience burnout can be significantly reduced. This requires the continuous reshaping of health care processes and structures, and continual support from management and administration within the health care system through effective communication strategies and the awareness to manage the areas of workload, control, reward, community, fairness, and values properly (Kumar & Weil, 1998). A key asset of our health care system is the peak performance of physicians. The failure to properly acknowledge and maintain this asset will only cause severe

problems in the future that could result in the loss of this asset, or even worse, the loss of innocent lives.

Limitations of this Study

As with most studies, this research study has some specific limitations. One of the key concerns with this research study is the lack of published studies that reported mean scores and standard deviations for the *emotional exhaustion* and *depersonalization* subscales of the Maslach Burnout Inventory (MBI). Approximately 84% of the published studies used the MBI burnout measure. However, only 11.7% of these studies reported mean scores and standard deviations for the *emotional exhaustion* and *depersonalization* subscales. Many of the studies that used the MBI reported gender differences as chi-squared values, odds ratios, *p*-values, and median values rather than as mean scores for each subscale. When studies present results in this way, it drastically reduces the number of studies that can be used for a meta-analysis. Future researchers need to be more vigilant in how they present their results. If researchers begin to routinely and consistently report mean scores and standard deviations for the MBI subscales, then future researchers will have the benefit of more data to analyze. Such an improvement will lead to heightened levels of confidence in any conclusions that are reached.

A second limiting factor of this project is that the authors of each study were not contacted for missing information. By contacting the authors, the sample size and the number of studies used in the meta-analyses may have increased.

A third limitation of this project is that other variables that have been found to be associated with burnout such as years of experience, number of hours worked, practice locale, and marital status, were not analyzed. In order to limit the scope of this project,

some of these variables had to be ignored, including years of experience, number of hours worked, and marital status. The practice locale (urban or rural) is one variable that would have been interesting to study although the amount of data available on this variable is minimal. Out of the 110 published studies used for project, only four reported a distinction between urban and rural practice locales (Whippen & Canellos, 1991; Yaman & Soler, 2002; Goehring et al., 2005; Boudreau et al., 2006). So far we know that rural physicians report higher levels of burnout than urban physicians; however, it would be beneficial for future researchers to include practice locale in their surveys on physician burnout to help understand the impact of environment.

A fourth limiting feature of this project was the categorization of the medical specialties, particularly specialists and other physicians. With such a large number of specialties in medicine, it is difficult to differentiate between specialties, such as oncology or emergency medicine, or other physician types such as hospital physicians or perfusionists. In the physician burnout literature, there has been no standard classification system devised to properly identify physicians based on their medical specialty. Until a standard classification system for physician types exists, it will continue to be difficult for researchers to determine what medical specialties to include in their focus of study. Until we sort this out, we will have difficulty answering the question, "Which medical specialty, if any, is more prone to burnout?"

A fifth limitation present in this project is the absence of grey literature. The decision was made not to include conference abstracts, thesis/dissertation abstracts, non-referenced journals, government reports, and technical reports because of the time constraints and costs associated with obtaining this information. The grey literature may

have been and can be a useful source of information for research. Using the grey literature in future meta-analyses on physician burnout would be an improvement on the current research project.

A final limitation present in this study is the amount of heterogeneity that existed across the 11 meta-analyses. Although other meta-analyses were conducted to try to account for the moderators across the studies, it is very difficult to determine what the overall factors contributing to the heterogeneity were because of the presence of moderators and also sampling error. Future researchers must try to account for as many contributing factors as they can in order to try and reduce the heterogeneity of their sample. Examples of possible contributing factors that researchers can examine may include the countries in which participants live and the age of the participants.

Although the limitations presented here have somewhat restricted this project, they have also provided several suggestions and opportunities for future research in the area of physician burnout and meta-analysis.

Directions for Future Research

Several directions for future research have already been alluded to in this discussion. To recap, the field of physician burnout would benefit from:

- A meta-analysis on physician burnout and practice local (urban versus rural)
- A meta-analysis on physician burnout and the countries physicians practice in
- Increasing the current data pool by identifying grey literatures
- Contacting current authors for possible data that was not obtained in the published studies

A Serendipitous Finding

As previously discussed, many of the published studies used for this project did not report mean score values for each subscale of the MBI. Instead, a numerical cut-off point value was used for each subscale identified by Maslach et al. (1996) to determine what range of experienced burnout (i.e., high, moderate, or low) individuals are facing. Maslach et al. (1996) divide each occupation into subgroups such as teaching, postsecondary education, social services, medicine, mental health, and other, and assign different numerical cut-off point values (i.e., upper, middle, and lower thirds of the normative distribution) to determine the range of experienced burnout for that specific group.

The categorization of the subgroups **medicine** and **mental health** that Maslach et al. (1996) have established poses a problem for the literature on physician burnout because the distinction that they have made is not clear enough. The **medicine** subgroup is classified as physicians and nurses, and the **mental health** subgroup is classified as psychologists, psychotherapists, counselors, mental hospital staff, and psychiatrists. It is difficult to distinguish between these two subgroups because some of the members of the mental health subgroup could be considered physicians (psychiatrists). A physician is defined as a licensed medical practitioner. Therefore, in order to make a clearer distinction between the medicine and mental health subgroups, physicians should be classified as their own subgroup. Any individual who is a licensed medical practitioner should fall into this occupational subgroup.

