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A Meta-Analysis of Video Based Interventions in Adult Mental Health

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Abstract

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MA, Northcentral University, 2010

BA, University of California, 1990

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

Symptoms of mental illness such as anxiety and depression diminish functioning, cause distress, and create an economic burden to individuals and society. This meta-analysis was designed to evaluate the effectiveness of video based interventions (VBIs) for the treatment of adults in mental health settings. VBIs comprise four different ways of using video in mental health therapy, including video modeling, video exposure, video feedback, and videos used for psychoeducation. Bandura's social learning theory, Beck's cognitive theory, and Dowrick's theory of feedforward learning form the theoretical framework for understanding how VBIs work. The research questions were: (a) what is the range of effect sizes for VBI in mental health treatment of adults? (b) what is the mean standardized effect size for VBI in this context? and (c) what categorical variables, such as type of mental health issue or specific VBI application, moderate the effect of VBI? A comprehensive literature search strategy and coding plan for between-group studies was developed; the overall effect size for the 60 included studies equaled 0.34. A meta-regression was conducted; although the results were not significant, it is possible that type of VBI may be a moderator. Subgroup analyses by mental health outcome found the largest effect size, 0.48, for caregiving attitude and the smallest effect size, 0.21, for depression. Although the results of this meta-analysis were mixed, this study provides preliminary support for VBI use with adults as an evidence-based treatment. VBIs can contribute to positive social change by improving mental health treatment for the benefit of individuals, families, and society.

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Dedication

This dissertation is lovingly dedicated in memory of my late father, Perry T. Davidson, who instilled in me a genuine desire to better understand myself and those around me. He introduced me to psychology via tattered paperbacks and his own personal journey. My dad was a voracious reader and committed to lifelong learning. He served as a role model for me in helping others and worked tirelessly throughout his career both leading and supporting organized labor. He worked for, and was honored by, numerous organizations committed to equality and social justice. He fostered in me a commitment to social change and inclusion for all. He overcame many personal challenges throughout his lifetime and demonstrated through his own efforts during his last decade on earth that personal growth is always possible and love for others can truly transcend the differences between us. He had a wicked sense of humor, took great joy in music and the theater, and loved his family. He learned over time how to soften his approach to others and express gratitude. It is almost 30 years since his passing, and I miss him every single day. I wish I could share this accomplishment with him and give him just one more hug at my hooding ceremony. Instead, I can honor my dad here and hope that these words might inspire others to appreciate those they love as much as they can for as long as they can.

Acknowledgments

I could not have completed this research project without the support, guidance, and encouragement of many to whom I extend my appreciation: first, to my husband Francisco, for supporting me in every possible way during my studies, for reminding me to keep my eyes on the prize, and for being an inspiration to become a scholar-practitioner of clinical psychology. To my sons who have put up with a mom studying and working in psychology for their entire lives. From Tony's first days in the university preschool to Ricardo's first attendance at a board presentation when he was two months old, my memories of this journey are inextricably linked with your growing up. I hope you all know how much your love and support has meant to me all this time.

To my clinical supervisors Dr. Kathleen Highly and Dr. Lisa Hayden for their encouragement and willingness to help me develop my skills, my research interests, and for guidance in establishing my professional identity. To all the colleagues in my cohort for your friendship and inspiration as we traveled this long road—together (nothing quite like four long stays in Minneapolis!) and separately—over the past 6 years.

To Dr. C. Tom Diebold and Dr. Rodney Ford for serving on my committee, and providing prompt and helpful feedback. Finally, my deepest appreciation to Dr. Steven G. Little for serving as my Chair and mentor. Your expertise, encouragement and positive attitude really helped me get through the times when my love for this research project periodically waned. Thank you for sticking with me the past couple of years and helping to make my personal goal of finishing my PhD a reality.

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Chapter 1: Introduction to the Study

Video based interventions (VBIs) have become increasingly used in a variety of mental health treatments in recent years. VBI, as a class of interventions, is comprised of several different but related uses of video during a therapeutic encounter. *Video modeling* (VM) consists of a video of a model performing a desired behavior that the client is then asked to imitate. In *video self-modeling* (VSM), the therapist uses a carefully edited video of clients performing a behavior proficiently. Seeing themselves being successful provides not only instruction in the quality of the behavior but is also thought to effect change due to increasing motivation and a sense self-efficacy. *Video exposure* (VE) techniques use video of a feared stimulus as part of a desensitization protocol for people with phobias. *Video feedback* (VF) is used in applications where the therapist's goal is to highlight areas of competence as well as provide specific information about behaviors that require further development. Finally, *psychoeducational videos* (PV) have been used in preparing clients for the therapy process and for developing coping skills, for example, to deal with severe or chronic physical ailments.

Examples of VBI include treatment of anxiety and depression in youth (Farrer et al., 2013), improving parent-child interactions by using VF (Steele et al., 2014), improving sleep in patients with breast cancer (Savard, Ivers, Savard, & Morin, 2014), and increasing coping skills for family members dealing with Alzheimer's disease (Williams et al., 2010).

Due to the increasing availability of digital video producing equipment and the possibilities for disseminating videos via web-based applications, VBI holds promise as

an evidence-based practice with wide applications in mental health. However, the true degree of effectiveness of VBI for adults with various mental health concerns has not been established. Meta-analysis is a method of quantifying the practical significance of a particular treatment through the comparison of magnitudes of effects across multiple studies (Ellis, 2010). The results of this study have positive social change implications in that mental health treatment may be improved by what we learn about the effectiveness of VBI, and improving the mental health of individuals improves society overall.

In the remainder of this chapter, I will provide the context for the study through a brief description of the background for using video as a teaching aide and a therapeutic intervention, the problem statement and purpose of the study, the research questions and hypotheses, and the theoretical foundation for understanding the VBIs being evaluated. I will also describe the rationale for choosing a meta-analytical research design as well as relevant VBI definitions, the assumptions, scope and delimitations, and limitations of the study. Finally, I will summarize the findings and discuss the significance of the research.

Background

Learning through use of video has been incorporated into everyday life since the advent of television and subsequent availability of videotape, digital recordings, and playback systems. Public television in the United States has made educational programming widespread for many decades. Public schools incorporated video lessons in classrooms as part of instruction early on, whether through use of filmstrips, movie reels, or video recordings. Currently, online education makes use of video to teach a variety of academic topics, vocational skills, and personal improvement programs. Because video is

now easily accessible and accepted in many areas of life, it may seem obvious that people can learn new ways of behaving using video. If mental health treatment is understood in the context of helping people learn more adaptive ways of behaving (with behavior including the mentalistic behaviors of thinking and feeling), using VBI as a therapeutic tool may enhance other therapeutic techniques.

Problem Statement

Although the utility of VBI as an adjunct to traditional therapeutic methods has been studied for decades, the impact of VBI as an evidence-based practice for mental health providers using currently available technology is poorly understood. I focused on the use of VBI as an intervention for a variety of mental health issues incorporating a systematic review of the literature and meta-analysis of published studies.

Purpose of the Study

The purpose of this quantitative study, a meta-analysis, was to determine the range of effectiveness of VBI used with adults in mental health settings as demonstrated in published research using group designs. Because a meta-analytic approach was used, an additional purpose of the study was to identify possible moderators of the effect of VBI, such as type of psychological variable being measured (e.g., anxiety compared with depression) or the specific type of VBI (VM, VE, VF, or PV) being employed.

Research Questions and Hypotheses

I designed this study to answer the following research questions:

1. What is the range of effect sizes, including 95% confidence intervals, for video based interventions (VBIs) in mental health treatment found in group studies with adult participants?
2. What is the overall mean effect size for VBI, including 95% confidence interval, in mental health treatment found in group studies with adult participants?
3. Do effect sizes from individual studies differ from the overall mean effect size based upon particular moderator variables, such as type of mental health symptom being addressed (e.g., anxiety or depression), or type of VBI employed (e.g., video feedback vs. video self-modeling)?

Based upon these research questions, the following hypotheses about VBI used in mental health treatment of adults are:

H_{o1}: The range of effect sizes for VBI in mental health treatment found in group studies with adult participants will be below .20.

H_{a1}: The range of effect sizes for VBI in mental health treatment found in group studies with adult participants will be .20 at a minimum and .80 at a maximum.

H_{o2}: The overall mean effect size for VBI in mental health treatment found in group studies with adult participants will be below .20.

H_{a2}: The overall mean effect size for VBI in mental health treatment found in group studies with adult participants will be greater than .20.

H_{o3}: The effect sizes from individual studies do not vary predictably from the overall mean effect size based upon moderator variables, such as type of mental health symptom being addressed or type of VBI employed.

H_{a3}: The effect sizes from individual studies do vary predictably from the overall mean effect size based upon moderator variables, such as type of mental health symptom being addressed or type of VBI employed.

Theoretical Foundation for the Study

Three main theories provide a foundation for understanding how VBI can improve mental health outcomes. These theories formed the basis for the literature review and development of the research questions and hypotheses. First, Bandura's social learning theory can be used to explain how behavior change can be based in cognitive processes that are not explained solely in terms of direct experience, associated experience, or rewarding consequences. In fact, direct contact with a stimulus is not necessarily required. Bandura (1971) proposed that a different explanation; people could develop new behaviors through a process of *vicarious learning*—watching a model behave in a certain way, identifying with the model, and deciding that performing as the model performed would be efficacious. The core components of social learning theory are that learning occurs not only through direct problem solving, which requires a high degree of effort with the opportunity for failure, but also through observational learning and imitation of a successful model. Social learning requires several steps, including attending to the model, retaining the observation in memory, reproducing the behavior later under suitable conditions, and having the motivation to reproduce the behavior

(Bandura, 1971). VM and VSM interventions incorporate all of these steps into the training process. By making videos of the self, making them brief and salient to the learning context, and editing them to show the person performing at mastery level, it is expected that people will attend, remember, and be motivated to perform similarly in the future.

Cognitive behavioral theory (CBT; Beck, 1963) constitutes both a framework for conceptualizing mental health problems and a plan for remediating symptoms. This is accomplished in therapy through active work by the patient, directed by the therapist, to challenge and change maladaptive core beliefs which contribute to psychological distress. The basic tenets of CBT assessments and interventions are that it is not so much the individual's experiences that are distressing but rather how the person thinks about the situation in relation to personal beliefs and expectations that activates a negative emotional response. These larger learning structures called *schemas* are developed through a complex learning process and an interaction with biobehavioral responses over time.

VBIs have been incorporated into CBT interventions for depression and social anxiety disorder as a way of providing objective evidence that contradicts maladaptive core beliefs. For example, VF of an anxious subject performing well giving a speech (Chen et al., 2010) has been used to help the patient contradict deeply held core beliefs about the inevitability of failing in a social situation and reduce subsequent anxiety. VBI would be a logical intervention to incorporate into the development of new ways to attend to, and process, distressing events.

Feedforward learning, or learning by anticipating the future (Dowrick, 2012), is a slightly different perspective on how VSM may work. Under this theoretical model, the concept of the work of mirror neurons as foundational in observational learning supports an explanation for how viewing oneself performing an action may be more powerful than viewing another person as a model. In addition, having the ability to mentally rehearse future events by remembering past success (as viewed in the constructed videos) allows for practice of correct responses even when not in the appropriate context to use them. Such visualization of future positive outcomes can be conceived of as part of *mental time travel*. Using memories of videos in this way is something that does not rely upon specific intervention strategies by teachers or others in the environment. This may also explain why VSM is known for rapid effects (trainings of a few minutes in duration repeated a few times), as opposed to hours of behavioral therapy over many weeks. A deeper discussion of these theoretical issues is presented in Chapter 2.

Nature of the Study

This doctoral study is a meta-analysis of published research into VBIs in mental health dating from its inception in the 1960s to 2016. Literature search strategies used in gathering published reports of quantitative research into VBI in mental health consisted of searching electronic databases, including PsycINFO, Medline, and ProQuest, for peer-reviewed articles and dissertations containing relevant keywords such as *video* and *therapy*, *video* and *mental health*, *video based interventions*, *video modeling*, *video feedback*, and *video self-modeling*. Although only primary, quantitative studies were included in the final meta-analysis; pertinent literature reviews and qualitative studies

were also examined for forward (cited by) and backward (reference list) searching in an effort to identify the maximum number of studies possible. Articles found through these search strategies were identified for inclusion into the meta-analysis based upon participant type being adult and dependent variable being some mental health component (such as depression, anxiety, or specific disorder severity). Selected studies also were required to report data needed for computation of effect size included in the publication. I excluded studies involving children, a diagnosis of autism, or video used in training therapists without a component involving client change.

Included studies were coded based upon a protocol including number of participants, type of VBI used, setting, degree of treatment fidelity reported, dependent variable, and how change was measured (self-report, therapist rating, or standardized instrument). Effect size estimates were computed for each study included in the final meta-analysis, and an overall effect size for VBI in mental health was also computed. I also conducted comparisons of effect sizes based upon meaningful moderators, such as type of VBI, type of dependent variable, mental health diagnosis, and degree of treatment fidelity reported by the researchers. The overall effect size was calculated at 0.34, and the results of a meta-regression for type of VBI as moderating effect size were not significant. Additional subgroup analyses suggest that there is strongest evidence for use of VBI to target caregiving attitude, and that the smallest effect for VBI related to the outcome variable depression. Details of all results are presented in Chapter 4 and discussed more fully in Chapter 5.

Definition of Terms

Effect size: The magnitude of change as a result of an intervention. For the purposes of this study, effect sizes were computed using Hedges's *g*, which is a calculation based upon the mean standardized difference of results in between-group studies, and can be computed based upon studies of different sample sizes (Ellis, 2010).

Mental health treatment: Therapeutic work conducted by a trained clinician, designed to ameliorate psychological distress such as subjective feelings of depression or anxiety and/or improve psychological functioning (affect, functional behaviors, attachment, reality testing).

Meta-analysis: A quantitative method for synthesizing research results which incorporates the computation of individual effect sizes for each study as well as an overall mean effect size for related studies, chosen for analysis on the basis of some common intended effect (Card, 2012).

Video based interventions (VBI): Treatment designed to ameliorate symptoms or improve functioning in individuals which incorporates some form of video (videotape or digital video recording) for the individual to view.

Video exposure (VE): A video image of a feared object or creature is presented to a phobic person as part of a structured desensitization treatment.

Video feedback: (VF): A video of a client is shown to the client by the therapist as a way of highlighting behaviors of interest. The therapist may select particularly good examples to build on existing skills and praise the client, or may also select negative behaviors to identify potential areas of growth.

Video feed-forward (VFF): Using video therapeutically to help the client envision a future situation where symptoms are reduced, and functioning is improved (Dowrick, 2012). VFF techniques are based upon the idea that mental rehearsal of new skills based upon the self as model are more effective that modeling other people's behavior, specifically due to neurological bias toward noticing the self.

Video modeling (VM): During an intervention session, a video of a model performing a desired behavior is shown and then the client is asked to imitate the behavior shown either during the treatment session or in an out-of-treatment scenario.

Video self-modeling (VSM): Similar to video modeling, except in this case the clients view video of themselves successfully performing a particular behavior or set of behaviors.

Assumptions

One assumption underlying this study was that the VBIs being described were actually implemented and that the measures used in the various individual research studies were valid and reliable. One of the necessary assumptions of a meta-analysis is that effect sizes can be considered legitimate based upon reported outcome measures (means, standard deviations, and sample sizes for each treatment group). However, there are always potential flaws in applied clinical psychology research related to the use of self-report measures and possible lack of treatment fidelity. These difficulties are examined as part of the qualitative rating of each study in the meta-analysis, so any conclusions drawn will must be considered with possible weaknesses of the original research in mind.

Another assumption was that as many valid studies of the topic as possible could be located and that those that are not located due to publication bias for statistically significant results, publication in a language other than English, or some other variable result in data that would lead to overestimating or underestimating effect sizes in the sample of studies.

Scope and Delimitations

The scope of this study included examining published VBI research with adult participants that is quantitative and includes data that can be used to compute effect sizes using mental health-related dependent variables such as anxiety or depression. I excluded single-subject design studies, review articles, studies relating to therapist training, duplicate studies or dissertation studies also published in another format, and qualitative studies. Further, although VBI is used with excellent results in treating children and adolescents with autism, such research was not included in this meta-analysis, as the learning mechanisms for those subjects and the skills being taught are likely qualitatively different from the strategies used by adults to improve mental health symptoms.

Limitations

There are two important limitations to consider in this study. First, as a meta-analysis, the data collection depends upon the rigor of the literature search and coding strategies. As I was the only researcher involved in the study, there is a possibility that the sampling method was not as inclusive as another might be. The generalization of the findings is limited to adults receiving treatment for mental health symptoms, and thus no

conclusions can be drawn about the utility of VBI in other populations (such as children or adults receiving VBI targeting issues other than mental health).

Significance

The results of this meta-analysis will advance the understanding of the clinical effectiveness of VBI as a treatment for a variety of mental health needs, including anxiety, depression, and adjustment disorders. Further, this study promotes the pragmatic use of VBI by contrasting effect sizes in studies with different implementation characteristics. For example, if the effectiveness of VF (one form of VBI) plus CBT is shown to be only marginally more effective than CBT alone, the efforts required to prepare an individualized VBI may not be justified (Rodebaugh, Heimberg, Schultz, & Blackmore, 2010). Another potentially useful contrast in effect sizes will be between VBI using the self as model versus VBI using another person as a model. Specific study characteristics and their relationships to effect sizes, such as type of disorder and length of treatment, could also yield valuable information about the appropriate implementation of VBI as well as suggestions for future research.

The results of this study can contribute to positive social change by providing meaningful data to support the development of improved mental health treatment in the future. This may be accomplished by identifying more clearly how VBI can be used with greatest effect and how current research protocols may be improved to reduce treatment time and improve outcomes for clients being treated with VBI.

Summary

VBIs have been used in mental health settings with adults for many decades, and several large-scale studies have been conducted in addition to case studies. Since the advent of video use in therapy in the 1960s, the possibilities for its application to a variety of mental health concerns have been apparent. VBIs have been used with individuals and with groups to treat specific disorders (Aderka, 2009). VBIs have been used as instructional materials prior to therapy to help patients prepare and to strengthen the therapeutic alliance (Johansen, Lumley, & Cano, 2011). This meta-analysis of VBI in mental health includes quantitative studies with adult participants where video-based didactic instruction, VM by self or other, and/or VF are used as part of treatment of disorders and symptom reduction, or developing coping skills. In Chapter 2, I discuss the body of literature representing the use of in the context of the historical development of VBI, the theoretical underpinnings of the use of VBI in mental health treatment, and descriptions of the specific applications of VM, VE, VF and PV as intervention tools in mental health treatment settings.