The numerical cut-off point score values determined for each subscale for each occupational subgroup also need to be reviewed. For a low degree of burnout, the

numerical cut-off point value for the **medicine** subgroup is less than or equal to 18 for the *emotional exhaustion* subscale, less than or equal to 5 for the *depersonalization* subscale, and greater than or equal to 40 for the *personal accomplishment* subscale. For an average degree of burnout, the numerical cut-off point value is between 19 and 26 for the *emotional exhaustion* subscale, between 6 and 9 for the *depersonalization* subscale, and between 39 and 34 for the *personal accomplishment* subscale. For a high degree of burnout, the numerical cut-off point value for the **medicine** subgroup is greater than or equal to 27 for the *emotional exhaustion* subscale, greater than or equal to 10 for the *depersonalization* subscale, and less than or equal to 33 for the *personal accomplishment* subscale (Maslach et al., 1996).

For a low degree of burnout, the numerical cut-off point value for the **mental health** subgroup is less than or equal to 13 for the *emotional exhaustion* subscale, less than or equal to 4 for the *depersonalization* subscale, and greater than or equal to 34 for the *personal accomplishment* subscale. For an average degree of burnout, the numerical cut-off point value is between 14 and 20 for the *emotional exhaustion* subscale, between 5 and 7 for the *depersonalization* subscale, and between 33 and 29 for the *personal accomplishment* subscale. For a high degree of burnout, the numerical cut-off point value for the **mental health** subgroup is greater than or equal to 21 for the *emotional exhaustion* subscale, greater than or equal to 8 for the *depersonalization* subscale, and less than or equal to 28 for the *personal accomplishment* subscale (Maslach et al., 1996).

Researchers would be better served to consider the upper, middle, and lower thirds of the normative distribution for the sample of 24,911 physicians in 69 studies identified in this project. For a low degree of burnout, the numerical cut-off point value is

less than or equal to 19 for the *emotional exhaustion* subscale, less than or equal to 6 for the *depersonalization* subscale, and greater than or equal to 36 for the *personal accomplishment* subscale. For an average degree of burnout, the numerical cut-off point value is between 19 and 23 for the *emotional exhaustion* subscale, between 7 and 9 for the *depersonalization* subscale, and between 38 and 36 for the *personal accomplishment* subscale. For a high degree of burnout, the numerical cut-off point value is greater than or equal to 24 for the *emotional exhaustion* subscale, greater than or equal to 10 for the *depersonalization* subscale, and less than or equal to 39 for the *personal accomplishment* subscale.

Researchers could also be interested in the comparison of the mean subscale scores reported by Maslach et al. (1996) and those found in this study. For the **medicine** subgroup, Maslach et al. (1996) report a mean score of 22.19 for the *emotional exhaustion* subscale, and a mean score of 7.12 for the *depersonalization* subscale. For the **mental health** subgroup, Maslach et al. (1996) report a mean score of 16.89 for the *emotional exhaustion* subscale, and a mean score of 5.72 for the *depersonalization* subscale. For this project and its sample of 24,911 physicians across 69 studies, the overall mean score for the *emotional exhaustion* subscale is 21, and the overall mean score for the *depersonalization* subscale is 8.

Final Thoughts

The purpose for this research was to gain a better understanding of the apparent contradictions that exist in the physician burnout literature, create new knowledge, answer questions, and discover new directions for research. Some of the contradictions that exist in the physician burnout literature were resolved. In particular, an association

between burnout and gender was found. As well, it was found that general practitioners are more likely to experience burnout than any other physician type. From these findings, it is evident that burnout continues to have a negative effect on physicians and their work. Some physicians who experience burnout may choose to cope with it or seek preventive measures. Other physicians may reduce their work hours, relocate their practice, or withdraw from the profession. Burnout has had and continues to have a strong impact on our health care system. The future of health care in Canada and around the world continues to be burdened by burnout.

The intent of this research study has been to call attention to the problem facing physicians today regarding the symptoms of burnout in their lives, and also to extend a call to action so that possible effective and preventative measures can be taken in an attempt to reduce the high levels of burnout in the physician population. Change cannot happen instantly. However, with the dedication and commitment of individuals, organizations, and local governments, the necessary change to support physicians and save lives is possible.

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Yaman, H., & Soler, J. K. (2002). The job related burnout questionnaire: A multinational pilot study. *Australian Family Physician, 31*, 1055-1056.

Zangaro, G. A., & Soeken, K. L. (2007). A meta-analysis of studies on nurses' job satisfaction. *Research in Nursing and Health, 30*, 445-458.

Appendices

Appendix A: Training Manual for Research Assistants

Physician Burnout: A "Meta-o-scopic" Analysis

Training Manual

Created by Amanda Mauthe

Meta-Analysis

In 1976, the research method of meta-analysis was introduced. Through the use of meta-analysis, research findings have become less conflicting; useful and sound conclusions have been drawn from existing research; clearer directions for future research needs have been provided; and new knowledge and answers to questions that could not be found or answered in individual studies have emerged (Hunter & Schmidt, 2004). The impact of meta-analysis has become so substantial that it has been used in many research fields, including medicine, finance, marketing, sociology, wildlife management, and economics (Hunter & Schmidt, 2004). However, to date, no meta-analysis has been conducted that examines the literature on physician burnout. This study will attempt to fill this gap in the research literature.

General Instructions for the Raters

You will be given a set of articles on physician burnout that you will have to extract information from. You are required to extract as much information as possible. However, in some instances you may not be able to obtain all of the information that is required. Thus, some of the information may be missing and you will have to leave some of the cells within the spreadsheet blank.