Chapter 2: Literature Review

Introduction

Video based interventions (VBI) are those uses of video as part of a program for behavior change. Although the utility of VBI as an adjunct to traditional therapeutic methods has been studied for decades, the impact of VBI as an evidence-based practice for mental health providers using currently available technology is poorly understood. I focused on VBI as an intervention for mental health issues of adults. The purpose of this meta-analytic quantitative study was to determine the range of effectiveness of VBI used with adults in mental health settings as demonstrated in prior published research using group designs. An additional purpose of the study was to identify possible moderators of the effect of VBI such as type of psychological variable being measured (e.g., anxiety compared with depression) or the specific type of VBI (VM, VE, VF, or PV) being employed. The types of VBI covered in this meta-analysis include the use of individualized videos created for a specific client as well as instructional videos made for a particular audience—for example, older adult crime victims (Acierno, Rheingold, Resnick, & Stark-Reimer, 2004)—but the information and images contained in the video are generic enough to be useful for many different individuals and at different times. There are three main types of VBI that can be created for a particular client (individual, couple, or family) and used in mental health therapy: VF, VM, and VSM.

In VF, the actions of the mental health client (and sometimes those of other individuals and/or the therapist) are recorded during a therapy session. The purpose is to use it later as part of a therapist-guided review with the client to increase awareness of

helpful or unhelpful behaviors or to challenge cognitive distortion by the depiction of evidence contrary to the person's negative self-evaluation. For example, VF may be used with people who have social anxiety who (incorrectly) believe that they have done very poorly delivering a speech when in fact they did well presenting ideas to others (Aderka, 2009; Laposa & Rector, 2014). VF can also be used with parents of infants to teach specific attachment behaviors to help both parent and child mental health outcomes (Lawrence, Davies, & Ramchandani, 2012; Reddy et al., 2014).

VM involves the preparation of a video showing another person doing an activity so that the client can learn through observation how to do the same activity. VM in mental health may include watching the video of another person coping with a feared situation, and it can be used as a part of a systematic desensitization intervention for specific phobias such as fear of snakes (Woody & Schauble, 1969), fear of dental treatment (Conyers et al., 2004), or fear of other medical techniques such as hyperbaric chamber therapy (Allen, Danforth, & Drabman, 1989). Learners themselves may also be used as models in a type of modeling technique called VSM. VSM involves the production of a video that is carefully edited to show the person performing a new behavior successfully, even though the person has not yet learned the behavior (Dowrick, 2012).

VBIs in mental health comprise an array of specific strategies for using didactic instructional techniques, modeling, and/or feedback to promote motivation for change, reduce symptom severity, and enhance coping skills. The utility of VBI has been demonstrated in diverse clinical applications over the past 20 years, including treatment

of survivors of childhood sexual abuse (Arauzo, Watson, & Hulgus, 1994), postpartum depression (Berkule et al., 2014), and adolescent sex offenders (Calleja, 2013). The utility of VBI in mental health applications is based upon the premise that psychotherapy can be enhanced by engaging clients visually, providing an active model to imitate, and by enhancing their awareness of behaviors that should be increased (e.g., assertive communication; Galassi, Galassi, & Litz, 1974) or decreased (e.g., critical self-comments; Kim, Lundh, & Harvey, 2002) to reduce distress and improve overall functioning.

There is a well-established and growing literature supporting the use of VBI in treatment of autism spectrum disorder in home, school, and community settings (Bellini & Akullian, 2007; Bellini & McConnell, 2010). Children and youth with autism are the major population associated with VBI such as VSM (also called *video feed-forward* techniques) to improve social functioning and independent living skills (Dowrick, 2012). However, despite evidence for applying VBI to other populations and using different strategies for incorporating video into applied behavioral therapies, there is a much smaller research base supporting VBI with adults in mental health treatment. Despite the early promise of using VBI in psychotherapy when video recording equipment became more available (Alger, 1969; Alger & Hogan, 1969; Cornelison & Tausig, 1964), mental health therapists make little use of VBI, particularly in private practice (Costello, 2002). A better understanding of the utility of VBI in mental health through this meta-analysis may yield important information about areas in need of further study or refinements of VBI as evidence-based practice. Recent developments in technology make the use of VBI

easier and less expensive than before, so if VBIs are found to be effective adjuncts to mental health treatment, more therapists could put them into use.

Literature Search Strategies

I searched electronic databases including PsycINFO, ProQuest, and Academic Search Complete using keywords and title words including *video based intervention*, *video modeling*, *video self-modeling*, *video feedback*, *video self confrontation*, *videotape and psychotherapy*, and *mental health and video*. Articles found during these searches were then used for forward and backward searches of other articles that cited them or were cited by them. Whenever possible, I also accessed links to related articles in common journals. I also searched dissertation abstracts using the same key terms, and general Internet searches for the same terms were also conducted, which yielded mainly book chapters or other sources which were not peer-reviewed.

Overview of the Literature Review

I conducted the review of literature on VBI in the context of understanding VBI within the history of psychotherapeutic interventions, and it includes references to several works that were not included in the final meta-analysis. In this section, I discuss the theoretical underpinnings of the use of video in therapy. Next, I present the major ways that VBIs are used in mental health treatment. Then I briefly outline specific disorders that have a research base established for VBI with examples of research in each area. Finally, I discuss VBIs that are outside the scope of this meta-analysis and the explain my rationale for their exclusion.

History of Video Use in Behavior Change

Videotape was recognized as a viable adjunct to therapy as early as the 1960s when its potential use for presenting models and helping modify behavior through stimulus control (rather than consequences) was identified (Ballard & Glynn, 1986). Early applications of videotape in therapy included treatment of persons with psychosis, using video as part of desensitization of phobias, and in family therapy (Sanborn, Pyke, & Sanborn, 1975). VF was also used in group therapy (Robinson & Jacobs, 1970) and marital therapy (Alger & Hogan, 1969) to help clients process emotional content and motivate change.

However, there is some question about the utility of VF in promoting positive behavioral change. One early study of the effects of VF as a self-confrontation method for people with alcoholism resulted in mixed findings (Schaefer, Sobell, & Mills, 1971). Schaefer et al. (1971) compared male inpatients with chronic alcoholism who received brief (5 minutes), long (30 minutes), or no VF of their behavior during controlled drinking sessions in a realistic bar setting inside Patton State Hospital in California. It was found that for some patients, the VF helped promote behavior change by highlighting the negative effects of alcohol intoxication. However, for many participants in the study viewing the videos was such a shame-inducing experience that they dropped out of treatment or increased their defensiveness, leading to poor outcomes.

Video also has appeal as a tool for psychoeducation in that videos can be constructed for a narrowly identified population or problem and provide information to many people in a controlled manner with greater impact than printed materials alone. One

study demonstrating this application was conducted with older adults who were victims of violence (Acierno et al., 2004). Victims were presented with a PV about crime-related symptoms, coping strategies, and the availability of advocate services. There was an immediate effect shown of gain in knowledge about coping strategies and future safety planning; however, despite learning this information, 6 weeks later the victims did not demonstrate a reduction in anxiety or depression (Acierno et al., 2004).

Video Based Interventions for Adults with Mental Health Needs

The literature on VBI for mental health treatment includes case study of treatment of bulimia (Simpson et al., 2006), and many studies using VBI to treat social anxiety (Chen et al., 2010; Clark et al., 2006; Harvey, Clark, Ehlers, & Rapee, 2000; Laposa & Rector, 2014; Orr & Moscovitch, 2010). VBI has also been used with patients with panic disorder (Parry & Killick, 1998) and those with borderline personality disorder (Waltz et al., 2009). Video has been used to aid in recall during psychotherapy (Kagan, Krathwohl, & Miller, 1963) and shows promise for improving coping skills for people with complex mental health needs (Clifford, 2011). There is also a generous research base for incorporating VBI into parenting training and efforts to increase attachment in caregivers of infants and young children (Berkule et al., 2014; Downing, Bürgen, Reck, & Zigenhain, 2008; Fukkink, 2008).

Other Applications of Video Based Interventions

VBIs have also been used (outside the scope of mental health treatment) in sports psychology (Loizou & Karageorghis, 2015), preparation of patients for medical procedures (Allen, Danforth, & Drabman, 1989), and helping those who stutter develop

greater speech fluency (Harasym, Langevin, & Kully, 2015). VF is also a common component of training for mental health practitioners (Beck et al., 2014). These types of studies are not included in this meta-analysis.

The Importance of Video Based Interventions in Mental Health

VBIs have become increasingly used in a broad range of mental health treatment applications in recent years. Due to the increasing availability of digital video producing equipment, and the greater possibilities for disseminating videos via web-based applications, VBI holds promise as an evidence-based practice. Examples of VBI include treatment of anxiety and depression in youth (Farrer et al., 2013), improving parent-child interactions by using VF (Steele et al., 2014), improving sleep in patients with breast cancer (Savard, Ivers, Savard, & Morin, et al., 2014), and increasing coping skills for family members dealing with Alzheimer's disease (Williams et al., 2010). However, the impact of VBI as an evidence-based practice for mental health providers using current technology is not well understood, which is why I conducted a meta-analysis of published studies, focusing on the current use of VBI as intervention for a variety of mental health issues.

Reduced Cost, Ease of Use, and Increased Access

Although VBI has been used in mental health treatment over the past 50 years, they are used in a small percentage of cases. In recent years, however, digital recording devices, storage, and playback have become much less expensive and easier to obtain and to use. Thus, therapists could easily adopt video creation and playback. If VBI emerges as a treatment of choice for specific conditions, and is demonstrated to be significantly

more effective than talk therapy or medication alone, those who need services and those who pay for them would benefit.

The ease with which videos can be recorded during structured therapy sessions or during home observations can aid therapists in adapting other evidence-based practices to the individual needs of clients. Clients can use videos on their own in between regular therapy sessions (e.g., in relaxation training) and make greater gains in learning coping strategies and reducing stress-induced symptoms.

Theoretical Bases for Video Based Interventions

Learning through video has been incorporated into our everyday lives since the advent of television and subsequent availability of videotape, digital recordings, and playback systems. Public television in the United States has created widespread educational programming for decades. Public schools have incorporated video lessons as part of instruction during the early years of video technology through use of filmstrips, movie reels, or reel to reel or cassette tape video recordings. Most recently, many public school students use personal video devices provided by schools as instructional aids. Computers are also used in the classroom for video access and online courses use video to teach a variety of academic topics, vocational skills, and personal improvement programs. Because video is used in so many different applications, it may seem that the belief that people can learn new ways of behaving through video is universally accepted. If mental health treatment is understood in the context of helping people learn more adaptive ways of behaving (including the mentalistic behaviors of thinking and feeling), it makes sense that teaching through use of video models or didactic processes should be

effective. However, the theoretical bases for assumptions about the utility of video in mental health applications merits discussion.

Bandura's Theory of Social Learning

Behavioral models for learning include classical (Pavlovian) conditioning and operant (Skinnerian) conditioning. Classical conditioning theory stresses the importance of actual direct experience with a stimulus and importance of association, or passive learning, based upon environmental influences. In operant conditioning, learning is understood as taking place not only in the context of antecedent associations but also in consequent contingencies such as reinforcement, which increases the probability of a response, or punishment, which decreases the probability of a response.

Bandura (1971) offered a new way of looking at learning by noting that behavior can change on cognitive processes that were not explained solely in terms of direct experience, associated experience, or rewarding consequences; in fact, direct contact with a stimulus is not necessarily required. Bandura proposed a different explanation; people could develop new behaviors through a process of *vicarious learning*—watching a model behave in a certain way, identifying with the model, and deciding that performing as the model performed would be efficacious (1971). The core components of social learning theory are that learning occurs not only through direct problem solving, which requires a high degree of effort with the opportunity for failure, but also through observational learning and imitation of a successful model.

Social learning requires several steps, including attending to the model, retaining the observation in memory, reproducing the behavior later under suitable conditions, and

having the motivation to reproduce the behavior (Bandura, 1971). VM and VSM interventions incorporate all of these steps into the training process. By making videos of the self, making them brief and salient to the learning context, and editing them to show the person performing at mastery level, it is expected that people will attend, remember, and be motivated to perform similarly in the future.

Decades of research into the aspects of social learning have contributed to understanding the processes involved in learning through modeling and vicarious reinforcement as described by Bandura (1971). The applications of Bandura's social learning theory have been researched for decades, and a thorough review of that research base is beyond the scope of this study. However, I located a comprehensive review article that details the components of Bandura's theory as it has evolved (Bandura, 2001)—in particular, the concept of self-efficacy in setting and accomplishing goals. Bandura notes that the evolution of his theory includes an understanding of not only the metacognitive skills of self-appraisal and expectancies involved in learning new tasks, but also the processes of self-reactiveness and self-reflectiveness. Self-reactiveness includes self-evaluation, which VBIs target in self-confrontation and feedback applications. Self-reflectiveness can also be enhanced through using VBI, as the person may gain appreciation of skills already developed and this in turn increases self-efficacy.

Cognitive Behavioral Theory and the Generic Cognitive Model

CBT, developed by Beck originally for the treatment of depression (Beck, 1963, 1964), constitutes both a framework for conceptualizing mental health problems and a plan for remediating symptoms. This is accomplished in therapy through active work by

the patient, directed by the therapist, to challenge and change maladaptive core beliefs which contribute to psychological distress. The basic tenets of CBT assessments and interventions are that it is not so much the individual's experiences that are distressing but rather how the person thinks about the situation in relation to personal beliefs and expectations that activates a negative emotional response. These larger learning structures called schemas are developed through a complex learning process and an interaction with biobehavioral responses over time. They become a way of interpreting experiences that may filter out positives and lead to catastrophic thinking. Often, people respond emotionally to a problem because of automatic thoughts outside of conscious awareness, which are distillations of the greater cognitive schemas each individual carries (Beck, 1991).

Schemas incorporate cognitive, affective, and behavioral responses in relation to core constructs and beliefs about the self. The emotional content of schemas result from certain types of unhelpful thinking patterns, or cognitive distortions. For example, a depressed person may have a negative filter and not be able to experience pleasure, focusing only on the painful aspects of daily life, and have the underlying core belief, *I am worthless*. With guidance from the therapist, the patient can examine the evidence about the unhelpful core belief, and work to change the belief and the subsequent depressive reaction. VBI has been incorporated into CBT interventions for depression and social anxiety disorder, as a way of providing objective evidence that contradicts maladaptive core beliefs. For example, video feedback of an anxious subject performing well giving a speech (Chen et al., 2010) has been used to help the patient contradict

deeply held core beliefs about the inevitability of failing in a social situation, and reduce subsequent anxiety.

More recently, Beck and others have revised the tenets of cognitive theory to include a more general model of behavior that addresses a wider range of psychological problems and explains better the interplay between external events, internal information processing, and emotional responding (Beck & Haigh, 2014). Under this view, called the *generic cognitive model* (GCM), psychological responses are experienced on a continuum of normal adaptive functioning to maladaptive functioning. The difference between a disorder and nondisordered behavior is the exaggeration of biases in information processing (Beck & Haigh, 2014). For example, it would be natural for anyone to experience some sadness after a rejection, but an adaptive response would be a balanced one where the person believes that although it feels bad being rejected, this happens to other people, and in the future he may find someone who is very accepting of him. In contrast, a person with depression may believe that he is worthless, that things will never get better, and these thoughts will lead to social withdrawal.

Similarly, under the GCM, disorders such as psychosis, generalized anxiety disorder, posttraumatic stress disorder, etc. can all be explained as exaggerations of responses that at a lower level are not psychopathological. The exaggerated reactions are based upon biases in attention and memory, and interventions to counteract these biases include providing guided feedback and teaching strategies to change how one attends to stressors (Beck & Haigh, 2014). VBI would be a logical intervention to incorporate into the development of new ways to attend to, and process, distressing events.

Neurocognitive Theory and Feedforward Learning

Feedforward learning, or learning by anticipating the future (Dowrick, 2012), is a slightly different perspective on how video self modeling may work. Under this theoretical model, the concept of the work of mirror neurons as foundational in observational learning supports an explanation for how viewing oneself performing an action may be more powerful than viewing another person as a model. In addition, having the ability to mentally rehearse future events by remembering past success (as viewed in the constructed videos) allows for practice of correct responses even when not in the appropriate context to use them. Such visualization of future positive outcomes can be conceived of as part of mental time travel, and using memories of videos in this way is something that does not rely upon particular strategies by teachers or others in the environment. This may also explain why video self-modeling is known for such rapid effects (trainings of a few minutes in duration repeated a few times), as opposed to hours of behavioral therapy over many weeks.

Additional support for the neuropsychology of learning through VSM and VF was summarized in a literature review researched by Devue & Brédart (2011). Neuroimaging studies, including those with split-brain patients, have demonstrated that looking at one's own face is more stimulating than looking at the face of another, but that processing of visual self-recognition occurs at more areas throughout both hemispheres of the brain (2011). Although firm conclusions about the relationship between self-recognition and self-awareness have not been posited, and more research is needed in this area, the

current findings are consistent with the premise behind using video for feedback and self-modeling applications.

The Processes of Video Based Interventions

VBI for mental health treatment can be understood as an umbrella term encompassing a variety of video techniques but incorporated into a therapeutic approach, aimed at ameliorating psychological distress. VBI can be administered to an individual or to a group, and can range from generic psychoeducational presentations (Acierno et al., 2012) to feedback to a client after a therapy session or the development of highly individualized self-modeling videos. The different types of processes involved in VBI are introduced with some examples.

Didactic Presentations

Patient education materials often consist of handouts providing information about specific disorders, tips on how to cope with symptoms and how to engage with the therapist, how therapy commonly proceeds, etc. Incorporating generic PV into treatment (Savard et al., 2014) or using videos to help therapy patients understand how therapy works in general (Shuman & Shapiro, 2002) are two examples of how non-individualized, yet targeted and salient VBI can be used in mental health treatment.

Modeling Others

Observational learning, as described by Bandura (1971), can be used with a video model as well as a live model. In mental health applications, desensitization therapy for phobia is one area where video modeling has been successfully employed as early as the 1960s (Woody & Schauble, 1969). Additional applications of video modeling of others in

mental health include showing videos of models relating positive therapy experiences in order to instill hope (Buckley & Malouff, 2005), and observing others using assertiveness skills in group training (Galassi et al., 1974).

Video Self-Modeling

VSM is a promising technique that has shown great efficacy particularly in use with children who have autism spectrum disorder (Bellini & Akullian, 2007; Bellini & McConnell, 2010; Dowrick, 2012). VSM uses special editing techniques to show the recipient successfully completing a task or demonstrating a skill that, in fact, has not yet been mastered. Although VSM has been shown to be highly effective in this population (children with autism), it does not appear to be used significantly in mental health applications with adults. As part of this meta-analysis, particular care was used to search for examples of VSM with adults, but I could not find any group studies using VSM. Quantitative evaluation of VSM with adults appears to be another gap in the professional literature.

Video Feedback

Watching oneself on video may provide a more objective picture of behavior compared to internalized self-critical thoughts which are common in anxiety and depression (Chen, Mak, & Fujita, 2015). Negative self-evaluative bias can be counteracted through guided use of video and comparison of one's own behavior in the past compared to the automatic self-evaluative processes that occur in the moment of interactions with other people (Claiborn, Goodyear, & Horner, 2001; Harvey et al.,

2000). In addition, VF can help people understand how their social interactions with others are perceived and how to improve them (Hartlage & Johnsen, 1973).

Therapist-guided feedback. VF has been used as an adjunct to exposure therapy with therapist feedback in numerous studies of social anxiety, with some demonstrating an appreciable effect (Kim et al., 2002; Orr & Moscovitch, 2010). However, other research has shown less promising results when VF was compared with placebo. VF was used in two different ways in one study, with the focus either on the speaker's own reactions or on the audience's reactions, and each of these groups was compared to exposure only or a placebo condition (Smits, Powers, Buxkamper, & Telch, 2006). Although within-groups changes were comparable in reducing speech fear for participants, there were no differences found between groups based upon type of treatment. Thus, VF has questionable effect compared to any kind of didactic or exposure-based treatment.

Video self-confrontation. Early applications of VF in mental health were touted as promising, but one review noted a lack of empirical support (Bailey & Sowder, 1970). The concept of self-confrontation was put forth as a therapeutic intervention to reduce the use of defensiveness in therapy more quickly and help the patient become more readily motivated for change. In one study using self-confrontation with inpatients with alcoholism, it was found that for a large portion the self-confrontation technique was too strong and shame-inducing. Self-confrontation had the additional negative effect of contributing to premature termination of therapy (Schaefer et al., 1971). For a more contemporary overview of self-confrontation theory and methods, including VBI, Young

et al. (2011) is a resource.

Mental Health Applications for Video Based Interventions

Another framework for understanding the effects of VBI in mental health treatment are the specific disorders and symptoms that VBI are used to address. Because the cognitive distortions associated with different disorders affect the processing of VBI, it may be that VBI also has different effects upon outcome by diagnosis. For example, people who are depressed may have a very negative filter and interpret images negatively, even if shown videos of themselves being successful (Acierno et al., 2012). In contrast, someone with a phobia about dental procedures may respond easily to desensitization therapy using a video model (Conyers et al., 2004).

Anxiety Disorders

Social anxiety disorder (SAD) has a rich literature involving the use of VF in combination with a variety of other techniques. One study suggests that cognitive preparation for speech giving, given in advance of VF, enhances the effect of VF (Kim et al., 2002). Participants who received cognitive preparation prior to speaking, which consisted of prediction of performance, visualization exercises (imagining an "internal video" prior to actually receiving VF), and instructions to pay particular attention to how they looked on the video as opposed to how they felt during the video recording procedure. Greater reductions in anxiety over speech performance were cognitive preparation plus VF group than the VF group alone, and this difference was even greater after a second trial.

One of the reasons for conflicting results in the use of VF for SAD could be the importance of other variables, namely level of distress and medication use (Chen et al., 2015). While VF was shown to improve ratings by both self and peers in specific speech behaviors, this effect was markedly reduced among those with higher overall anxiety, and markedly improved among those who were also using benzodiazepines to reduce anxiety symptoms.

A more recent application of VF to the treatment of SAD suggests that VF can be used with success within a CBT model of social anxiety, because VF is useful in changing the individual's focus of attention away from interoceptive information and toward external, observable behaviors in self and others (Laposa & Rector, 2014). Under the model proposed by Laposa and Rector, people with SAD have exaggerated interpretations of any autonomic arousal, and this leads them to erroneously perceive social threat. However, when they can learn to focus attention away from these negative bodily symptoms, which can be facilitated by VF, their experience of anxiety is diminished.

Depression

Depression is a disorder that takes on many forms, and has physical, cognitive, and behavioral symptoms. One of the problems in depression is the difficulty individuals have engaging in pleasurable activities, which contributes to depressed mood, and becomes a cycle that is difficult to break. VBI has been used to help the bereaved cope with symptoms of depression (Acierno et al., 2012) by targeting behavioral activation. Similarly, VBI has been used in parenting programs to target pleasurable interactions

between mothers and infants; this resulted in not only improved quality and quantity of interaction, but also a reduction in depressive symptoms reported by the mothers (Berkule et al., 2014).

Parenting Skills, Attachment, and Family Functioning

VF has been incorporated into parenting training for mothers of young children with developmental disabilities (Phaneuf & McIntyre 2007). Problematic maternal behaviors, such as intrusion (not allowing the child to be independent) and reinforcing negative child behaviors, were reduced using guided feedback from a therapist. Another series of studies into programs for improving parenting skills (Juffer, Bakermans-Kranenbug and van Ijzendoorn, 2008) focused on attachment behaviors between mothers and infants/young children. In most cases, within just a few sessions, mothers were able to increase their responsiveness to the child, understand the importance of mirroring behaviors, and using more empathetic responses to children in distress.

The findings in attachment research with parents have been extended to attachment behaviors of professional caregivers working with adolescents and adults with developmental disabilities (Schuengel, Kef, Damen, & Worm, 2012). Schuengel et al. used an experimental design to evaluate the effectiveness of VF interventions. Caregivers described as having dismissing attachment representations (using defensive and deactivating strategies against attachment experiences) and those with preoccupied attachment representations (characterized by mental entanglement and a hyperactivating response to attachment experiences with clients) demonstrated improved levels of care as a result of VF interventions in a program called Contact (Schuengel et al., 2012).

Caregivers with an autonomous representational style, characterized by openness, deliberation, and valuing attachment experiences, seemed to also gain in quality of care provided over time participating in the Contact program, but the contribution of the VF treatment was not significant for these caregivers who already were able to attune their responses to clients based upon attachment needs.

A similar approach was used in a two-case study research project targeting mothers with schizophrenia who had impaired interactions with their infants (Reddy et al., 2014). An observational tool called the *pediatric infant parent exam* (PIPE) was used to measure the quality of mother-infant interactions. Lower scores on this instrument indicate more adaptive functioning, and higher scores are associated with difficulty engaging with the infant, being overly intrusive, or having other types of atypical interactions. Interactions were improved with guided coaching by the therapist using shaping techniques in reviewing videos (VF) with parents. Mother 1 demonstrated an improvement by reducing her PIPE total score from 8 pre-intervention to 3 post-intervention; Mother 2 also improved from a pre-intervention PIPE score of 12 to a score of 8 post-intervention (Reddy et al., 2014).

Health Related Functioning and Coping Skills

VBI has been applied to several different particular patient groups to address health symptoms, the experience of anxiety and depression, and general quality of life issues. In one study of women with breast cancer who also experienced insomnia (Savard et al., 2014), three groups of patients were compared on many variables in a pretest/posttest randomized controlled trial. One group received professionally

administered cognitive behavioral therapy for insomnia (CBT-I) over six sessions. One group was provided self-help instruction booklets and a 60-minute DVD covering the same material (the VBI group), and the third group received no treatment. Effect sizes were computed for all conditions on the many sleep-related variables (e.g., total sleep time, sleep onset latency, and sleep efficiency) but also on depression, anxiety, and quality of life. Overall, the largest treatment effect was found for those participating in professional therapy, but VBI in this study also yielded a moderate effect size for improvement in all areas and a consistently larger effect size than the control group. Thus, although VBI did not promote equal improvements compared to individual professional therapy for insomnia, it appears that VBI can be a valuable treatment for those who are unable or unwilling to avail themselves of individual CBT.

Another important health procedure is regular dental care. For some intellectually disabled adults, tolerating a dental visit can be very difficult and results in treatment refusal or disruptive behavior that puts the patient and the treatment teams at risk of physical harm (Conyers et al., 2004). Conyers et al. compared VM of a familiar person successfully completing all 18 steps of a detailed task analysis and receiving praise for doing so within a systematic desensitization treatment program. The total video time was 15 minutes, and included such activities as the model entering the dental waiting room, sitting in the dental chair, tolerating the chair being leaned back, tolerating listening to suction sounds for 10 seconds, etc. All three individuals receiving the in-vivo desensitization treatment showed improvement, and two of the three VM participants were also able to complete all 18 steps in the simulated dental visit. Again, although the

VBI used in this protocol did not seem as effective for the participants as the individual desensitization sessions, the gains were substantial and the resources necessary to achieve them much less costly in terms of professional time to administer individual desensitization treatment.

The challenges associated with caring for loved ones with Alzheimer's disease have also been treated using VBI (Williams et al., 2010). A program to increase caregiver coping skills, and reduce perceived stress, incorporated videos of other caregivers in stressful situations along with workbook exercises and telephone coaching in a treatment package of 10 modules was compared to a waitlist control condition in the Williams et al. study. For those receiving the VBI, there were major improvements in depressive symptoms (d = 0.63), perceived stress (d = 0.90), and trait anxiety (d = 0.64), but not in self-efficacy or other psychological variables. There was a moderate effect for improvement in blood pressure with the VBI treatment at a 6-month follow up. One barrier to caregivers receiving treatment for stress is difficulty going to a treatment site because of ongoing caregiving responsibilities in the home (Hayden, Glynn, Hahn, Randall & Randolph, 2012). Incorporating VBI into treatments that can be performed at a distance may serve as an effective way to address this barrier (Williams et al., 2010).

Preparation for Therapy and Developing the Therapeutic Alliance

In addition to using VBI as a treatment for specific psychological disorders, VBI has been used to improve attitudes toward therapy and prepare clients to have reasonable expectations about how therapy works (Buckley & Malouff, 2005; Johansen et al., 2011). Buckley and Malouff used a simple experimental procedure comparing attitudes about

help-seeking in adults who either watched a 30-minute video of people talking about their positive experiences of psychotherapy (the VBI modeling condition) or a video about psychotherapy and self-concept that did not provide models with positive attitudes toward therapy (control). There was a positive effect from using the video; and 24% of the improvement in attitude was explained by the VBI.

In contrast, a more complex study was conducted to compare the effects of two different kinds of video preparation for therapy patients (Johansen et al., 2011). In the first experimental condition, participants watched a video providing information targeting how a therapeutic alliance is formed, and including information about possible disagreements between therapist and client in goal setting. The second video concerned the experience of participating in therapy, and included comments such as "thoughts and feelings are not facts" (Johansen et al., 2011, p. 165). A third video was used to create a control condition, and the content of this video was psychoeducational in nature, relating to the use of breathing techniques to develop mindfulness skills. Contrary to the research hypotheses, the Alliance video did not improve alliance ratings, but it did increase negative affect in participants. This may be due to a priming effect of providing negative examples prior to meeting the therapist, and inducing anxiety in participants. Further, neither the Alliance nor Experiential videos had any impact on attrition from therapy.

A different approach to role induction for therapy incorporated VBI to prepare parents for child psychotherapy process and outcomes (Shuman & Shapiro, 2002). It was hypothesized that preparing parents by use of a brochure before beginning treatment would improve outcomes, and that adding an instructional video to the brochure would

cause an even greater improvement when compared to a control condition of no preparation. In fact, neither the VBI condition nor use of brochure was found to improve treatment attendance or prevent premature termination (Shuman & Shapiro 2002).

Another VBI intended to strengthen the therapeutic alliance with parents of young children in therapy incorporated VF of parent-child-therapist interactions as an adjunct to a manualized CBT parent training program (Yasui & Henry, 2014). In this study, the same therapist used treatment as usual with the families before introducing the VBI; video feedback was used specifically to address cultural issues in the family and how culture influences parenting practices and expectations. It was found that not only did the VBI help the parents feel a greater alliance with the therapist, but also that the additional training and practice in using VBI to address cultural issues around parenting increased the therapists' cultural competence. This was a small study (19 families worked with three therapists) so the findings should be interpreted with caution. However, the impact not only to the family but also the improvement in therapist skills is notable. It is possible that using VBI helps therapists gain from feedback as much as their clients.

Video Based Interventions Excluded from this Study

Although this meta-analysis encompasses many areas under the umbrella term *mental health*, there are some uses of video technology that are excluded from the study as they do not align with the concept of therapist-administered treatment.

Distance Learning Self-Help Strategies

This study does not include use of video for remote interventions characterized as behavioral intervention technologies (see Mohr, Burns, Schueller, Clarke, & Klinkman,

2013, for a general discussion of possibilities for future research of remote applications such as using web-based programs and social media platforms). Nor are possible interventions based upon distance learning as part of parent training (Jones et al., 2013) included in the meta-analysis, because the focus in this study was about incorporating VBI directly into face-to-face mental health treatment interventions.

Teletherapy

Teletherapy comprises all applications of mental health interventions accomplished via telephone or internet contact between therapist and client (Clarke & Yarborough, 2013), and although this may incorporate some VBI, this indirect method of using video is not included in this meta-analysis of VBI.

Children

VBI for childhood anxiety have been incorporated into CBT skills-based programs for anxiety (Essau et al., 2014; Farrer et al., 2013) in a manner similar to the programs for adults (Rodebaugh et al., 2010) previously discussed. Applications of VBI to several important skill acquisition issues with schoolchildren, such as speech fluency and functional communication with peers and teachers, also show promise (Thiemann & Goldstein, 2001). Further, studies of parenting programs often measure the infant or young child's adjustment as part of the overall treatment package (Høivik et al., 2015). Although these and similar studies may contribute to our understanding of VBI overall, they are excluded from this study due to the inherent difficulty in generalizing findings for treatment efficacy among children to adults.

Autism. As noted previously, the literature specific to use of VBI for children

with autism has shown VBI to be an important evidence-based practice in school and home settings (Bellini & Akullian, 2007; Bellini & McConnell, 2010) Because the specific skills and behaviors addressed with young people with autism differ in important aspects from the general adult population dealing with mood or anxiety symptoms, I did not include such studies this meta-analysis.

Therapist Training and Supervision

Video review of therapists-in-training began as early as videotape was made available in the early 1960s (Walz & Johnston, 1963). Review of therapy sessions as part of clinical supervision remains an integral part of structured practicum and internship experiences for most graduate students in psychology (Beck et al., 2014). However, because the focus of VF in that case is on building therapist skills rather than directly targeting symptoms or otherwise measuring client outcomes, this meta-analysis did not include such studies.

Methodology of the Study

This quantitative study is a meta-analysis of published research into VBI in mental health treatment for adults, dating from its inception in the 1960s to 2016. Literature search strategies to be used in gathering published reports of quantitative research into VBI in mental health consisted of searching electronic databases, including PsycINFO, Medline, and ProQuest, for peer-reviewed articles and dissertations containing relevant keywords such as *video* and *therapy*, *video* and *mental health*, *video based interventions*, *video modeling*, *video feedback*, and *video self-modeling*. Although only primary, quantitative studies were included in the final meta-analysis, pertinent

literature reviews and qualitative studies were examined for forward (cited by) and backward (reference list) searching to identify the maximum number of studies possible.

Articles found through these search strategies were identified for inclusion into the meta-analysis based upon participant type being adult and dependent variable being some mental health component (such as depression, anxiety, or specific disorder severity), and data needed for computation of between groups effect size included in the publication. Studies involving children, a diagnosis of autism, or video used in training therapists without a component involving client change, were excluded.

Included studies were subsequently coded based upon a protocol including number of participants, type of VBI used, setting, degree of treatment fidelity reported, dependent variable, and how change was measured (self-report, therapist rating, or standardized instrument). Effect size estimates were computed for each study included in the final meta-analysis, and an overall effect size for VBI in mental health was computed using statistical software. Comparisons of effect sizes based upon meaningful moderators, such as type of VBI and type of mental health outcome, were also conducted. Qualitative evaluation of risk of bias in included studies, such as use of non-standardized outcome measures and non-random assignment to experimental groups, was also conducted and used as the basis for interpretation of the calculated effect sizes and limitations of this study.

Chapter 3: Research Method

Introduction

VBIs have been used in a variety of mental health treatment applications since the 1960s when videotape equipment became available for clinicians to use. Due to the reduction of cost and ease of use of digital video producing equipment during the past decade, and the current possibilities for disseminating videos via web-based applications, VBI holds promise as an evidence-based practice. Examples of VBI for mental health interventions include treatment of anxiety and depression in youth (Farrer et al., 2013), improving parent-child interactions by using VF (Steele et al., 2014), improving sleep in patients with breast cancer (Savard et al., 2014), and increasing coping skills for family members dealing with Alzheimer's disease (Williams et al., 2010). However, there is a lack of understanding of the impact of VBI as an evidence-based practice for mental health providers; therefore, I examined the current use of VBI for mental health applications for adults through a systematic sampling of the literature and meta-analysis. This study was designed to answer the following research questions:

1. What is the range of effect sizes, including 95% confidence intervals, for VBIs in mental health treatment found in group studies with adult participants?
2. What is the overall mean effect size for VBIs, including 95% confidence interval, in mental health treatment found in group studies with adult participants?

3. Do effect sizes from individual studies differ from the overall mean effect size based upon moderator variables, such as type of mental health symptom being addressed (e.g., anxiety or depression), or type of VBI employed (e.g., VF vs. PV)?

Answers to these research questions can support or demonstrate a lack of support for VBI as evidence-based treatments for a variety of mental health conditions. The findings from this study may also provide suggestions for future primary research studies investigating effects per disorder, symptom, participant group, or treatment setting. Important indicators of study quality, such as treatment fidelity and blinding to condition, were also evaluated during review of each included study to inform interpretation of the validity of results.