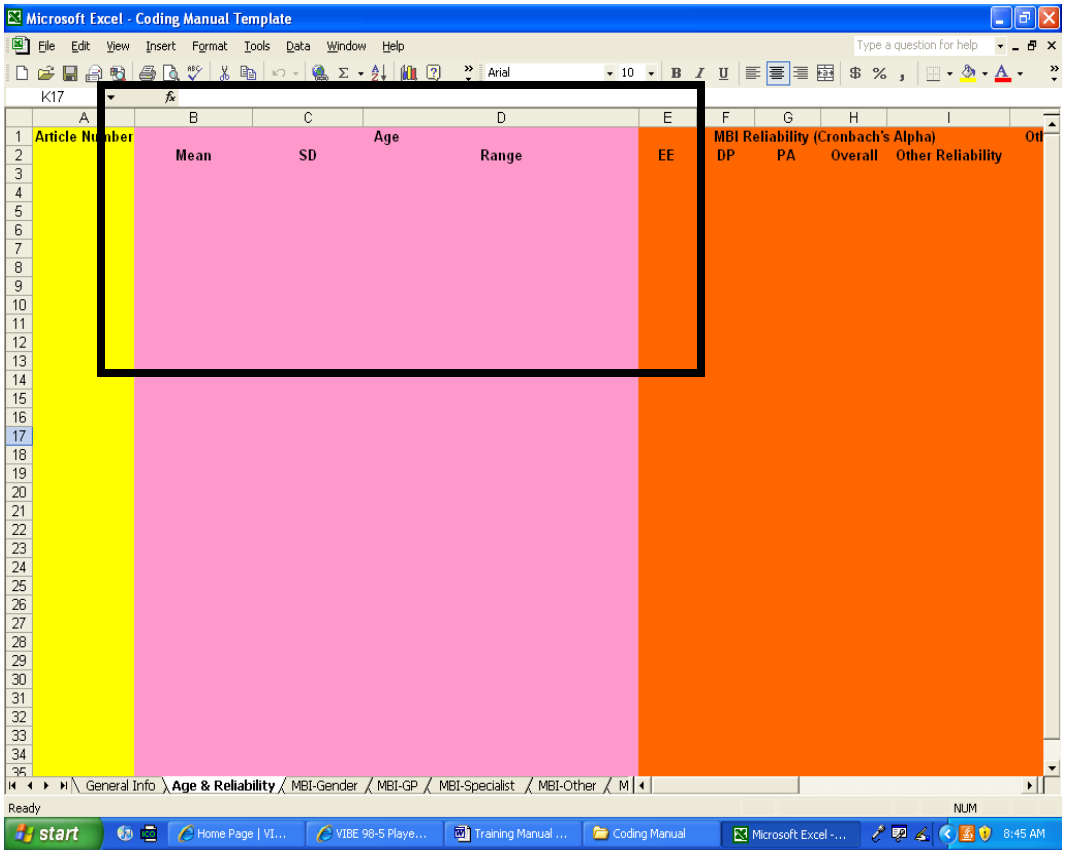
Training Session

Before you begin extracting information from the set of articles, you will be given a one-hour training session. During this session, you will be provided with step-by-step instructions on how the data extraction process works and what is required of you. You will be given a tutorial on the electronic version of the coding manual that you will be using for this project.

You will be given two articles to practice with. The first article is titled "The Job Related Burnout Questionnaire: A Multinational Pilot Study." The second article you will practice with is titled "Predictors of Burnout and Job Satisfaction Among Turkish Physicians." After you have completed these two articles, they will each be reviewed by the researcher and your results will be compared for differences. You will then be asked to take home two articles and practice on your own. You will be asked to email your results to Amanda Mauthe at amanda.mauthe2@uleth.ca for comparison. You will then be given a set of articles and it is your task to extract as much information as you can for each article. You will have two weeks to complete the coding manual and your final coding manual will be submitted to Amanda Mauthe at amanda.mauthe2@uleth.ca no later than September 12, 2008.

Throughout the process of coding the articles, you may contact Amanda Mauthe by email (amanda.mauthe2@uleth.ca) or telephone her at (403)329-6197 if you have any questions or are having any problems with the data extraction process at any time.

Included in this manual are examples of each of the spreadsheets you will be working on to obtain the information that is required of you. Each spreadsheet is made up of cells which contain the variables you will be extracting. For example (see below), the variable age is made up of three cells – mean, standard deviation, and range.



Please remember that you may not be able to obtain all of the information that is required. Please leave the cells blank if you cannot find the information.