Research Design and Rationale

A meta-analytic research design was chosen to investigate the utility of VBI in mental health treatment because meta-analyses are used to synthesize results from multiple individual treatment studies into a quantifiable overall effect size (Ellis, 2010). A meta-analysis may yield meaningful data about the potential benefits of a particular treatment as opposed to statistical significance, which is closely tied to sample size and thus may either overestimate or underestimate the true value of the treatment (Ellis, 2010). By using weighted comparisons of results based upon sample size, and including studies that may have been dismissed previously due to not reaching statistically significant conclusions (Card, 2012), information from a wider range of studies of VBI are available to clinicians via this meta-analysis. The results of this meta-analysis can

advance the understanding of the clinical effectiveness of VBI in a variety of disorders, including anxiety, depression, and adjustment disorders.

Further, this study promotes the pragmatic use of VBI by contrasting effect sizes in studies with different implementation characteristics. For example, if the effectiveness of VF (one form of VBI) plus CBT is shown to be only marginally more effective than CBT alone, the efforts required to prepare an individualized VBI may not be justified (Rodebaugh, Heimberg, Schultz, & Blackmore, 2010). Another potentially useful contrast in effect sizes could be between VBI using the self as model versus VBI using another person as a model. Specific study characteristics and their relationships to effect sizes, such as type of disorder and specific VBI technique used (VF, VM, or PV), could also yield valuable information about the implementation of VBI as well as suggestions for future research. Because the methodology of meta-analysis is an iterative process (Ellis, 2010), some data about study characteristics initially gathered ultimately proved inapplicable to the overall conclusions of the study. In addition, conclusions from this meta-analysis highlighted qualitative aspects of the use of VBI.

Methodology

Selection Criteria

As shown in Figure 1, the strategy for identification and selection of studies followed several predetermined steps with data kept on how the studies included in the final sample for meta-analysis were chosen. I used a funnel approach for finding appropriate studies, with initial steps including as many studies as possible passing a cursory abstract review for possible inclusion and data extraction for the meta-analysis.

Studies that did not meet criteria for reporting data appropriate to computing effect sizes, but which were found to be relevant to the topic (e.g., prior literature reviews or theoretical discussion of VBI) were reviewed to inform the interpretation of effect size computations as well as suggestions for future research.

I identified group studies reporting quantitative results of VBI in mental health via electronic database searches using the following keywords and title words: *video*, mental health, therapy, counseling, psychotherapy, video based intervention, video modeling,* and *video self-feedback.* The Boolean operator "and NOT autism" was used in an effort to reduce the number of studies that would later be excluded. Despite this strategy, many studies related to autism were included in results from the keyword searches. The following electronic databases were searched: Academic Search Complete, Database of Abstracts of Reviews of Effects, Expanded Academic ASAP, Medline, ProQuest Central, ProQuest Dissertations & Theses Global, PsycARTICLES, ScienceDirect, and Web of Science.

Once study citations were identified, abstracts were reviewed for inclusion and exclusion criteria. The inclusion criteria included the study being quantitative, using mental health-related dependent variables such as anxiety or depression and with data reported for adult participants. Exclusion criteria were single-subject design studies, review articles, studies relating to therapist training, duplicate studies or dissertation studies also published in another format, and qualitative studies. Manual searching of citations and references of studies also yielded additional studies not found via database keyword and title word searches. All potentially relevant studies that were available full-

text were subsequently evaluated for inclusion in the meta-analysis. I excluded studies that did not report means and standard deviations of VBI treatment outcomes, or other statistics which can be used to compute effect sizes. I also excluded studies that did not have adult participants or for other reasons (dependent variable not a mental health issue, VBI not used as a treatment for participant). Finally, all remaining included studies were organized for manual data extraction as described in the next section.

Data Extraction

Each study included in the meta-analysis was coded by hand on paper forms using the categories detailed in Appendix A. The coding categories are based upon prior literature review (see Chapter 2) and the research questions of this study. Some important issues were considered in the development of this coding strategy, which merit discussion. First, as in all meta-analyses, it is important to record all source information accurately as well as quantifiable results from which to compute effect sizes. Further, because conducting a meta-analysis is an iterative process, it was anticipated that there might be important moderator variables such as type of VBI or type of mental health issue that could influence the overall effect size estimate for VBI. Thus, data relating to these issues were coded for each study as well as information about participants, information about treatment fidelity, and information about outcome measures used.

In conducting a meta-analysis, the coding categories may be expanded or restricted once the study is underway as data emerges about what information is crucial to the research questions and what information may be less important or unavailable. The paper coding materials were kept, and I entered data into statistical software. Use of

paper coding strategies followed by entry into a database is the preferred method for conducting meta-analysis, as it allows for easier data collection and the ability to catch errors or revise the data collection plan as needed than when data are extracted directly into a computerized system (Ellis, 2010).

Data Analysis Plan

Review Manager 5.3 (RevMan; The Cochrane Collaboration, 2014) is a comprehensive software program available for free download for scholarly use. This program incorporates management of all types of meta-analysis required information throughout the phase of conduction of this study as proposed. This includes database records of all literature searched, included, and excluded, and additional references pertinent to the proposed study. RevMan is also capable of storing statistical data necessary for the computation of individual effect sizes for each study in the proposed meta-analysis, computation of mean standardized effect size for all included studies, computation of confidence intervals and creation of forest plots to illustrate findings. Thus, all data analysis discussed in this section refer directly to the use of RevMan, version 5.3, except for the meta-regression procedures I describe later.

Effect size calculation and statistical procedures. As described by Deeks and Higgins (2010), for a meta-analysis of studies using a group design with a continuous outcome measure (such as a depression rating scale, in the case of mental health treatment), the minimum data required to calculate an effect size are the group sizes, the mean responses, and the standard deviations of the group mean responses. The statistic used to report effect sizes in individual studies using between-groups design with unequal

group sizes used in RevMan is Hedges's adjusted *g*. The equations used in RevMan to compute Hedges's adjusted g for two groups with unequal sample sizes, with standardized mean difference (*SMDi*) and sample error (*SE*) are

$$SMD_i = \frac{m_{1i} - m_{2i}}{s_i}\left(1 - \frac{3}{4N_i - 9}\right)$$

$$\mathrm{SE}\left\{SMD_i\right\} = \sqrt{\frac{N_i}{n_{1i}n_{2i}} + \frac{SMD_i^2}{2\left(N_i - 3.94\right)}}$$

(Deeks & Higgins, 2010, p.3).

Following the calculation of all individual effect sizes for the studies, combined results across studies were computed using RevMan programmed to assume a random-effects model and where effect sizes from each study are weighted to reflect sample size. The 95% confidence interval for this overall effect size was also calculated. I also produced forest plots of the individual studies' mean standardized effect sizes and the overall mean standardized effect for VBI in mental health were also produced using the MetaXL program with the results obtained in RevMan.

Heterogeneity analyses. Statistical heterogeneity reflects variance in obtained effect sizes and our confidence in the magnitude of the variance as well as the proportion of the variance due to actual effects and not random error. In RevMan, an appropriate statistic for the between-study variance in a random-effects meta-analysis is τ^2 (Tau^2). Given the different clinical applications included in this meta-analysis, heterogeneity was assumed. The interpretation of this statistic will answer the question about the average intervention effect across studies. However, τ^2 is an estimate dependent upon the

underlying metrics in each meta-analysis. Therefore, τ^2 cannot be used to compare variance in effect sizes between different types of meta-analyses. An additional statistic, I^2, is also computed by RevMan. Because I^2 is based upon the Q statistic (a measure of weighted squared standard deviations of the included studies), it represents a percentage of true statistical heterogeneity compared to observed variation in the results, and can therefore be compared and interpreted across many different analyses.

A funnel plot of study results also graphically represents the heterogeneity of the sample of studies used in this meta-analysis, with effect sizes of each study plotted in a plane of SE along the y-axis and effect size Hedges's *g* along the x-axis. If the meta-analysis is unbiased in overreporting from smaller size studies (publication bias), the plot of effect sizes should fall roughly within the boundaries of the funnel distribution. Effect sizes shown as dots falling outside of the boundaries of the funnel plot may be considered outliers and should be interpreted carefully when considering the quality of the meta-analysis itself.

Moderator analyses. Once I calculated the preliminary effect sizes of the individual studies and compared to the overall mean effect size, I observed trends in the data and further investigated for moderator effects. For example, if I found consistently greater effects for treatment of social anxiety than for depression, it may suggest that future research focus on improving protocols for social anxiety. Alternatively, if I found VF associated with greater effect sizes than VM, future research may be indicated in terms of matching specific types of VBI to specific mental health concerns. The number and specific types of possible moderators were not initially predicted; however, I

conducted both post-hoc meta-regression by type of VBI and subgroup analyses by outcome variable based upon my initial review of results. .

Threats to Validity

In a meta-analysis, internal validity consists of an evaluation that the individual research studies being used are of high quality and appropriate to answering the meta-analytic research questions. Threats to internal validity include possible problems with the studies being used which may or may not be evident in the published version of the study. Because the meta-analysis must incorporate whatever flaws are present in the source studies, (and of course there is no study without any potential source of systematic error), such threats cannot be controlled for in the traditional sense as part of the meta-analytic design. Instead, the researcher must evaluate the sources of bias and report them qualitatively, so they can be accounted for in the final interpretation of the overall results (Card, 2012). For this reason, several coding categories were constructed to allow for collection of data on each study related to selection and assignment of participants to treatment or control groups, as well as possible attrition bias, bias in reporting outcomes, and fidelity to treatment. I created a tabular report about possible bias in the studies comprising the meta-analysis in these categories and these constitute qualitative validity ratings for each study.

External validity in a meta-analysis concerns the appropriateness of the research questions being asked and the identification, inclusion, and exclusion of the studies used as relevant to answering the research question. In this case, clear definition about what VBI in mental health means and what the scope of this study includes and excludes,

along with systematic sampling of the literature and a clear rationale for using specific studies are the strategies being used to guard against threats to external validity.

Threats to Reliability

Measurement in a meta-analysis is accomplished through careful and accurate coding of studies. Inaccuracies in recording data extracted from studies, and fuzzy operational definitions for coding categories, are potential threats to reliability in the present study. Further, as there is only one researcher conducting this study, a traditional inter-rater reliability estimate cannot be computed. However, there is a method for reporting on intra-rater reliability, and that is to have the single researcher re-code a random subset of "clean" articles later, and compute the proportion of agreement on the categories in the studies as an Agreement Ratio, as follows:

$$AR = \frac{number\ of\ agreements}{number\ of\ studies}$$

The higher the *AR*, the greater the internal reliability estimate. Once the total number of studies included in the final meta-analysis is determined, the procedure for random-sampling and the proportion of studies to be re-coded are calculated and reported (Card, 2012). Because data gathering, and all statistical analyses were conducted by the sole author of this study, the Agreement Ratio statistic was computed and is reported in Chapter 4.

Ethical Procedures

The raw data used in this study were comprised of the published statistical results of prior studies. I reviewed the studies included in the meta-analysis to ensure that commentary on ethical procedures for treatment of participants (such as informed consent

and confidentiality) were used at the time of the source studies. However, because this study used secondary data as the unit of inquiry and did not require contemporaneous participation se of individual participants, there were no anticipated ethical risks. The Walden University Institutional Review Board approved the research plan for this study prior to collection of data.

Summary

This study consists of a meta-analysis of published research into VBIs used in mental health treatment. The study was limited to applications of VBI with adult participants in studies using group designs. (Studies of VBI used with children and adolescents diagnosed with autism spectrum disorders were excluded from this meta-analysis). This study was designed to answer the following research questions:

1. What is the range of effect sizes, including 95% confidence intervals, for video based interventions (VBIs) in mental health treatment found in group studies with adult participants?
2. What is the overall mean effect size for VBI, including 95% confidence interval, in mental health treatment found in group studies with adult participants?
3. Do effect sizes from individual studies differ from the overall mean effect size based upon particular moderator variables, such as type of mental health symptom being addressed (e.g., anxiety or depression), or type of VBI employed (e.g., video feedback vs. video modeling)?

A strategic plan for locating relevant studies (see Figure 1); and for coding and extracting data for analysis was described earlier in this chapter. The coding categories include the areas of source characteristics, study sample characteristics, design characteristics, type of VBI used, mental health symptom measured (type of dependent variable in the study and how measured), length of treatment, and results. Study quality characteristics were also recorded and later analyzed related to risk of bias. Details of the coding categories are listed in Appendix A. Management of study information and statistical analyses using RevMan software (The Cochrane Collaboration, 2014) has also been described in the Data Analysis Plan section of this chapter.

As with all meta-analyses, the research plan underwent slight changes as studies are coded and analyzed and important factors not previously considered may emerge (Borenstein, Hedges, Higgins, & Rothstein, 2009). For example, no studies using video self-monitoring were found; however, three studies using VE for desensitization interventions were found. Once the studies were selected, coded, and data extracted, recorded on paper, and then entered into RevMan, the following statistical computations were conducted using RevMan and other programs (discussed in detail in Chapter 4):

1. Computation of standardized mean effect sizes for the individual studies, using a random effects model for continuous outcomes. Hedges's adjusted *g* is the effect size statistic calculated, as this allows for unequal numbers of participants in groups (Deeks & Higgins, 2010). A 95% confidence interval for each study's standardized mean effect was also calculated, and this information presented in a forest plot.

2. Computation of an overall standardized mean effect size for all of the studies in the meta-analysis, also including a 95% confidence interval, is also graphically represented at the bottom of the forest plot for all included studies.

3. Evaluation for heterogeneity of the studies used; because this is a meta-analysis combining results from studies involving different dependent variables within the overall construct of mental health intervention, it was expected that the studies would demonstrate heterogeneity and thus fit the random-effects statistical model being employed.

4. Domain-based evaluation of risk of bias in included studies, presented in tabular form. For example, one study may have a risk of systematic error due to selection bias, while another may have risk due to attrition. These categories are not evaluated statistically but rather presented as qualitative information for consideration in interpretation of the meta-analysis results.

In Chapter 4, all results of this meta-analysis are presented and interpreted as relating to the original research questions about VBI in mental health treatment of adults. Additional analyses of potential moderator variables, such as type of VBI (for example, comparing individualized video feedback to generic PV) and mental health outcome (reduction in anxiety vs. depression), were also conducted based upon trends noted in the original effect size computations of the individual studies and relationship to particular qualitative variables previously coded. The results presented in Chapter 4 will form the foundation for conclusions about the utility of VBI in mental health treatment and recommendations for future research.

Chapter 4: Results

Introduction

This meta-analytic study was designed to evaluate the effectiveness of VBI) in a variety of mental health treatment applications, as reported in between-group studies. VBI includes using such approaches as VF, in which therapists can show clients how they perform behaviors such as public speaking thereby helping people with social anxiety improve negatively biased self-appraisals (Rodebaugh et al. 2010). PV can also be used as part of patient role induction into therapy (Deane et al., 1992). Videos can serve as stimuli for vicarious exposure to a feared object or situation as part of systematic desensitization (Conyers et al., 2004; Götestam, 2002). VF has also been harnessed as part of guided feedback to parents in improving caregiving attitude (Cassiba, Castoro, Costantino, & Sette, 2015). However, the impact of VBI as an evidence-based practice for mental health treatment using currently available technology is poorly understood. The results of this study can contribute to the knowledge base about VBI as evidence-based treatments for a variety of mental health conditions. Effect sizes calculated for VBI as part of this meta-analysis highlight the potential for increased use of VBI in mental health treatment settings and improved study design to evaluate VBI utility. Therefore, this meta-analysis was designed to answer the following research questions:

1. What is the range of effect sizes, including 95% confidence intervals, for video based interventions (VBIs) in mental health treatment found in group studies with adult participants?

2. What is the overall mean effect size for VBI, including 95% confidence interval, in mental health treatment found in group studies with adult participants?
3. Do effect sizes from individual studies differ from the overall mean effect size based upon moderator variables, such as type of mental health symptom being addressed (e.g., anxiety or depression), or type of VBI employed (e.g., video feedback vs. video modeling)?

Data Collection: Selection and Inclusion of Studies

Using the search criteria described in Chapter 3, a total of 2,420 abstracts were identified for review during electronic database searches conducted from November, 2016 through April, 2017. Of these, 301 were dissertations and the remaining 2,119 were published in peer-reviewed journals. Based upon the inclusion criteria for this study, 89 full-text articles were retrieved for further consideration. Twenty-nine of the papers retrieved were excluded for reasons detailed in the next section; 60 articles remained for inclusion in this meta-analysis and constituted 2.5% of all search results. A flowchart of the meta-analysis literature search and data retrieval process is presented in Figure 1.

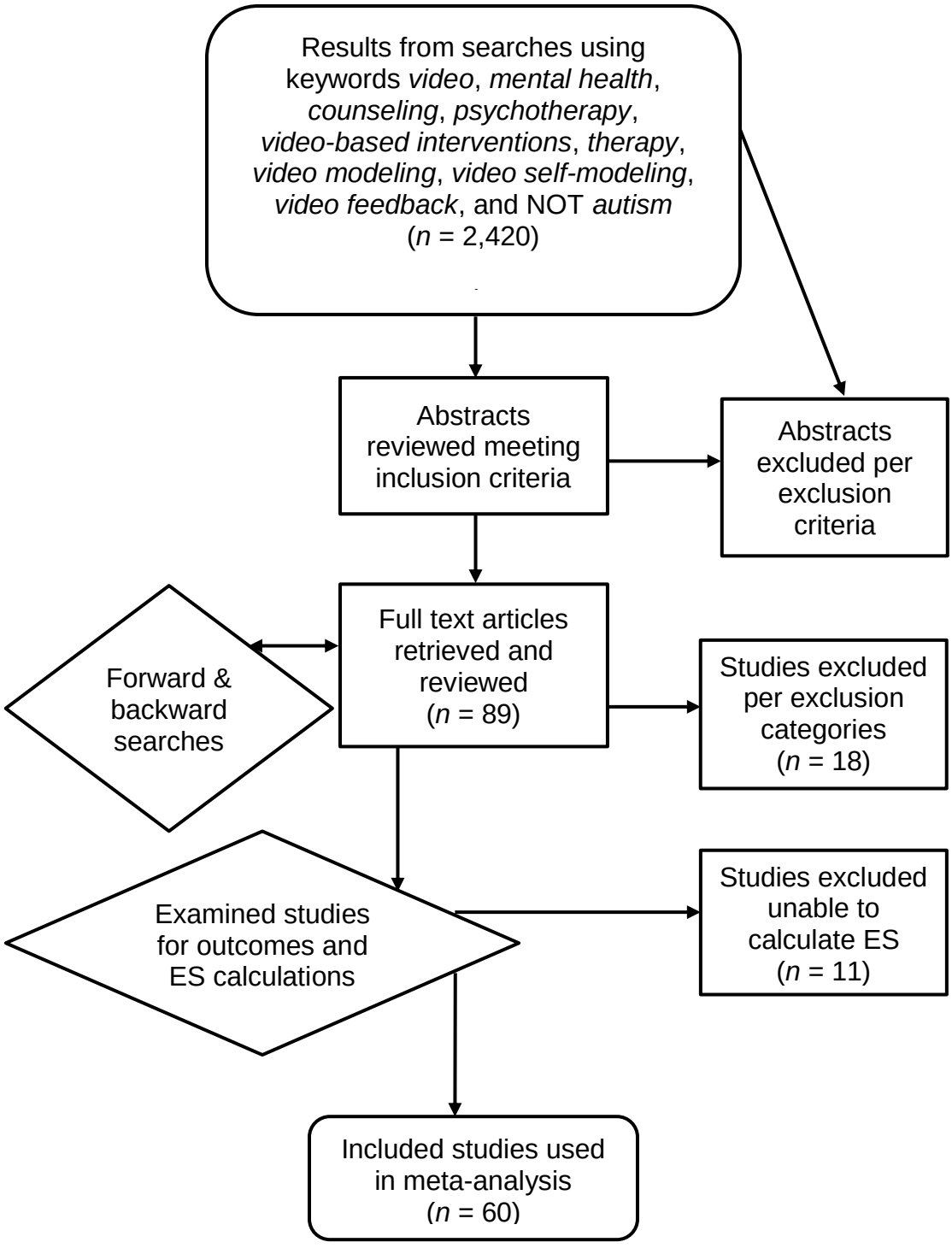


Figure 1. Meta-analysis flowchart.

Characteristics of Excluded Studies and Descriptive Statistics

The reasons for excluding 29 studies initially identified for inclusion were as follows: one study due to the VBI being self-help (not guided by a mental health therapist), two studies were qualitative in nature, four were case studies, five were review articles, six reported findings within-subjects, and 11 studies met all inclusion criteria but did not provide enough data to compute effect sizes. Excluded studies are listed in Appendix B in full reference format.

Characteristics of Included Studies and Descriptive Statistics

Included studies (n = 60) ranged in publication date from 1973 to 2015. Overall, data used in this meta-analysis are from a total of 4,290 adult participants, of whom 49.8% received VBI and 50.2% served as controls. Table 1 summarizes the number and type of VBI interventions used in all included studies and the mental health outcomes that were investigated. Included studies are listed as references to this paper, and marked with one asterisk. Table 1 presents category sizes of all included studies based upon type of VBI and types of mental health outcomes. As shown in Table 1, the most prevalent types of VBI found were VM and VF, while least common was VE. The majority of symptom specific VBI studies were for treatment of anxiety, while the fewest VBI studies targeted depression.

Table 1

Number of Included Studies by Type of VBI and Mental Health Outcome

Type of VBI	Overall mental health (*n* = 60)	Anxiety (*n* = 19)	Depression (*n* = 8)	Preparation for therapy (*n* = 14)	Caregiving attitude (*n* = 9)	Other mental health outcome (*n* = 10)
Psycho-educational video	17	3	4	8	0	3
Video modeling	20	4	0	6	5	5
Video feedback	20	9	2	0	6	2
Video exposure	3	3	0	0	0	0

Statistical Calculations and Software Used

A few different methods were undertaken to compute and graph effect sizes and inferential statistics for this meta-analysis. Decisions regarding software selection were based upon appropriateness to the research questions, reviews of meta-analysis literature to identify reliable software widely accepted by the scientific community, ease of use, and financial expense to the researcher. The primary management of study references, calculation of effect sizes, and evaluation of risk of bias was conducted using the Review Manager 5.3 (RevMan) program (The Cochrane Collaboration, 2014) with instructions provided in the associated handbook for RevMan (Higgins & Green, 2011). A Microsoft Excel calculator for determining standard deviations from other statistical values such as *p*, *t*, CI, and *SE*, linked to the RevMan program (Drahota & Bellor, 2011), was also used

for some studies which reported those values instead of directly reporting standard deviations for the group mean results.

Graphs for funnel plots and forest plots were created using a Microsoft Excel add-in program, MetaXL 5.3 (Barendregt & Doi, n.d.) to improve readability via editing commands common to Microsoft Excel and Microsoft Word. The standardized effect sizes (Hedges's *g*) and *SE* for each study as calculated in RevMan were input into the MetaXL spreadsheet. Meta-regression analyses and computation of Egger's regression test for publication bias were accomplished using STATA IC software for students (StataCorp LLC, 2017), because the RevMan program does not offer these features.

Risk of Bias and Effect Sizes

There are numerous factors which can contribute to bias in a meta-analysis, and one way to evaluate the possible range and sources of bias is by reviewing a scatterplot of within study variance for each study (the x-axis) against the study size (the y-axis) and comparing this to calculated effect sizes (Sterne & Harbord, 2004). The construction of the funnel outlines is based upon the assumption that all studies' effect sizes, represented by the dots of the scatterplot, follow a normal distribution around the overall meta-analysis effect size; the smaller studies are at the bottom of the plot and the studies with more participants are represented at the top of the plot. The outside lines of the funnel indicate the boundaries of the 95% confidence interval for all studies' effects if the assumption of normality is met, when comparing them to the overall effect for all the included studies (the vertical line; Sterne & Harbord, 2004). Because this meta-analysis was of group study designs with continuous outcome measures and varying sample sizes

for treatment and control conditions, the effect sizes of the individual studies and the overall effect were calculated using the Hedges's *g* formula (Ellis, 2010).

A funnel plot of all included studies is shown in Figure 2. Ten studies results are shown lying outside the funnel. This could reflect a variety of possible biases, including publication bias, the heterogeneity of interventions and designs of studies, heterogeneity of sample sizes within studies, and other possible artifacts in this study (Sterne & Harbord, 2004). Publication bias was analyzed using Egger's Regression Test for Funnel Plot Asymmetry (Egger, Smith, Schneider, & Minder, 1997) and will be explained following the funnel plot. Other potential biases that can contribute to funnel plot asymmetry will be discussed in Chapter 5 as part of the overall evaluation of strengths and limitations inherent in this meta-analysis.

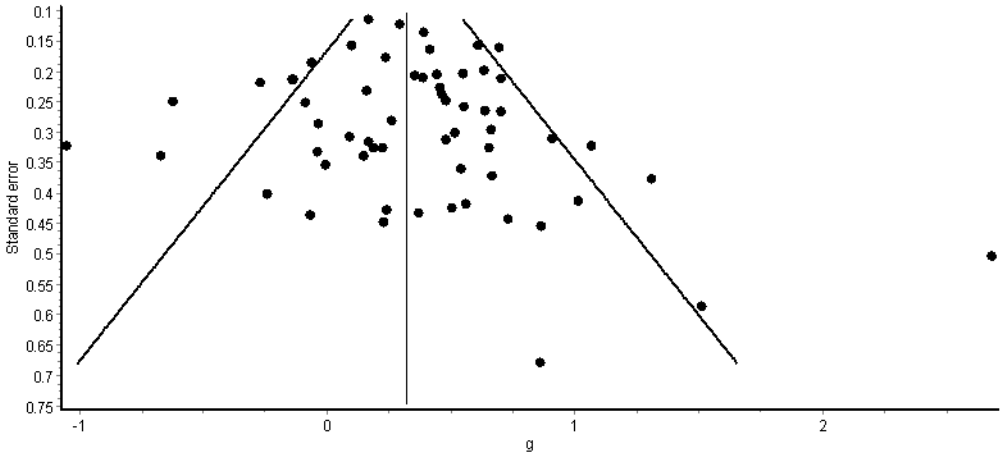


Figure 2. Funnel plot of standard error vs. effect size for all included studies (n = 60).

As previously mentioned, small studies with large effects can contribute to asymmetry in the funnel plot of a meta-analysis, and this may reflect publication bias, sampling bias, true heterogeneity, chance, or other sources of variance. Beyond a visual inspection of the funnel plot, statistical methods have been proposed to evaluate the impact of small study sizes on overall effect sizes. Egger's test (Egger et al., 1997) uses a regression of each study's effect estimate against the inverse of its standard error. If Egger's test is statistically significant, this suggests possible publication bias in the meta-analysis. For this meta-analysis, Egger's test was conducted using STATA IC and the results were not statistically significant, $p = 0.55$, which indicates that the meta-analysis results were not compromised due to publication bias. However, significant bias in effect sizes can also be due to several other issues and require a qualitative evaluation based upon the nature of interventions and the quality of individual studies. These issues will be discussed further in Chapter 5.

Overall Effects for VBI in All Mental Health Outcomes

In Table 2, all included studies' major characteristics are listed, and studies are ranked by effect size, from smallest to largest. The table continues for six pages due to the large number of included studies. The types of VBI listed are PV, VM, VF, and VE. There were no VSM studies with mental health outcomes found for this meta-analysis. The mental health outcomes for each study are labeled as ANX (anxiety), DEP (depression), CAT (caregiving attitude), PREP (preparation for therapy) or OTH (other outcomes that did not constitute a minimum of five associated studies).

All participants in these studies were adults over the age of 18, but if other participation criteria were employed (for example, meeting criterion for a specific diagnosis or score on an intake screening), those special criteria are also listed under the column labeled *Participant characteristics*. Risk of bias for each study was evaluated separately, and the qualitative labels for bias risk are explained at the bottom of the table. If there is no risk of bias items listed for a given study, it does not mean that all risk of bias had been eliminated; rather, risk of bias in that VBI study is not outside the norm of similar randomized control trials for mental health treatment.

Effect sizes for individual studies ranged from Hedges's g = -1.05, 95% CI [-1.69, -0.42] to 2.69, 95% CI [1.70, 3.67]. The overall standardized mean effect size for VBI as treatment for mental health was Hedges's g = 0.34, 95% CI [0.24, 0.45], z = 6.38 ($p < .001$), supporting a small to medium effect for VBI in adult mental health. The results for heterogeneity effects were $\tau^2 = 0.09$ and $I^2 = 61\%$. Thirteen of the studies (21.7% of those included in the overall meta-analysis) yielded negative effect sizes for VBI on mental health outcomes.

Table 2

Effect Sizes and Risk of Bias of All Included Studies, Ranked by Effect Size

Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Strupp & Bloxom, (1973)	44	- 1.05	[-1.69, -0.42]	1.5	PV	PREP	low SES patients in community rehab clinics			X		
Bilszta et al. (2012)	37	-0.67	[-1.34, -0.01]	1.4	VF	CAT	college students, community volunteers		X		X	
Price & Anderson (2012)	67	-0.62	[-0.11, 1.76]	1.9	VE	ANX	volunteers diagnosed with social anxiety disorder (DSM-IV)					
Resnick et al. (2007)	84	-0.27	[-0.70, 0.16]	2.1	VM	OTH	female victims of sexual assault	X	X		X	
Kanai et al. (2011)	25	-0.24	[-1.03, 0.55]	1.1	VF	ANX	Japanese undergraduate students, identified as socially anxious			X		
Kaplan et al. (2012)	88	-0.14	[-0.56, 0.28]	2.1	PV	PREP	undergraduates in psychology classes, midwestern US				X	
Sterba et al. (2015)	88	-0.14	[-0.56, 0.28]	2.1	PV	OTH	breast cancer survivors					
Johansen et al. (2011)	70	-0.09	[-0.58, 0.41]	1.9	PV	PREP	volunteers seeking counseling at university center				X	
Chen et al. (2015)	21	-0.07	[-0.92, 0.79]	1.0	VF	ANX	college students in Japan			X		

(table continues)

Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Eckhouse et al. (2014)	49	-0.04	[-0.60, 0.53]	1.7	PV	ANX	hospitalized orthopedic or cancer patients	X				
Schmidt et al. (2012)	36	-0.04	[-0.69, 0.62]	1.4	VF	DEP	adults with TBI and impaired self-awareness					
Cummings & Wittenberg (2008)	32	-0.01	[-0.70, 0.69]	1.3	VF	CAT	outpatients - parents of young children referred with behavior problems		X		X	
Perlick et al. (2010)	43	0.08	[-0.52, 0.68]	1.5	PV	DEP	primary family caregivers of people with bipolar I or II disorder					
Millery et al. (2002)	176	0.10	[-0.21, 0.41]	2.5	PV	PREP	detox ward inpatients w/heroin and/or cocaine dependence		X	X	X	
Peterson et al. (1998)	35	0.15	[-0.52, 0.81]	1.4	PV	DEP	women with DSM-IV diagnosis of binge eating disorder					
Juffer et al. (2005)	80	0.16	[-0.29, 0.61]	2.0	VM	CAT	adoptive parents					
Kim et al. (2002)	40	0.17	[-0.45, 0.79]	1.5	VF	ANX	high social anxiety (score >17 on Fear of Negative Evaluation Scale		X	X	X	
Kravitz et al. (2013)	305	0.17	[-0.92, 0.39]	2.7	PV	DEP	primary care outpatients with PHQ-9 score ≥ 5				X	
Rapee & Hayman (1996)	38	0.19	[-0.45, 0.83]	1.5	VF	ANX	university students w/self-reported speaking anxiety					

(table continues)

Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Done & Thomas (1992)	41	0.23	[-0.4, 0.86]	1.5	VM	CAT	adult caregivers of people with dementia	X				
Parry & Killick (1998)	20	0.23	[-0.65, 1.11]	1.0	PV	ANX	outpatients referred for treatment of panic disorder	X		X		
Ebert et al. (2015)	128	0.24	[-0.11, 0.59]	2.3	PV	PREP	community sample with symptoms of depression					
Ng et al. (1999)	22	0.24	[-0.60, 1.08]	1.1	VM	OTH	patients with COPD enrolled in exercise program			X		
Webster-Stratton et al. (1988)	51	0.26	[-0.29, 0.82]	1.7	VM	CAT	parents of children ages 3 – 8 with conduct problems					
Berkule et al. (2014)	269	0.30	[0.05, 0.54]	2.7	VF	DEP	mothers of infants, low-income					
Fitzpatrick et al. (2005)	94	0.36	[-0.05, 0.76]	2.1	PV	DEP	College students & community members in Ohio, self-reporting suicidal ideation					
Rodebaugh et al. (2010)	22	0.37	[-0.48, 1.22]	1.0	VF	ANX	outpatients with a primary diagnosis of social anxiety disorder					
Deane et al. (1992)	92	0.39	[-0.03, 0.80]	2.1	VF	PREP	outpatients referred for individual therapy				X	
Demyan & Anderson (2012)	221	0.39	[0.12, 0.66]	2.6	PV	PREP	psychology undergraduates, midwestern US				X	

(table continues)

Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Hartlage & Johnsen (1973)	150	0.42	[0.09, 0.74]	2.4	VM	OTH	"hardcore" unemployed enrolled in work program			X		
Webster-Stratton (1994)	106	0.44	[0.04, 0.85]	2.1	VM	CAT	parents of child diagnosed with ODD or conduct disorder		X			
Harvey et al. (2000)	72	0.46	[0.00, 0.93]	1.9	VM	ANX	college students rated as highly anxious					
Lim et al. (2005)	80	0.46	[0.01, 0.90]	2.0	VM	OTH	parents of adolescents seeking brief parenting intervention			X		
Clark et al. (2006)	42	0.48	[-0.13, 1.10]	1.5	VF	ANX	outpatients with social phobia diagnosis		X			
Moss et al. (2011)	67	0.48	[-0.0, 0.97]	1.9	VF	CAT	French-speaking parents of infants in Quebec				X	
Rybarczyk et al. (2005)	23	0.50	[-0.33, 1.34]	1.1	PV	OTH	older adults with comorbid insomnia and health conditions				X	
Orr & Moscovitch (2010)	46	0.52	[-0.01, 1.11]	1.6	VF	ANX	college students & community members with social anxiety					
Kemenoff et al. (1995)	32	0.54	[-0.17, 1.25]	1.3	VF	OTH	members of families seeking treatment at college counseling clinic					
Buckley & Malouff (2005)	63	0.55	[0.05, 1.06]	1.8	PV	PREP	college students and community volunteers		X		X	

(table continues)

Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Shuman & Shapiro (2002)	100	0.55	[0.15 – 0.95]	2.2	VM	PREP	parents of children ages 3-10			X	X	
Villani & Rive (2012)	24	0.56	[-0.26 – 0.95]	1.1	VE	ANX	students and non-students in Milan					
Whitaker et al. (2004)	168	0.61	[0.30 – 0.92]	2.5	VM	PREP	undergrad students receiving course credit					
Rodebaugh & Chambless (2002)	60	0.64	[0.12 – 1.16]	1.8	VF	ANX	undergrad psychology students		X			
Stosny (1994)	106	0.64	[0.24 – 1.03]	2.2	VM	PREP	male spouse abusers		X	X	X	X
France & Dugo (1985)	40	0.65	[0.02 – 1.29]	1.5	VM	PREP	outpatients (nonpsychotic) referred to therapy groups in Illinois		X			
Groeneveld et al. (2011)	48	0.66	[-0.08 – 1.25]	1.6	VM	CAT	home-based childcare providers in the Netherlands				X	
Peterson et al. (2001)	31	0.67	[-0.06 – 1.40]	1.3	PV	OTH	females diagnosed with binge eating disorder		X		X	
Svanberg et al. (2010)	192	0.70	[0.38 – 1.01]	2.4	VF	CAT	low-income mothers of infants	X	X		X	
Rodebaugh (2004)	95	0.71	[0.29 – 1.12]	2.1	VF	ANX	undergrads with speech anxiety		X		X	

(table continues)