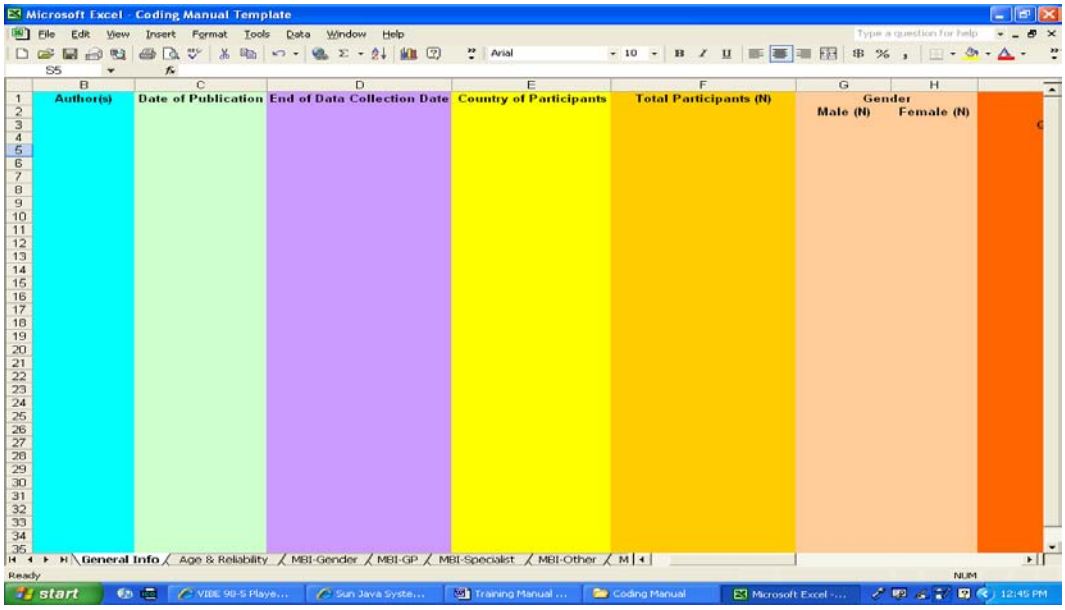
The Data Extraction Process

You will begin the data extraction process by obtaining general information from the article. You will extract the following information to complete this spreadsheet:

- The name of the first **author** of the article followed by "et al."
- The **date the article was published** in a journal
- The **date the data used in the article "was obtained**." This can be found at either the beginning of the article or the end of the article. Not all of the articles will include this date. If a date cannot be found, leave the cell blank

- The **country of the participants** used in the study. This is the country in which the study took place
- The **total number of participants** used within the study
- The **total number of males and females** that participated in the study
- The **total number of males and females** that participated in the study and are a **specific type of physician**. There are **three types of physicians**. These include practicing physician, resident, and medical student. There are also **three types of practicing physicians** which include:
    - **General practitioners and/or family physicians**
    - **Specialists** such as oncologists, urologists, radiographers, infectious disease specialists, emergency physicians, pediatric critical care specialists, pediatricians, osteopathic physicians, surgeons, psychiatrists, internists, anesthesiologists, primary care physicians, transplant surgeons, or palliative physicians
    - **Other** such as hospital physicians, perfusionists, or any other physician type not specified as a general practitioner or specialist
- The **practice locale of the participants** in the study. This includes two types, urban or rural. Not a lot of the articles will provide this information. Please leave the cell titled “practice locale” blank if the proper information cannot be obtained

An example of the spreadsheet is below:



- Characteristics of the **burnout measure** used. Most of the studies conducted will use the Maslach Burnout Inventory (MBI) as its burnout measure. There are three editions of the MBI (1981, 1986, & 1996). Within the set of articles that you will be given, you will find that the 1986 and 1996 editions of the MBI will be the most common.
    - The **1986 edition** of the MBI is a 22-item questionnaire which measures burnout on three separate subscales including *emotional exhaustion*, *depersonalization*, and *personal accomplishment*. Each item of the MBI is rated on a seven-point (0-6) Likert scale which measures the frequency with which the feelings and attitudes of each subscales are experienced (Maslach, Jackson, & Leiter, 1996). The *emotional exhaustion* subscale is made up of nine items and measures feelings of being exhausted by one's work or being emotionally overextended (Maslach, Jackson, & Leiter, 1996). The *depersonalization* subscale is made up of five items and measures an unfeeling or impersonal response towards patients (Maslach, Jackson, & Leiter, 1996). The *personal accomplishment* subscale is made up of eight items and assesses feelings of incompetence and a lack of successful achievement of one's work with other people (Maslach, Jackson, & Leiter, 1996)
    - The **1996 edition** (MBI – General Survey (MBI-GS)) is a 16-item questionnaire which measures burnout on three subscales that are equivalent to those of the 1986 version of the MBI. These include *exhaustion*, *cynicism*, and *professional efficacy*. Each item of the MBI-GS is rated on a seven-point (0-6) Likert scale which measures the frequency with which the feelings and attitudes of each subscales are experienced (Maslach, Jackson, & Leiter, 1996). The *exhaustion* subscale is made up of five items and refers to emotional and physical fatigue (Maslach, Jackson, & Leiter, 1996). The *cynicism* subscale is made up of five items and reflects an indifference or distant attitude towards work (Maslach, Jackson, & Leiter, 1996). The *professional efficacy* subscale is made up of six items and is similar to the *personal accomplishment* subscale of the

MBI. However, it also includes both social and nonsocial aspects of a lack of occupational accomplishments (Maslach, Jackson, & Leiter, 1996)

- Please indicate the type of burnout measure being used. If the MBI is used, please type "MBI" in the cell titled "type." Also, indicate the year of the MBI, the number of items it contains, and whether it uses a frequency or intensity scale. Generally, the MBI will use a frequency scale.