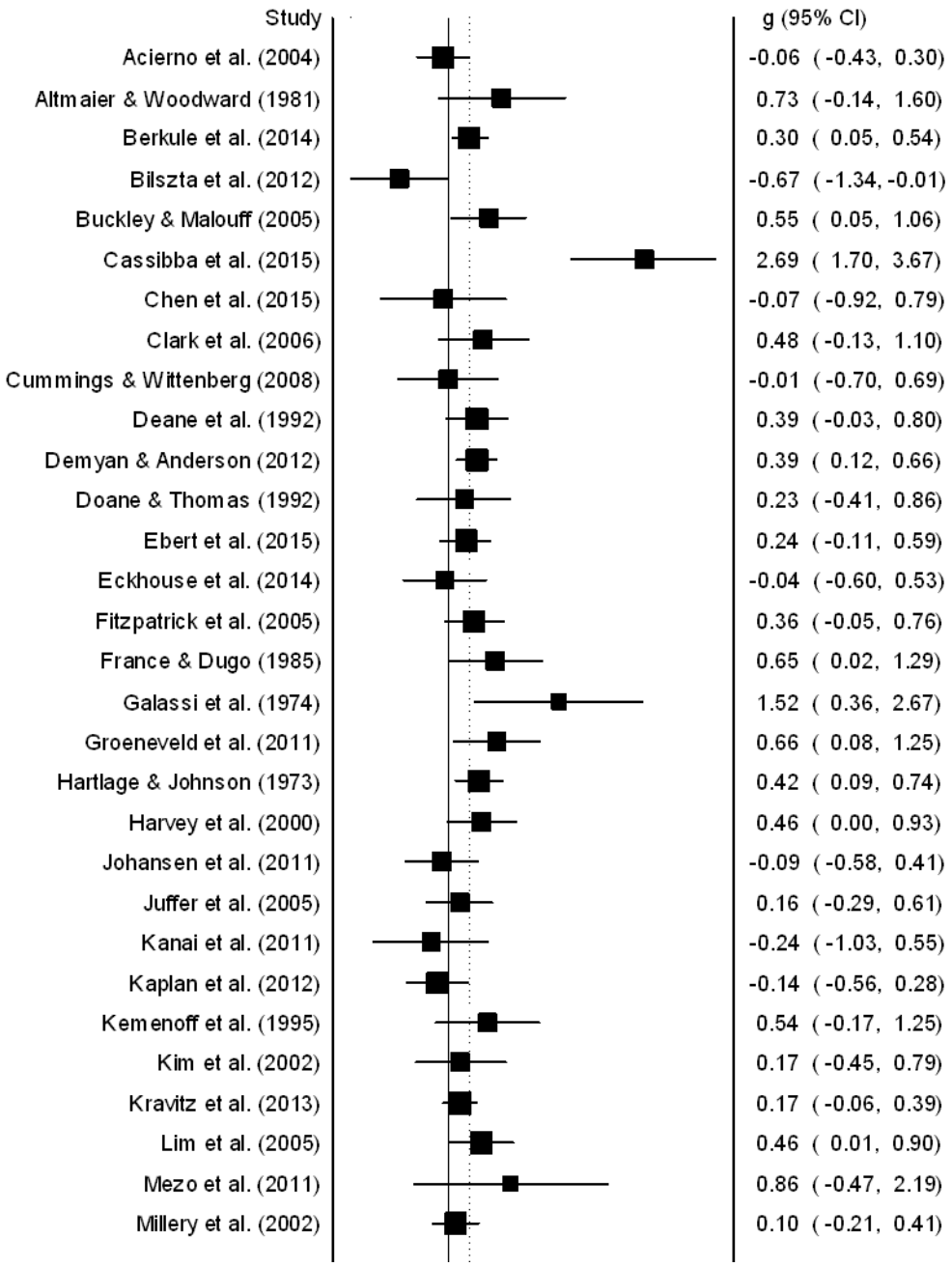
Study	*n*	ES *g*	95 % CI	% of Overall ES *g*	VBI type	Mental health outcome	Participant characteristics	Risk of bias[a]				
								A	B	C	D	E
Stetz et al. (2011)	60	0.71	[0.18, 1.23]	1.8	VM	ANX	military medical staff assigned to forward surgery teams		X			
Altmaier & Woodward (1981)	22	0.73	[-0.14, 1.60]	1.0	VM	ANX	test-anxious college students					
Mezo et al. (2011)	10	0.86	[-0.47, 2.19]	0.5	VM	OTH	undergraduate college students					
Padgett (1983)	24	0.87	[-0.02, 1.76]	1.0	VF	OTH	married couples seeking outpatient counseling					
Smith & Lewis (1974)	46	0.91	[0.30, 1.76]	1.5	VM	PREP	undergraduate students in education		X	X		
Pillofer et al. (2015)	28	1.02	[0.21, 1.83]	1.1	VF	CAT	at-risk mothers of infants in Germany					
Zwick & Atkisson (1984)	45	1.07	[0.44, 1.70]	1.5	PV	PREP	outpatients at community counseling center			X	X	
Vansteen-wegen et al. (2007)	35	1.31	[0.57, 2.05]	1.2	VE	ANX	students self-reporting spider phobia			X		
Galassi et al. (1974)	16	1.52	[0.36, 2.67]	0.7	VM	ANX	college psychology students with low self-expression			X		
Cassibba et al. (2015)	32	2.69	[1.70, 3.67]	0.8	VF	CAT	mothers of infants (two parent families)					

Note: [a]Risk of bias was evaluated based upon the following study attributes:
A = nonrandom assignment to conditions, B = nonblinding of personnel, C = ad-hoc or nonstandardized outcome assessment, D = attrition greater than 10% of original sample, and E = selective reporting of results.
An X in a column indicates risk of bias type evident from published study.

Effect sizes were calculated using positive effects to reflect improvement in psychological functioning (reduction in symptoms, distress, or other negative experiences). Therefore, outcome measures for many studies needed to be recoded in the opposite direction prior to effect size calculation. As an example, a measurement of improvement in depression would be fewer reported symptoms (lower mean scores) on the Beck Depression Inventory (BDI). Possible BDI scores range from 0 (no depression symptoms reported) to 63 (the maximum possible level of depression). The equation (minimum score + maximum score) – (reported score) = recoded score was used in these circumstances so that higher scores in the VBI intervention group, compared with the control group, are reflected in a positive effect. This method retains the underlying measurement scale range so that the same standard deviations as originally reported would still apply to each study's findings. Given this recoding strategy, the negative effects calculated in these 13 studies do represent the apparently unhelpful application of VBI to mental health treatment under certain circumstances. In Chapter 5 possible explanations for these findings will be discussed and related to the subgroup and moderator analyses which follow in this chapter.

Figure 3 is the forest plot of all included studies' weighted effect sizes, with studies listed in alpha order. The weighted standardized mean effect size is represented by the size of the box of each study, and the range of the confidence intervals are shown by the length of the branches extending from each box. Although many of the individual studies yielded very small effect sizes and have confidence intervals including 0, as

depicted in the forest plot, the overall standardized mean effect size 95% CI ranges from 0.24 to 0.45.



Dashed line represents standardized overall mean effect size Hedges's *g* = 0.34.

Figure 3. Forest plot of weighted effect sizes and 95% confidence intervals for all included studies. Studies 1-30 shown here (figure continues next page, studies 31-60).

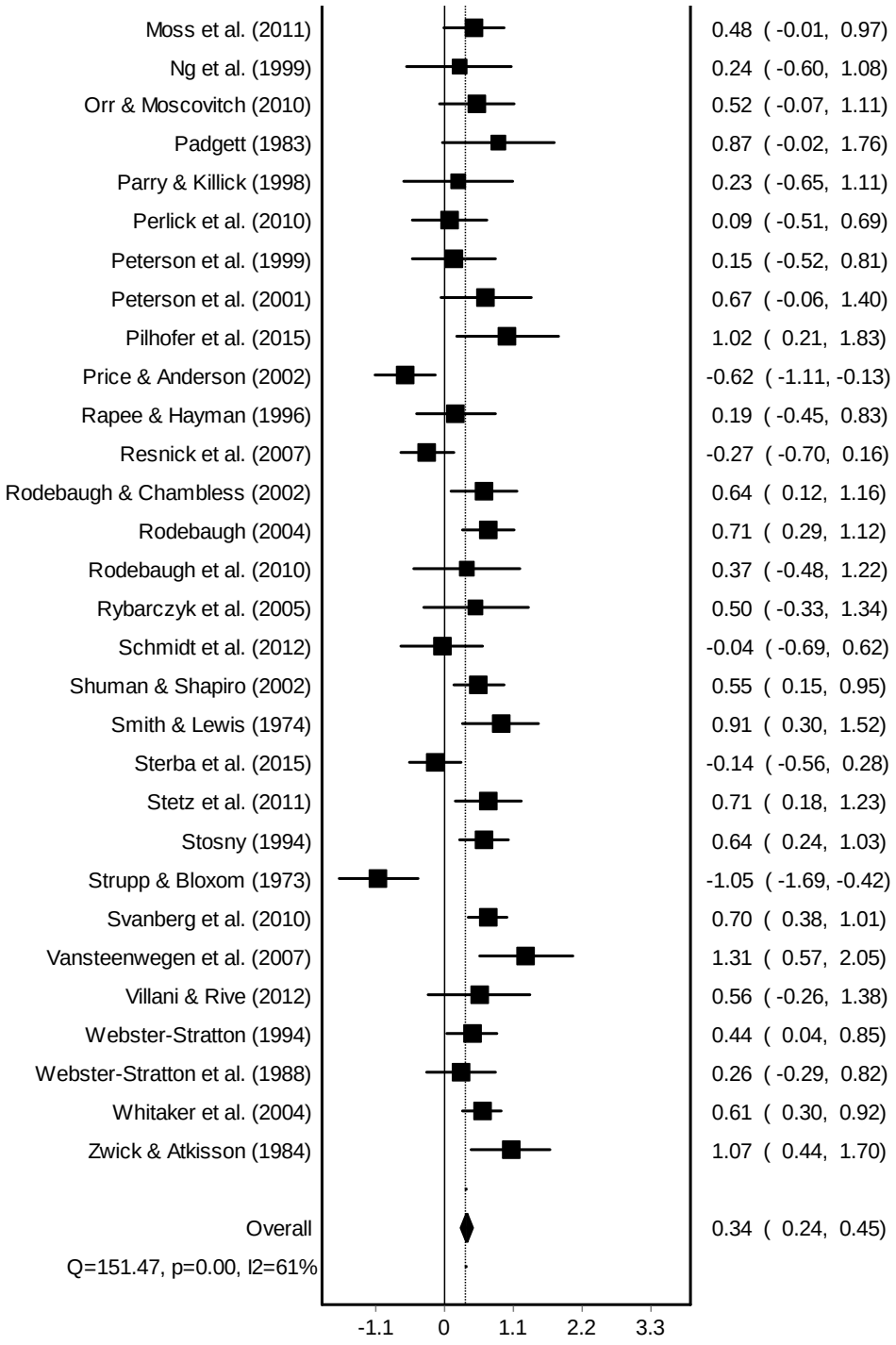


Figure 3 (cont.). Forest plot of weighted effect sizes and 95% CI for studies 31-60, and overall standardized mean effect for VBI in mental health.

Because all data were gathered and analyzed by one researcher, intra-rater agreement reliability *(AR)* for the effect size calculations was determined by comparing results for a random sample of six studies in a subsequent calculation with the initial calculations (both using separate RevMan files, and the associated Microsoft XL calculator if needed).

The equation used for this calculation was $AR = \frac{number\ of\ agreements}{number\ of\ studies}$

For this study, AR = 83.3 %, indicating good reliability for effect size calculations.

Meta-Regression of VBI Type to Effect Size

A random effects meta-regression using the four types of VBI as covariates to predict standardized mean effect size was conducted to evaluate VBI type as a significant moderator. Because the potential moderators are categorical variables, they were converted to dummy variables and coded accordingly to conduct the meta-regression using STATA IC. The main meta-regression output results are presented in Table 3. VE was automatically dropped from the analysis due to collinearity (data were available from only three studies). None of the remaining types of VBI were identified as significant predictors of effect size (p values are all greater than 0.05, and all 95% confidence intervals include zero).

Interestingly, the joint test for significance of all covariates, with Knapp-Hartung variance estimator used, was significant, Model F (3,56) = 8.38, p = 0.0001. This statistic suggests that at least one of the VBI types identified is associated with the treatment effect (Harbord & Higgins, 2008). It may be that this study did not have enough power to detect a relationship between VBI type and effect size. However, because meta-

regression and other subgroup analyses are observational in nature, even significant findings could not be construed as causal (Borenstein et al., 2009). Neither can nonsignificant results be interpreted as demonstrating a lack of association between type of VBI and effect size.

Table 3

Meta-Regression Output for VBI Types as Covariates for Effect Size

Predictor	Coefficient	Standard Error	*t*	$p > \lvert t \rvert$	95% Confidence Interval
Psychoeducational video	-.9385	.4709	-1.99	0.051	[-1.8820, .0050]
Video modeling	-.0456	.4622	-0.10	0.922	[-.9717, .8805]
Video feedback	-.1526	.4714	-0.32	0.747	[-1.0969, .7915]
Constant	.7189	.4475	1.61	0.114	[-.1775, 1.6154]

Subgroup Meta-Analyses by Outcome Variable

Due to the heterogeneity of outcomes included in this overall investigation into VBI for mental health, subgroup meta-analyses were conducted to determine if effect sizes tended to vary by type of mental health problem being addressed. Effect sizes and heterogeneity estimates were computed for each group of studies reporting on each of the following mental health outcomes: anxiety, depression, preparation for therapy, caregiving attitude, and another category for studies not otherwise represented., as well as analyses of publication or other bias for each of these subgroups. Results from these five subgroups are summarized in this section.

Anxiety. A funnel plot of the studies in this subgroup is shown in Figure 4. Four studies (21% of the total sample) lie well outside the funnel, suggesting publication bias or other possible bias or measurement artifacts.

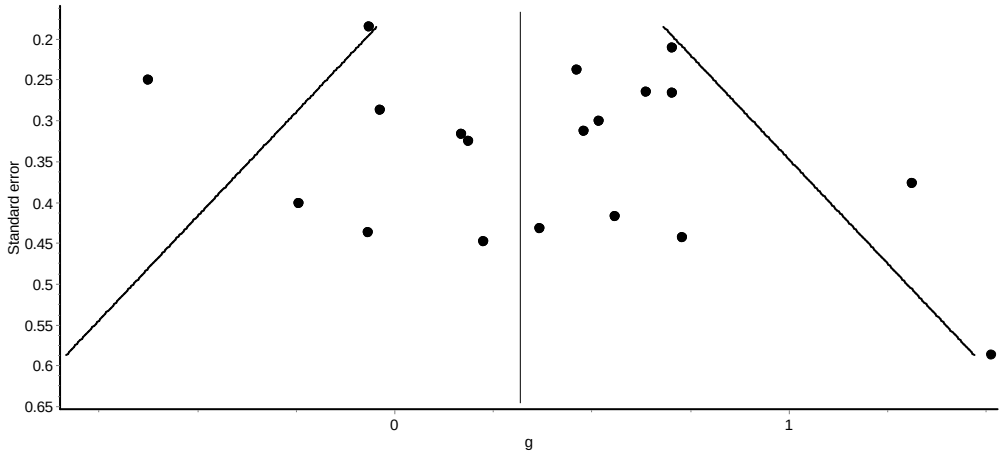


Figure 4. Funnel plot of 19 studies with anxiety as mental health outcome.

As shown in Figure 5, the 19 studies of VBI for anxiety yielded a somewhat higher effect size than the overall meta-analysis; however, the confidence interval was also larger, Hedges's g = 0.36, 95% CI [0.14, 0.58]. Heterogeneity was slightly lower than in the 60 study meta-analysis, $\tau^2 = 0.13$, $I^2 = 58\%$. The test for overall effect was significant, $z = 3.18$ ($p = 0.001$). Data were reported for 870 participants.

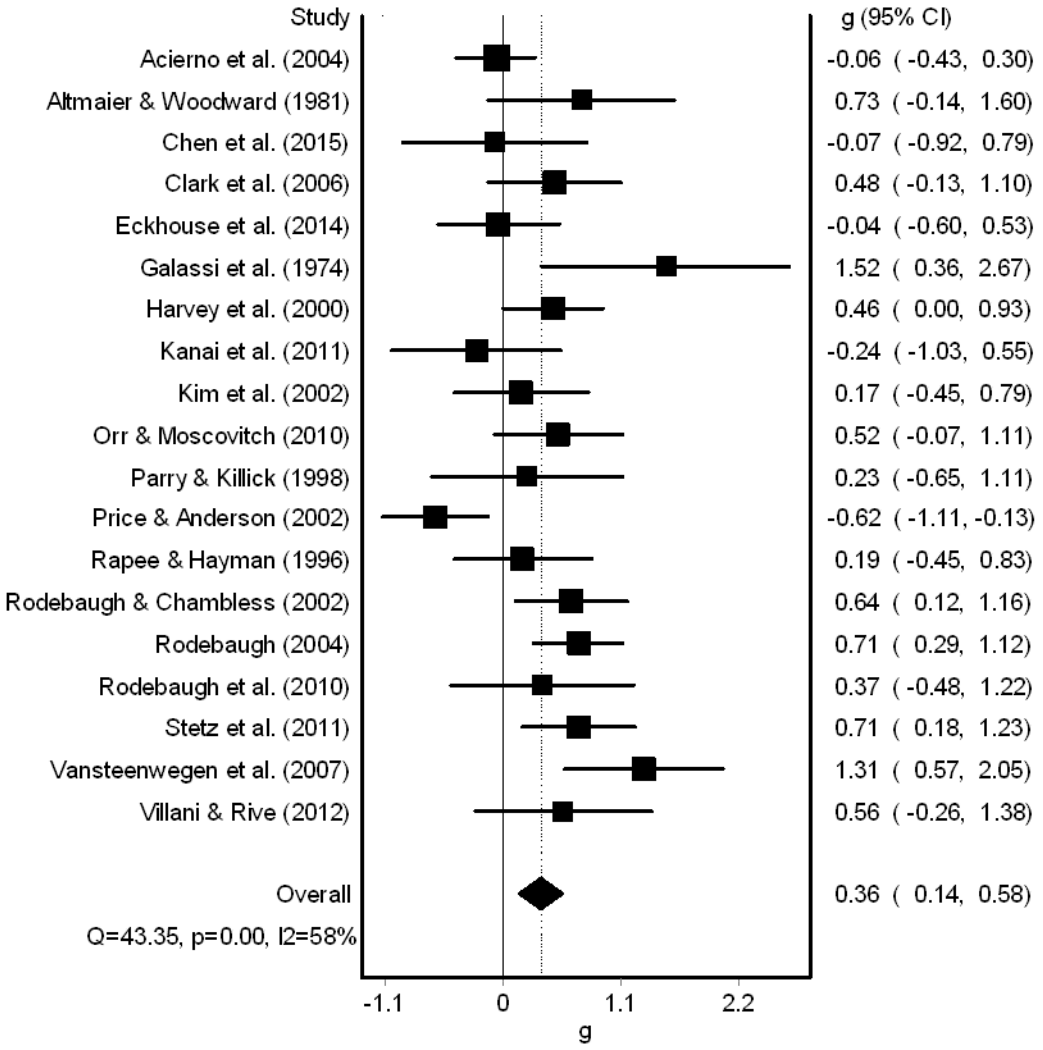


Figure 5. Forest plot of weighted effect sizes and 95% confidence intervals for studies with anxiety as mental health outcome.

Depression. Eight studies comprised the subgroup where improvement of depression symptoms was the targeted outcome for VBI. Data were reported for 932 participants. As shown in Figure 6, the funnel plot suggests that there was no publication bias in this subgroup of studies. The heterogeneity statistics for this subgroup were $\tau^2 = 0.13$, $I^2 = 0\%$; these results are likely due to the small number of studies in this subgroup.

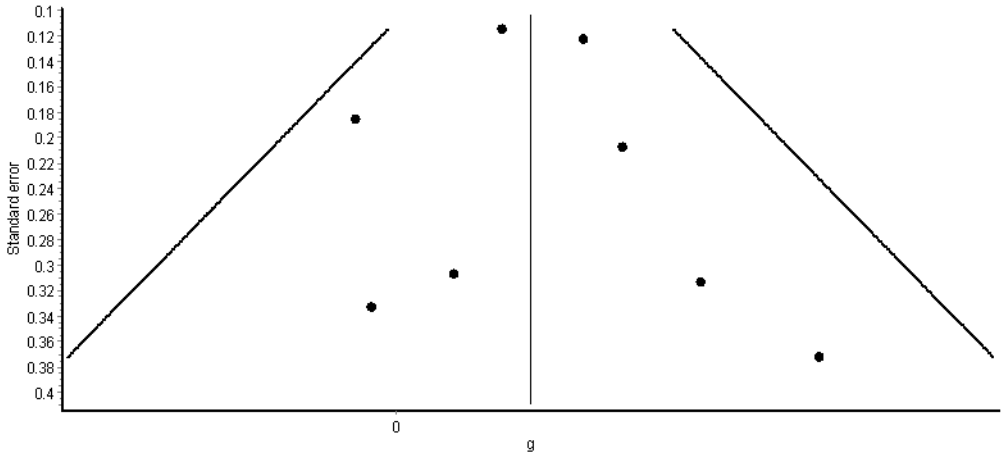


Figure 6. Funnel plot of eight studies with depression as mental health outcome.

Although two of the studies yielded small negative individual effect sizes, as shown in Figure 7, the overall effect size for this group was Hedges's g = 0.21, 95% CI [0.08, 0.34], $z = 3.31$ ($p < 0.001$).

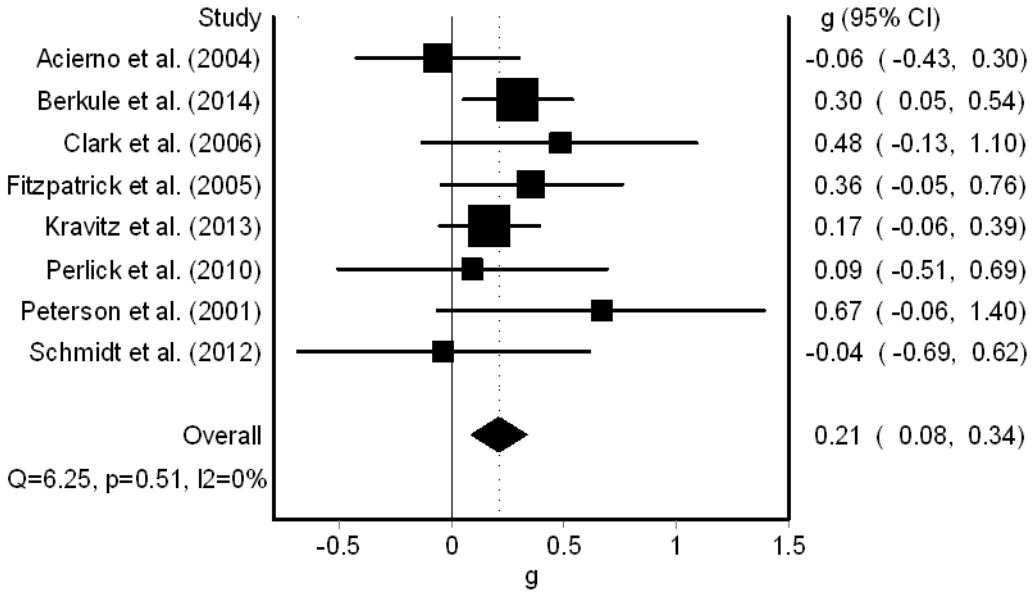


Figure 7. Forest plot of weighted effect sizes and 95% confidence intervals for studies with depression as mental health outcome.

Preparation for therapy. As depicted in Figure 8, two of the 14 studies of VBI used to prepare clients for therapy fell well outside of the funnel. Additional evaluation of sources of possible bias contributing to these results is discussed in Chapter 5

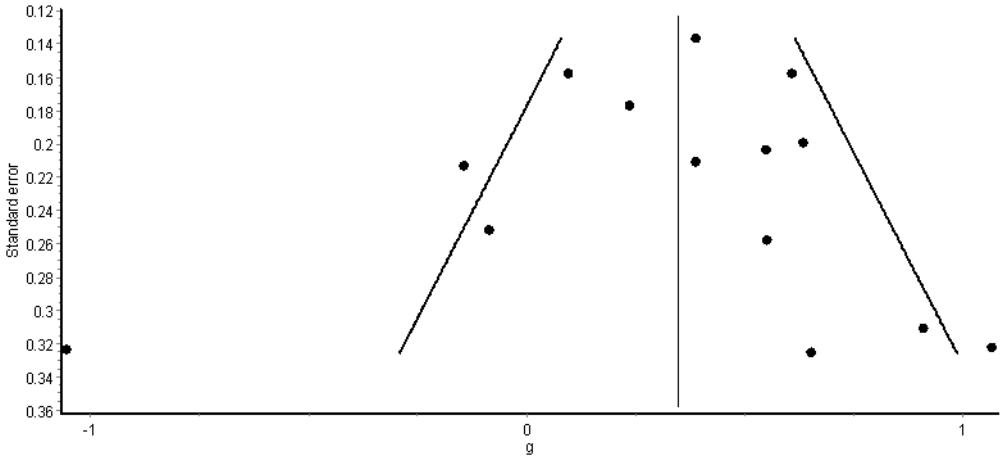


Figure 8. Funnel plot of 14 studies with preparation for therapy as mental health outcome.

The preparation for therapy subgroup meta-analysis results are shown in Figure 9. The overall standardized mean effect size was computed using data from a total of 1379 participants; 46.7% experienced VBI and 53.3% served as controls. This subgroup was also highly heterogeneous, $\tau^2 = 0.11$, $I^2 = 71\%$. Despite three of the studies yielding negative effect sizes, the standardized mean effect size for this subgroup was Hedges's $g = 0.34$, 95% CI [0.13, 0.55], $z = 3.20$ ($p = 0.001$).

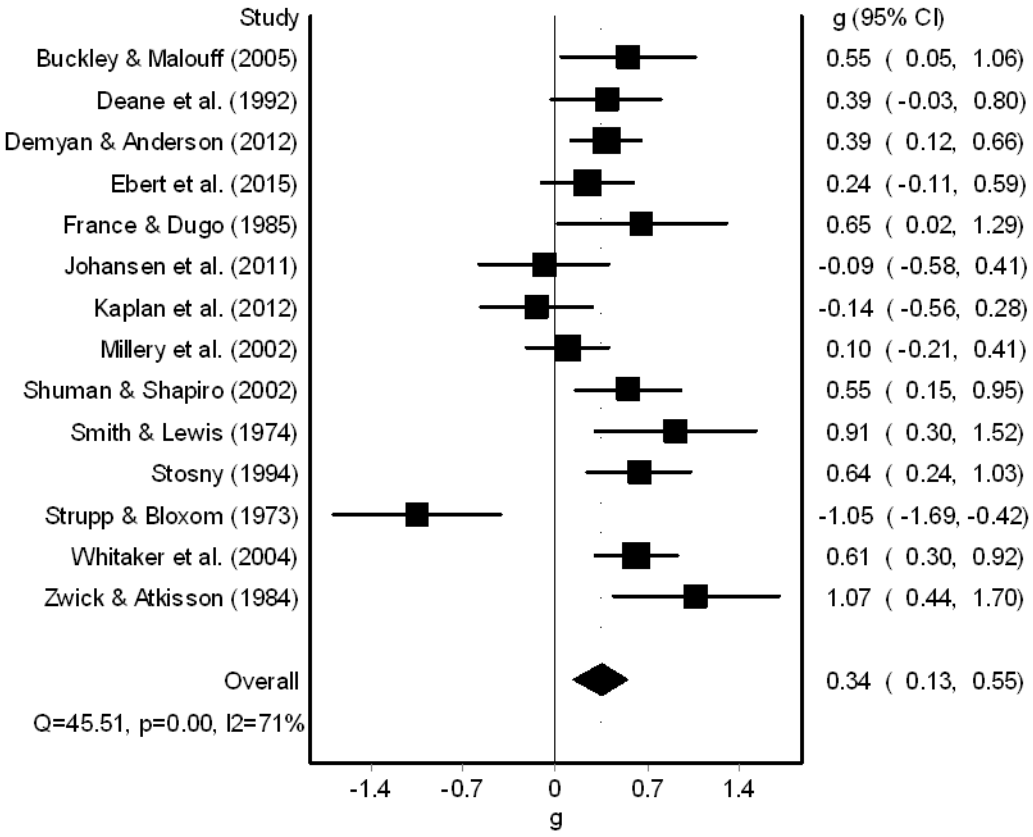


Figure 9. Forest plot of weighted effect sizes and 95% confidence intervals for studies with preparation for therapy as mental health outcome.

Caregiving attitude. This subgroup includes data from 11 studies, and calculations were based upon data from 714 participants. As shown in Figure 10, two studies' effect sizes lie well outside of the funnel plot. The variation among studies and the overall standardized mean effect for caregiving attitude is depicted in Figure 11. The heterogeneity statistics for this subgroup were $\tau^2 = 0.22$, $I^2 = 75\%$. The effect size for this subgroup was Hedges's $g = 0.48$, 95% CI [0.15, 0.80], $z = 2.84$, ($p = 0.005$). Graphical representation of these results are shown in Figure 10 and Figure 11.

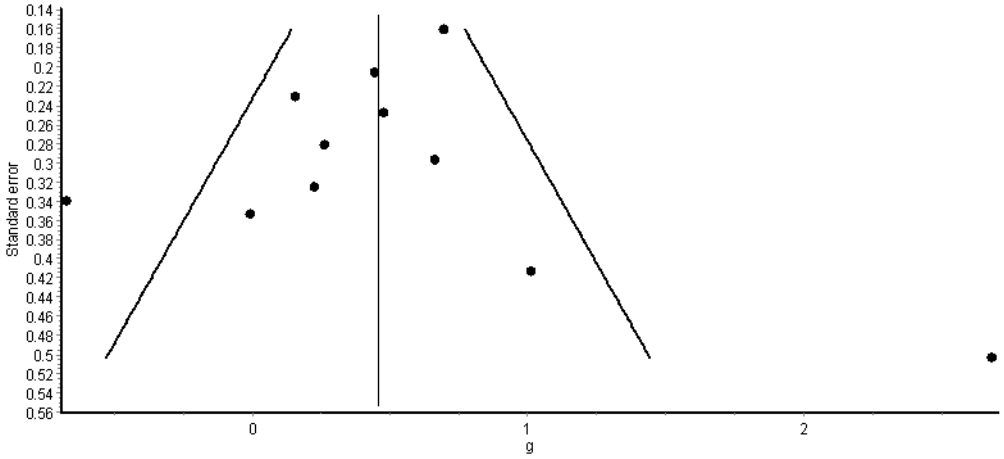


Figure 10. Funnel plot of eight studies with caregiving attitude as mental health outcome.

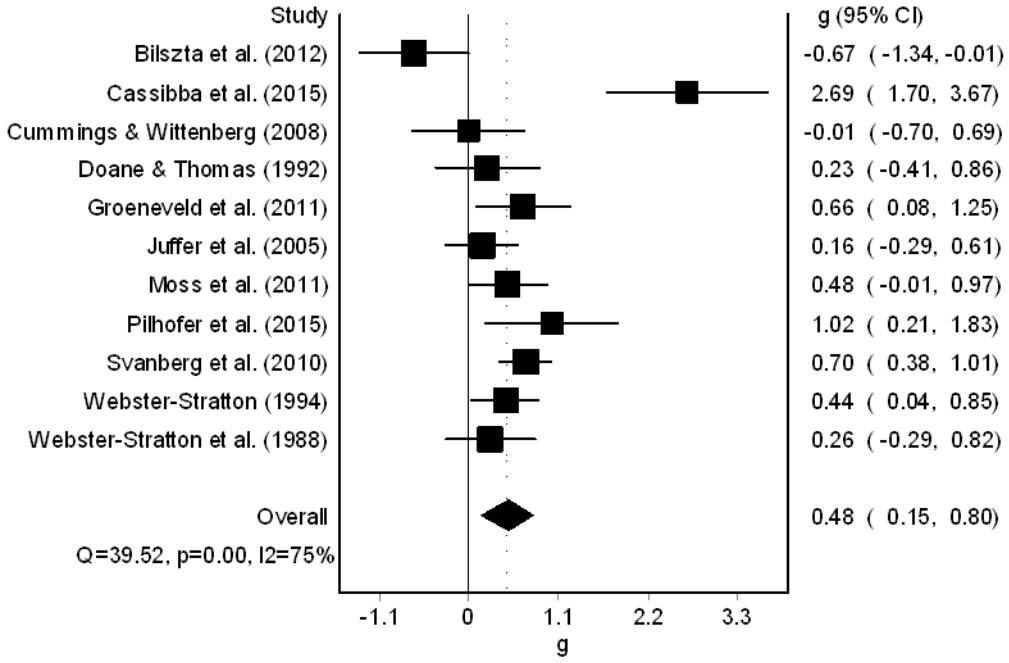


Figure 11. Forest plot of weighted effect sizes and 95% confidence intervals for studies with caregiving attitude as mental health outcome.

Other mental health outcomes. Ten studies reported effects for VBI on mental health outcomes distinct from the other subgroups. Because these studies could not be analyzed in groups of more than three studies having shared outcomes, they were included in this 'other' category for subgroup analysis. Distractibility, family functioning, negative affect, self-efficacy, binge-eating, and insomnia comprised the outcomes reported in this subgroup. Data included in this subgroup analysis is from 547 participants, 50.6% of that number received VBI and 49.4% served as controls. Figure 12 shows the distribution of standard errors for these studies.

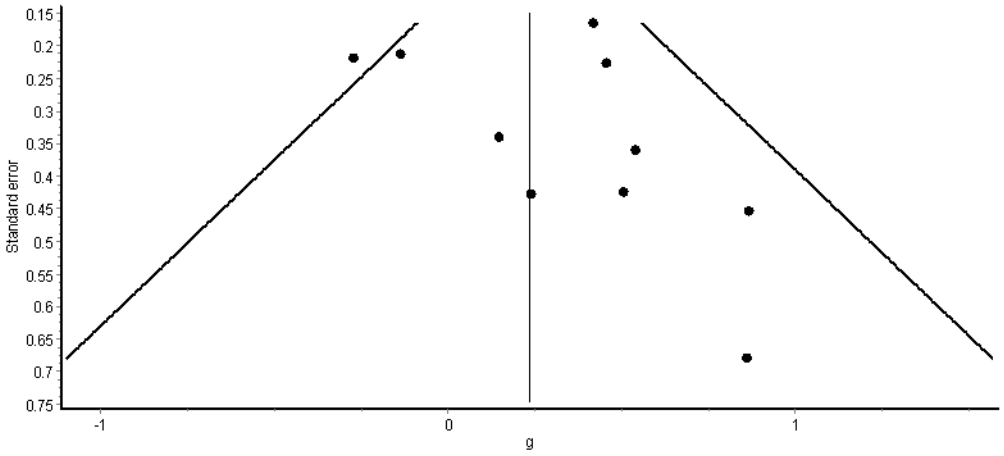


Figure 12. Funnel plot of 10 studies with "other" mental health outcomes.

Figure 13 shows the plot of results for weighted effect size calculations of this group of "other" studies. Interestingly, this subgroup was found to have much lower heterogeneity of results than the other groups where outcomes were relatively homogeneous. The heterogeneity statistics for this subgroup were $\tau^2 = 0.06$ and $I^2 = 43\%$. The standardized mean effect size for this group overall was Hedges's $g = 0.31$, 95% CI [0.06, 0.55], $z = 2.44$, ($p = 0.01$).