Burnout Measure		
Type	Year	# of Items

- If the MBI is not used in the article you are coding, please specify the name of the burnout measure used in the cell titled "type." Also, if possible, include the year of the measure, and the number of items it contains in the cells provided

- **General Health Questionnaire (GHQ)**. Some of the articles use the GHQ as a measure. The GHQ is a self-administered screening test which detects minor psychiatric disorders in the general population (Goldberg, 1972). Generally, the GHQ is available in 60-, 30-, 20-, and 12-item versions (Goldberg, 1972). If an article uses the GHQ as a measure, please indicate the number of items that make up the GHQ in the cell provided**:**

GHQ
# of Items

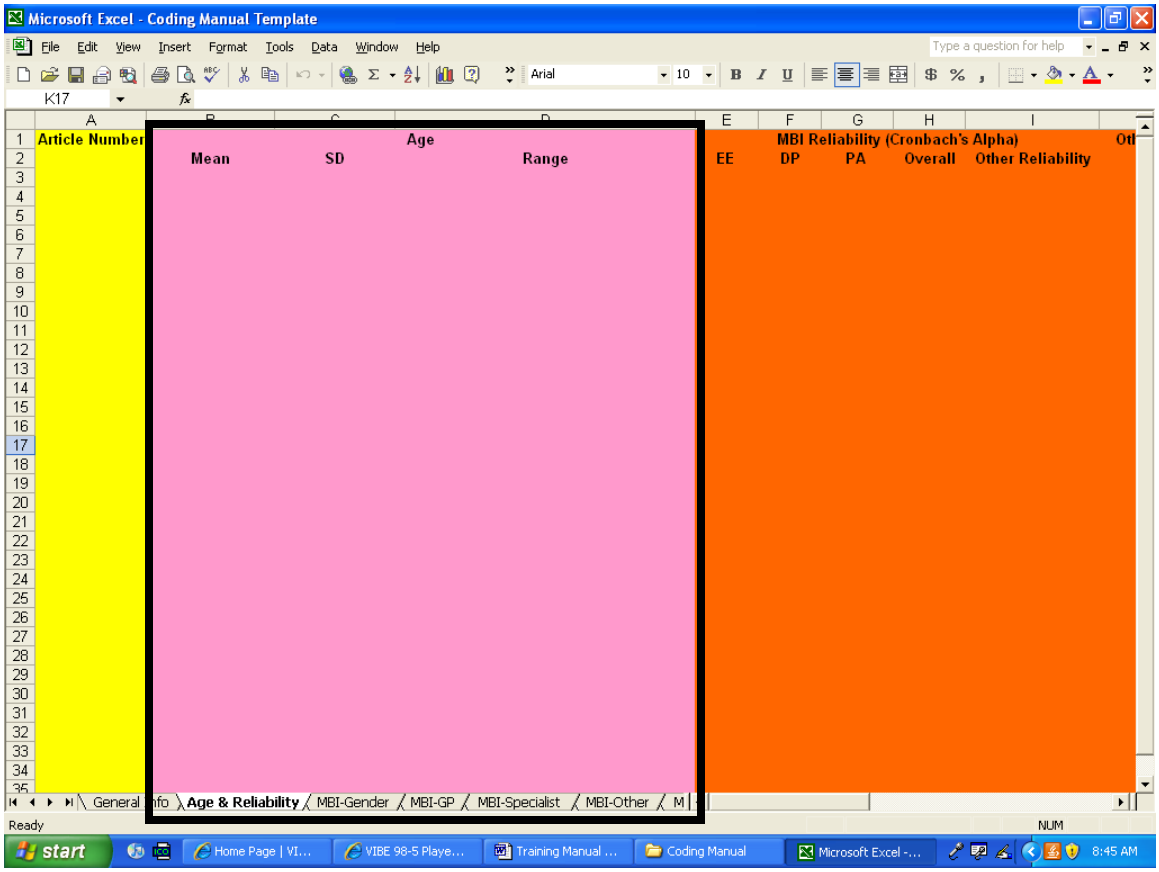
- **Satisfaction Measure**. Some of the articles use a satisfaction measure which measures job/career satisfaction. If an article uses a measure of satisfaction, you need to indicate the name of the measure used. Please do not abbreviate the name of the measure

After you have completed extracting the necessary general information for the article you are working on, you will continue using the same article and extract information on the age of the participants used in the study and the reliability of the measure(s) used in the study. Not all of the measures used in the study will report reliability. If no reliability is reported, you will leave the cells titled "reliability" blank.

From the article, you need to extract as much information about the age of your participants as possible. However, not all of the articles will report this information. If

you cannot fill in all the cells titled “age,” you will leave the cells blank. For age, you will need to extract the following information:

- **Mean** – the arithmetic average of a data distribution (Cooper & Schindler, 2006)
- **Standard deviation** – summarizes how far away from the mean the data values typically are (Cooper & Schindler, 2006)
- **Range** – the difference between the largest and smallest scores in a data distribution (Cooper & Schindler, 2006)



You will also need to extract the following information for the reliability of the measures used:

- Burnout Reliability. The burnout dimension that will be used in most of the articles is the MBI. As previously stated, the 1986 edition of the MBI is made up of three subscales. They are *emotional exhaustion*, *depersonalization*, and *personal accomplishment*. As well, the 1996 edition of the MBI-GS is made up of three subscales. They are *exhaustion*, *cynicism*, and *professional efficacy*. The majority of reliabilities reported are Cronbach’s alpha (α). Most of the articles will report these reliabilities for each of the subscales of the MBI. However, you

may find that some of the articles do not report any reliability at all, or that an overall reliability is given which includes all three subscales. Please report all Cronbach's alpha (α) reliabilities for either each subscale of the MBI or an overall reliability for all the subscales in the cells provided. If no Cronbach's alpha (α) reliability is reported, please leave the cells blank

MBI Reliability (Cronbach's Alpha)				MBI Reliability (Cronbach's Alpha)			
EE	DP	PA	Overall	EX	CY	PE	Overall

- If another form of reliability other than Cronbach's alpha (α) is used for the MBI, please indicate the type of reliability and its score in the cells provided:

MBI Reliability	
Type	Score

- If the article you are working on uses another burnout measure other than the MBI, please indicate its Cronbach's alpha (α) reliability in the cell provided. If no reliability is given for the burnout measure used in the study, please leave the cell titled "other burnout measure reliability (Cronbach's alpha)" blank:

Other Burnout Measure Reliability (Cronbach's Alpha)
Score

- If the article you are working on uses another burnout other than the MBI, and reports a reliability other than Cronbach's alpha (α), please indicate the type of reliability and report its score in the cell titled "other burnout measure reliability." Below is an example:

Other Burnout Measure Reliability	
Type	Score

- General Health Questionnaire (GHQ) Reliability. If an article you are coding uses the GHQ as a measure, you will need to indicate the overall Cronbach's alpha (α), if possible, in the cell provided:

GHQ Reliability (Cronbach's Alpha)
Score

- However, if another form of reliability other than Cronbach's alpha (α) is reported, please indicate the type of reliability and report its score in the

cell titled “GHQ Reliability.” If no reliability is reported, you will leave the cell blank:

GHQ Reliability	
Type	Score

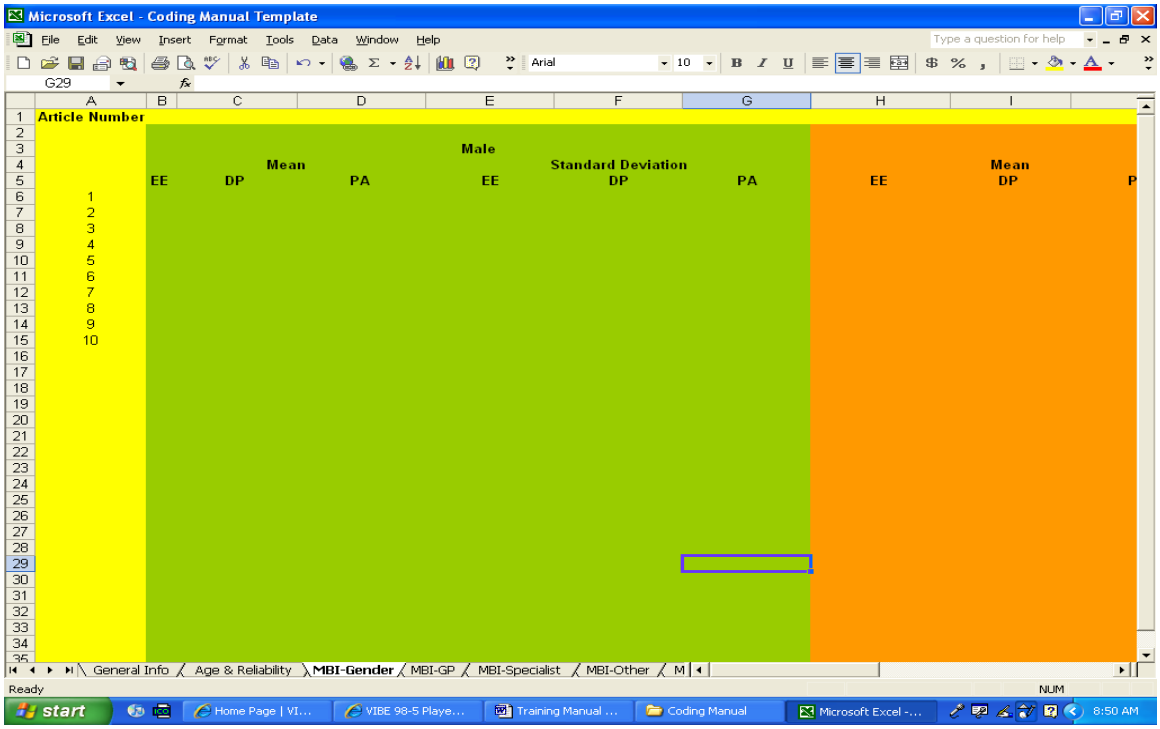
- Satisfaction Measure Reliability. If an article you are coding uses a satisfaction measure, you will need to indicate the overall Cronbach’s alpha (α), if possible, in the cell provided:

Satisfaction Reliability (Cronbach's Alpha)
Score

  - However, if another form of reliability other than Cronbach’s alpha (α) is reported, please indicate the type of reliability and report its score in the cell titled “Satisfaction Reliability.” If no reliability is reported, you will leave the cell blank:

Satisfaction Reliability	
Type	Score

After you have reported the age(s) of the participants and reliabilities for the measures used in the article you are working on, you will use the same article and collect data specifically on the MBI and gender. You will need to indicate the means and standard deviations for each dimension of the MBI based on gender. Not all of the articles will contain this information. Do your best to extract as much information as you can. Below is an example of the spreadsheet:



After you have reported the means and standard deviations for each dimension of the MBI based on gender, you will further this process and extract the means and standard deviations for each physician type by gender. For example, your article may give you MBI scores for males and/or females who are practicing physicians, residents, or medical students. If you cannot extract this information, you will leave the cells blank.

After you have reported all of necessary information for the MBI, you will follow the same procedure if your article used the GHQ as a measure. You will begin by reporting the means and standard deviations of the GHQ based on gender. Then, you will further this process and extract the means and standard deviations for each physician type by gender. For example, your article may give you GHQ scores for males and/or females who are practicing physicians, residents, or medical students. If you cannot extract this information, you will leave the cells blank.

Finally, after you have reported all the necessary information for the GHQ (if necessary), you will follow the same procedure if your article used a measure of satisfaction. You will begin by reporting the means and standard deviations of the satisfaction measure based on gender. Then, you will further this process and extract the means and standard deviations for each physician type by gender. For example, your article may give you satisfaction scores for males and/or females who are practicing physicians, residents, or medical students. If you cannot extract this information, you will leave the cells blank.

After you have completed these steps for one article, you will start on another article and follow the same procedure. Keep in mind that all of the articles are different and that you may not be able to extract all of the information that is required from each article.

Below are detailed instructions on how to complete each spreadsheet.

Sheet 1

You will begin the data extraction procedure for each article by obtaining general information from the article you are working on. Each of the variables you will be asked to extract for this section are describe below. If the article you are working on does not contain all of the information that is described below, your will leave the cell(s) you cannot provide empty

Author(s)

- List the first author's last name followed by "et al"

Date of Publication

- Specify the year that the article was published

End of Data Collection Date

- Specify the year that the data in the article was accepted or finally revised
- This date may not be specified in the article. If no date is mentioned, leave this cell blank

Country of Participants

- Specify the country where the study took place
- Please indicate the province or state of the country in brackets. For example, USA (California) or Canada (Alberta)

Total Participants (N)

- This includes the total number of participants who participated in the study

Gender (Male (N) and Female (N))

- This includes the total participants (N) by gender, male and/or female
- Please specify the number of males and the number of females separately. For example:

Gender	
Male (N)	Female (N)

- If the (N) for only one gender of the total participants (N) is provided, please fill in the appropriate variable cell for that gender. For example, if the study consisted of 245 females and 0 males, you would input the data as the following:

Gender	
Male (N)	Female (N)
	245

- If the total participants (N) are not separated by gender, leave the variable cell blank

Physician type

- This variable is divided into three other cells:
  - Practicing physician
    - This includes **general practitioners (GP) and/or family physicians**
    - **Specialist** – this includes oncologists, urologists, radiographers, infectious disease specialists, emergency physicians, pediatric critical care specialists, pediatricians, osteopathic physicians, surgeons, psychiatrists, internists, anesthesiologists, primary care physicians, transplant surgeons, or palliative physicians
    - **Other** – this includes hospital physicians, perfusionists, or any other physician type not specified as a general practitioner or specialist
  - Resident
  - Medical Student

- For each of these variables, indicate the number of each physician type found within the article you are extracting from. Some of the articles will specify the total number of each physician type that makes up the total participants (N). For example, the article you are working on may have a total sample of 250 participants (N). The article may further describe the sample and indicate that 125 of the participants are general practitioners, that 75 of the participants are oncologists, and that 50 of the participants are residents. Therefore, you would input the data as the following:

Physician Type				
Practicing Physician			Resident	Medical Student
GP	Specialist	Other		
125	75		50	

- Some articles will not contain this information. If it is not provided in the article, leave the variable cells blank

Practice Locale (Urban or Rural)

- Some of the articles will specify the practice locale of the total participants (N) as either rural or urban
- If so, indicate the number of physicians who work in an urban setting and those who work in a rural setting
- If no specification of practice locale is provided, leave the variable cell blank

Burnout Measure

- Specify the type of burnout measure used in the article you are extracting from
- Most of the articles will use the Maslach Burnout Inventory (MBI) as the measure of burnout

- Please specify the year of the burnout measure used in the study. This can be found at the back of the article in the reference section
- Please specify the number of items used in the measure

Burnout Measure		
Type	Year	# of Items

General Health Questionnaire (GHQ)

- Specify the number of items used in the GHQ
- Generally the GHQ is made up of 60, 30, 20, or 12 items
- Leave this cell blank if the GHQ measure is not used in the current article you are collecting data from

Satisfaction Measure

- State the name of the satisfaction measure used in the study
- Do not abbreviate the name
- Leave this cell blank if no satisfaction measure is being used in the current article you are collecting data from

Sheet 2

You have just finished extracting general information from the article you are working on. Now, using the same article, you will need to extract the following variables:

Age

- You will need to find the mean, standard deviation, and range for this variable
- Not all of this information will be found in each article. Provide as much information as you can
- If the sample in the article you are extracting data from shows two different ages for the participants, either by gender or physician type, provide both ages on two separate lines as seen below:

Age		
Mean	SD	Range
36.45		
37.63		

Maslach Burnout Inventory (MBI) Reliability

- As previously discussed, there are three editions of the MBI (1981, 1986, & 1996). The 1986 edition of the MBI is made up of three subscales. They are *emotional exhaustion*, *depersonalization*, and *personal accomplishment*. The 1996 edition of the MBI-GS is made up of three subscales. They are *exhaustion*, *cynicism*, and *professional efficacy*

- Although it would be ideal to indicate a reliability score for each subscale, some of the articles may not report reliability for all three. Fill in as much information as you can
- If an overall reliability is given for all of the dimensions, indicate it in the cell titled "overall"
- The majority of reliabilities reported will be Cronbach's alpha (α). This reliability measure ranges from 0 to 1.0

- If another type of reliability other than Cronbach's alpha (α) is used for the MBI, indicate the type of reliability used and the reliability score in the cell titled "MBI reliability"

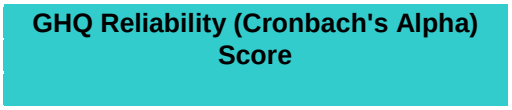
Other Burnout Measure Reliability

- If another burnout measure other than the MBI is used, indicate Cronbach's alpha (α) for the measure if the information is provided in the article

- If another type of reliability other than Cronbach's alpha (α) is used for the other burnout measure, indicate the type of reliability used and the reliability score in the cell titled "other burnout measure reliability"

General Health Questionnaire (GHQ) Reliability

- Indicate the overall reliability of Cronbach's alpha (α) in the cell provided



- If another type of reliability other than Cronbach's alpha (α) is used for the GHQ, indicate the type of reliability used and the reliability score in the cell titled "GHQ reliability"

GHQ Reliability	
Type	Score

Satisfaction Measure Reliability

- Indicate the overall reliability of Cronbach's alpha (α) in the cell provided

Satisfaction Reliability (Cronbach's Alpha)
Score

- If another type of reliability other than Cronbach's alpha (α) is used for the satisfaction measure, indicate the type of reliability used and the reliability score in the cell titled "Satisfaction Reliability"

Satisfaction Reliability	
Type	Score

You have just completed the general information coding sheet and the age and reliability coding sheet for the article you are working on. Next, you will extract data for the MBI variable. In particular, you will indicate the means and standard deviations for each dimension of the MBI for gender (sheet 3) and physician type (sheets 4-8). Below are detailed instructions for each sheet.

Sheet 3

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), input the scores for each dimension into the cell titled "mixed"

Mixed					
Mean			Standard Deviation		
EE	DP	PA	EE	DP	PA

- If no means or standard deviations are provided at all, leave the cells blank

Sheet 4

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender and physician type - general practitioner and/or family physician
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided if the scores are reported using the physician type - general practitioners and/or family physicians An example of only male general practitioners is below:

General Practitioner Male					
Mean			Standard Deviation		
EE	DP	PA	EE	DP	PA

- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – general practitioner and/or family physician, input the scores for each dimension into the cell titled "mixed" (as seen below):

General Practitioner Mixed					
Mean			Standard Deviation		
EE	DP	PA	EE	DP	PA

- If no means or standard deviations are provided at all, leave the cells blank

Sheet 5

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender and physician type - specialist
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided if the scores are reported using the physician type - specialists
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – specialist, input the scores for each dimension into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the variable cells blank

Sheet 6

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender and physician type - other
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided if the scores are reported using the physician type - other
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – other, input the scores for each dimension into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the variable cells blank

Sheet 7

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender and physician type - resident
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided if the scores are reported using the physician type - resident
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – resident, input the scores for each dimension into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the variable cells blank

Sheet 8

- Indicate the means and standard deviations for each dimension of the MBI (ee, dp, pa) for gender and physician type – medical student
- Record each mean and standard deviation for each dimension of the MBI separately for males and females in the cells provided if the scores are reported using the physician type – medical student
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – medical student, input the scores for each dimension into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the variable cells blank

You have just finished inputting the means and standard deviations for each dimension of the MBI for gender and physician type. You will now complete the same task if the article you are working on uses the General Health Questionnaire (GHQ) as a measure. The instructions are given below:

Sheet 9

This sheet consists of reporting means and standard deviations for GHQ scores for gender and physician type.

Gender

- Indicate the mean and standard deviation for the GHQ score for gender
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type – General Practitioner and/or Family Physician

- Indicate the mean and standard deviation for the GHQ score for gender and physician type – general practitioner and/or family physician
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided if the scores are reported using the physician type – general practitioner and/or family physician
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – general practitioner and/or family physician, input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Specialist

- Indicate the mean and standard deviation for the GHQ score for gender and physician type – specialist
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided if the scores are reported using the physician type – specialist
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – specialist, input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Other

- Indicate the mean and standard deviation for the GHQ score for gender and physician type – other
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided if the scores are reported using the physician type – other

- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – other, input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Resident

- Indicate the mean and standard deviation for the GHQ score for gender and physician type – resident
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided if the scores are reported using the physician type – resident
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – resident, input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type – Medical Student

- Indicate the mean and standard deviation for the GHQ score for gender and physician type – medical student
- Record each mean and standard deviation for the GHQ score separately for males and females in the cells provided if the scores are reported using the physician type – medical student
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – medical student, input the GHQ score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

You have just finished inputting the means and standard deviations for each GHQ score for gender and physician type. You will now complete the same task if the article you are working on uses a satisfaction measure. The instructions are given below:

Sheet 10 – Satisfaction Measure Scores

- This sheet consists of reporting means and standard deviations for the satisfaction measure for gender and physician type

Gender

- Indicate the mean and standard deviation for the satisfaction measure score for gender
- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided

- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type – General Practitioner and/or Family Physician

- Indicate the mean and standard deviation for the satisfaction score for gender and physician type – general practitioner and/or family physician
- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided if the scores are reported using the physician type – general practitioner and/or family physician
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – general practitioner and/or family physician, input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Specialist

- Indicate the mean and standard deviation for the satisfaction score for gender and physician type – specialist
- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided if the scores are reported using the physician type – specialist
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – specialist, input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Other

- Indicate the mean and standard deviation for the satisfaction score for gender and physician type – other
- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided if the scores are reported using the physician type – other
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – other, input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type - Resident

- Indicate the mean and standard deviation for the satisfaction score for gender and physician type – resident

- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided if the scores are reported using the physician type – resident
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – resident, input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

Physician Type – Medical Student

- Indicate the mean and standard deviation for the satisfaction score for gender and physician type – medical student
- Record each mean and standard deviation for the satisfaction measure score separately for males and females in the cells provided if the scores are reported using the physician type – medical student
- If the means and standard deviations that are provided in the article you are working on are not recorded separately by gender (separate scores for males and females), but are reported by physician type – medical student, input the satisfaction measure score into the cell titled "mixed"
- If no means or standard deviations are provided at all, leave the cells blank

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