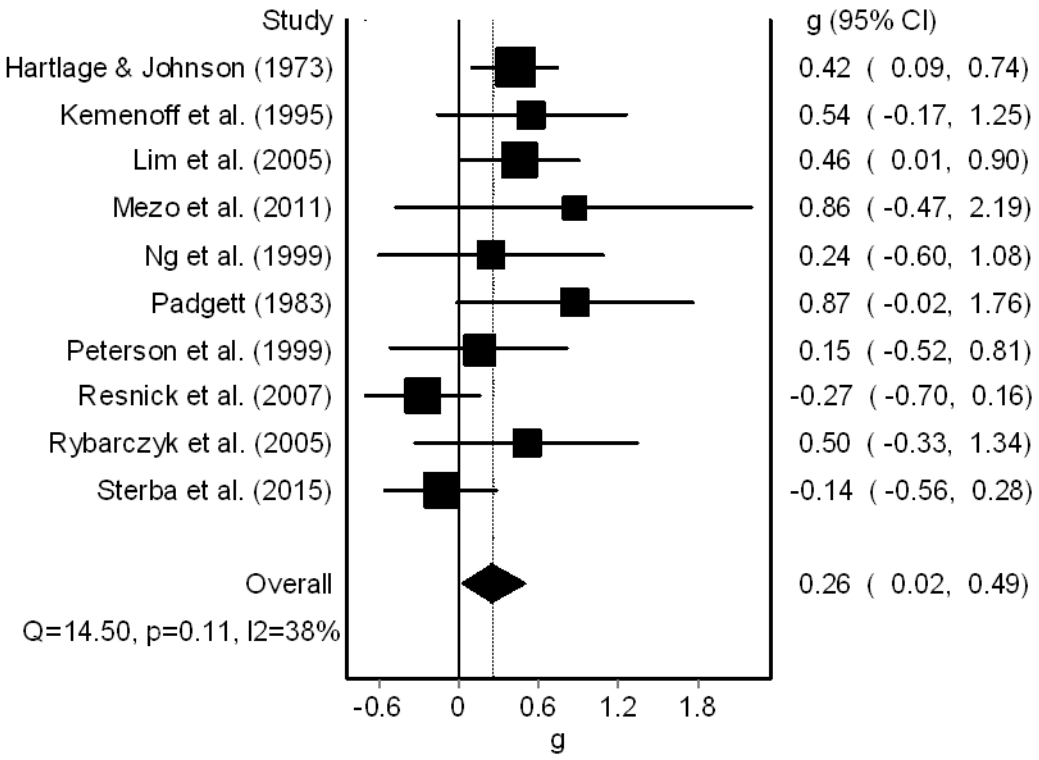


Figure 13. Forest plot of weighted effect sizes and 95% confidence intervals for studies with "other" mental health outcomes.

Summary of Results

The answers to the three research questions of this study, based upon the results obtained in this meta-analysis, are as follows:

1. What is the range of effect sizes, including 95% confidence intervals, for video based interventions (VBIs) in mental health treatment found in group studies with adult participants?

Effect sizes for VBI in mental health treatment of adults, calculated as standardized mean effects using a random effects model, ranged from - 1.05,

95% CI [-1.69, - 0.42] (Strupp & Bloxom, 1973) to 2.69, 95% CI [1.70, 3.67] (Cassibba et al., 2015). Thus, the first null hypothesis, *Ho1: The range of effect sizes for VBI in mental health treatment found in group studies with adult participants will be below .20* is rejected. However, the first alternative hypothesis *Ha1: The range of effect sizes for VBI in mental health treatment found in group studies with adult participants will be .20 at a minimum and .80 at a maximum* was also not supported; the range of effect sizes was much greater than hypothesized (- 1.05 to 2.69).

2. What is the overall mean effect size for VBI, including 95% confidence interval, in mental health treatment found in group studies with adult participants?

The overall standardized mean effect size is 0.34, 95% CI [0.24, 0.45], $p < 0.001$. Thus, the second null hypothesis of this study is rejected, *Ho2: The overall mean effect size for VBI in mental health treatment found in group studies with adult participants will be below .20.* Instead, the alternative hypothesis *Ha2: The overall mean effect size for VBI in mental health treatment found in group studies with adult participants will be greater than .20* is supported.

3. Do effect sizes from individual studies differ from the overall mean effect size based upon moderator variables, such as type of mental health symptom being addressed (e.g., anxiety or depression), or type of VBI employed (e.g., VF vs. VM)?

Subgroup meta-analyses conducted on the different types of mental health outcomes suggest that VBI may be most effective as a treatment intended to improve caregiving attitude; $g = 0.48$, 95% CI [0.15, 0.80]. VBI was found least effective in studies of treatment for depression, $g = 0.21$, 95% CI [0.08, 0.34].

The results from the meta-regression did not demonstrate statistically significant differences based upon type of VBI; however, it is possible that type of VBI may still be a meaningful moderator of effect size as meta-regression results may be influenced by power size. Therefore, a moderator may in fact be associated with effect size for an intervention despite lack of support in the meta-regression results. Thus, the results are mixed regarding the third null and alternative hypotheses, *Ho3: The effect sizes from individual studies do not vary predictably from the overall mean effect size based upon particular moderator variables, such as type of mental health symptom being addressed or type of VBI employed*. The null hypothesis cannot be rejected.

In Chapter 5, a more robust interpretation of the results will be offered including comments about underlying issues related to implementing VBI and measuring outcomes in mental health intervention settings. The limitations of this study will be presented as well as suggestions for new research in the use of video and other technology as part of mental health treatment. Specific needs for further research in this area will be highlighted, along with some suggestions for mental health clinicians in adopting VBI as part of their own practices, outside of the research setting. The utility of meta-analyses for clinicians in understanding evidence-based practices in mental health will also be discussed.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this meta-analysis was to determine the range of effectiveness of VBIs used with adults in mental health settings as demonstrated in published research using group designs. Because a meta-analytic approach was used, an additional purpose of the study was to identify possible moderators of the effect of VBI such as the type of VBI (VM, VSM, VF, or PV) and type of psychological variable being measured (e.g., anxiety compared with depression).

The results of this meta-analytic study of VBI applications in mental health were mixed. There was heterogeneity in the sizes of included studies, ranging from 10 participants in the Mezo, Hall, Duggan, and Noël (2011) study using video to teach progressive muscle relaxation to 305 participants in the Kravitz et al. (2013) study using PV to improve treatment engagement in people diagnosed with depression. In addition, there was variability in the definitions of mental health outcomes and measures used even among studies categorized as treating the same mental health symptom. For example, several studies focused on social anxiety, but outcome measures included highly reliable and validated instruments such as the Beck Anxiety Inventory (Acierno et al., 2004) as well as idiosyncratic measures such as a Subjective Units of Distress scale (Orr & Moscovitz, 2010). Thus, despite using a statistical method to allow for comparisons between measures with different underlying numeric scales (computation of the standardized mean difference), the qualities of each measure must also be considered in the analysis of all data. Just as a clinician cannot rely on symptom checklists alone when

evaluating a patient, the user of meta-analytic results cannot rely solely upon the computed effect sizes. The risk of bias in each individual study, such as use of unreliable measures, or nonrandom assignment to groups constitute a meaningful qualitative framework in which to better interpret the meta-analysis.

The effect sizes for individual studies ranged from strongly negative, Hedges's *g* = -1.05, 95% CI [-1.69, -0.42], indicating that the VBI worsened the mental health condition, to strongly positive, Hedges's *g* = 2.69, 95% CI [1.70 – 3.67], suggesting that VBI can be a highly effective treatment. To better understand these disparate effect sizes and their possible value to further development of evidence-based mental health practices, it is important to strategically evaluate the more effective and less effective applications of VBI in the studies comprising this meta-analysis.

Similar to Chapter 4, I structured the discussion in Chapter 5 to consider the overall effects found, effects according to the meta-regression of VBI types, and subgroup analyses based upon mental health outcomes used. Subsequently, I will discuss the limitations of the present study in terms of validity and generalizability of the findings. I will also discuss recommendations for future research, the implications of this study within the context of positive social change, and potential ramifications for VBI and other technology based interventions in the field of mental health.

Interpretation of the Findings

Meta-analysis is one way to evaluate the utility of treatments to populations with specific treatment needs. The conclusions of any meta-analysis are limited by the research design; for this meta-analysis the data points used are results from group clinical

trials of VBI in mental health (either purely experimental or quasi-experimental) as published in electronic form in particular databases. Although I thoroughly searched for studies meeting inclusion criteria, there is the possibility that important studies were not located, even though publication bias was not evident according to the funnel plot analysis described in Chapter 4.

Further, all interpretations of effect sizes are made in consideration of underlying risk of bias in the studies used, as detailed in Table 2. Possible sources of bias coded as present or absent for all included studies in this meta-analysis were as follows:

1. Nonrandom assignment to conditions
2. Nonblinding of personnel
3. Ad-hoc or nonstandardized outcome assessment
4. Attrition greater than 10% of original sample
5. Selective reporting of results.

A later section in Chapter 5 is devoted to risk of bias and ways to reduce bias inherent in meta-analysis in general and this study.

Overall Findings for VBI in Mental Health Treatment of Adults

The overall standardized mean effect size for VBI as treatment for mental health was Hedges's $g = 0.34$, 95% CI [0.24, 0.45], supporting a small to medium effect. Although 21.7% of the studies included in the overall meta-analysis yielded negative effect sizes, the effect size of 0.34 ($p < 0.001$) for VBI on mental health outcomes indicates that VBI has good utility for symptom reduction in adults. The numeric value of the effect size is customarily interpreted according to Cohen's (1992) categories of small,

medium, and large. However, the interpretation of clinical utility in the pragmatic view of a patient or therapist may not align with arbitrary lower boundaries of small = 0.2, medium = 0.5, and large = 0.8 (Ellis, 2010). As an example, a patient with moderate symptoms of anxiety may feel significant relief with symptom reduction of one third of a standard deviation in outcome score. For this person, a treatment with effect size of 0.34 is certainly worthwhile. Further, it is important to consider the effect sizes of other potential treatments in terms of balance between benefit to the patient and risk of side effects. Current treatment of mental health symptoms often includes the use of psychotropic medications, which have many potential side-effects including cognitive impairment and negative physiological effects (Hanson & Modiba, 2017). For a patient choosing treatment, the promise of a possibly small to medium improvement from using VBI over a small number of therapy sessions may seem more positive than accepting noticeable side-effect risks from medication use long-term.

This overall effect for VBI was computed using results from a highly heterogeneous group of studies, as reflected in the descriptive statistic I^2. The value of I^2 represents the percentage of variation across studies that reflect real differences in effect size, with thresholds for interpretation of level of low = 25%, moderate = 50%, and high = 85%. The moderate heterogeneity (I^2 = 61%) in the included studies list was expected because this meta-analysis was designed to gather as much data as possible from group studies of VBI used with adults. Including studies with a variety of VBI implementation methods and a variety of outcomes would be expected to produce a variety of individual effect sizes.

Although VBI has been consistently found in the past to be highly effective for use in children with autism, mainly in single-subject designs (Bellini & Akullian, 2007; Shukla-Mehta, Miller, & Callahan, 2011), to my knowledge this is the first meta-analysis of VBI for adults using between-group study designs with mental health outcomes as the dependent variable. Although conclusions from this overall effect cannot be drawn comparing specific types of VBI (e.g., VF vs. VM) or using VBI to target mental health symptoms, these findings are evidence that VBI can be effective for adults in a variety of treatment settings.

Meta-Regression and Subgroup Analyses

Meta-regression. Once an overall meta-analysis has been conducted, results from included studies can be further analyzed for evaluation of potential moderator variables. One way to accomplish this type of post-hoc analysis is through use of meta-regression. This statistical procedure allows for comparison of studies grouped by a categorical variable in terms of predictive power to the continuous variable of effect size (Steichen, 2004). One possible moderator in the current study was type of VBI. The results of the meta-regression, presented in Chapter 4, did not support the identification of any single type of VBI analyzed (PV, VM, VF, or VE) as a significant predictor of effect size. However, one statistic reported in the meta-regression supports the conclusion that at least one of the types is a significant predictor of treatment effect. This output for the joint test for significance of all covariates was $F(3,56) = 8.38$, $p = 0.0001$. The two seemingly contradictory results from the same meta-regression may be explained by the lack of statistical power due to small sample size (Harbord & Higgins, 2008). Thus, the

findings from the meta-regression are intriguing but a clear conclusion about VBI type as a moderator variable cannot be drawn. Borenstein et al. (2009) stressed that meta-regression analyses, although rooted in statistical analysis, are observational and nonsignificant results cannot be interpreted as support for lack of an association between the variable and effect size. Thus, the question about VBI type as a moderator remains unanswered.

Subgroup analyses. Another method for describing the relative strength of a categorical variable among studies to effect size is through subgroup analyses. These are smaller meta-analyses conducted using the same data as in the primary meta-analysis but on subgroups identified through the practical similarities among studies. Clinical mental health treatments are often categorized according to outcome variables such as symptom or type of disorder. For this meta-analysis, therefore, I conducted subgroup analyses based upon outcome variable. The five outcome categories chosen for subgroup analyses were anxiety, depression, preparation for therapy, caregiving attitude, and other mental health outcomes (comprised of studies that did not fit into any of the other categories in enough number to warrant grouping). Results of the subgroup analyses are included in Chapter 4; here I will discuss notable differences among the subgroup analyses and conclusions about the relative merits and drawbacks for VBI based on focus of treatment outcomes.

Anxiety. VBI for the treatment of anxiety can take several forms. The heterogeneity of the studies in this subgroup include all types of VBI and participants reporting anxiety symptoms as well as those who did not. The studies in this subgroup

with the largest individual effect sizes include VF for social anxiety (Rodebaugh, 2010; Rodebaugh & Chambless, 2002), VM for spider phobia (Vansteenwegen et al., 2007), and PV for relaxation training (Stetz et al., 2011). Galassi et al.'s 1974 VF study reported the largest effect (g = 1.52, with a positive confidence interval) and the subject characteristics (college students with no diagnosis) may have contributed to this result. This can be understood in terms of the perceptions of people reporting symptoms of anxiety disorders when they receive feedback compared to participants who have anxiety levels within the expected range given a situation. The difference between two such groups can be understood in terms of cognitive distortions (Beck & Haigh, 2014). A person who does not have high anxiety in most situations may be more able to accept feedback as positive on balance (Korn, Rosenblau, Burtika & Heekeren et al., 2016). In contrast, highly anxious individuals likely already have negative self-appraisals and may interpret feedback as criticism of faults rather than reinforcement of good performance, no matter the intent of the person giving feedback or the positive qualities being highlighted (Rodebaugh, 2004). With verbal plus VF exerting a stronger influence than verbal feedback alone, it is possible that this negative self-appraisal bias accounts for the negative effect sizes found in the VBI studies focused on anxiety outcomes.

Depression. The overall effect size of VBI for depression was 0.24, despite one study yielding a negative effect size (Schmidt et al. 2012). The Schmidt et al. (2012) study involved patients with traumatic brain injury (TBI) receiving feedback about a meal preparation task, and depression was one of several secondary outcome measures. There may have been measurement error due to the differences in ability to accurately self-

report depressive symptoms for people with TBI compared to the healthy control group on which the measure, the Depression Anxiety Stress Scale, was normed (Antony, Bieling, Cox, Enns, & Swinson, 1998). All but one of the studies in this group had a possible effect size of zero when considering the 95% confidence interval.

The study in this group with a positive effect size of Hedges's g = 0.30, 95% CI[0.05, 0.54] was one investigating the use of VF of mother-infant interactions as a preventive intervention for maternal depression (Berkule et al., 2014). While most of the studies using VF for families are reported in the subgroup analysis for caregiving attitude, the Berkule et al. (2014) study differed from them in the selection method and treatment setting for the intervention. This was a randomized control trial comparing VBI with a supportive instruction method given by a medical assistant, which has previously demonstrated effectiveness in increasing parental sensitivity, much as the studies reported in the caregiving attitude subgroup. However, this implementation of VF on mother and infant interactions took place during regular pediatrician visits, and the hypothesis was that maternal depression would be reduced in dyads receiving VF because of improved maternal responsiveness. The Berkule et al. (2014) study was the second largest in the depression subgroup, involving 269 dyads, and thus made a significant contribution to the overall mean effect for this subgroup.

It is important to note that this study was also one example where the researcher had to decide which group to set as the control, because data for three groups were reported. Rather than including multiple analyses of the same study, I decided to use the control group more closely aligned with the VBI group, except for the use of video. The

two groups that did not use VBI in this study were a take-home program of educational materials promoting parental involvement, and a group that received only regular pediatrician visits and no additional education or parental coaching. The difference between the VF group and the (educational) control group used was less than the difference between VF and the pediatrician visit only control group. Therefore, this is an example of how decision making by the researcher for calculating the effect size of individual studies can alter meta-analysis results. I chose to take the more conservative approach, and the reported effect size for this study (0.30) as slightly smaller than if it had been calculated using the no intervention control group (0.34) for comparison.

Preparation for therapy. This subgroup of studies was not initially identified in the proposal for the current meta-analysis until a cursory literature search had been conducted. Although the VBI described in these studies were not primarily targeting a mental health symptom, willingness to participate in therapy and positive attitude toward the process/positive expectancies emerged as important goals which may affect therapy for any mental health outcome. The overall effect was moderate, and seven of the included studies had moderate to large effects with confidence intervals that did not include zero. The most effective of these was Zwick and Atkisson's (1984) study of use of PV to teach clients what to expect in therapy. Similar studies in this group included measured attitude toward therapy, actual attendance at group therapy following administration of VBI, and expectations of parents who had children attending therapy following a PV to prepare them (Shuman & Shapiro, 2002)

There is no mental health therapy that will be effective if the person needing help does not attend. Further, a main goal in initial contact with a therapist (no matter the therapeutic orientation) is to instill hope for positive change via the therapeutic process. Thus, preparation for therapy seems a very good potential use of VBI, based in the results of this study. Exposure to videos outlining the expected behavior of clients and therapists may serve to both improve role induction and increase patient attendance at therapy when they are least likely to follow through. Therapy preparation videos could also be disseminated to potential patients before their first appointment, and serve as a tool for empowerment of the patients to best use their therapy time according to knowledge they have gained prior to even meeting the therapist.

Caregiving attitude. Video feedback for parent-child dyads has been used extensively, particularly as part of parenting programs in Europe. However, few studies of this nature were found that met criteria for inclusion in this meta-analysis because they are often reported as qualitative exploration of the technique (Juffer et al, 2008) or report within-subject improvement as part of case studies (Schecter et al., 2006; Steele et al., 2010). Despite this, 11 studies were included in this group and five of them yielded moderate to large effect sizes. Three of the five studies related to increasing maternal sensitivity to infants: the Cassibba et al. study (2015) in Italy, the Pillhofer et al. (2015) study in Germany, and the Svanberg, Mennet, & Spieker. (2010) study in England. Thus, in addition to VBI seeming to be an effective intervention to improve caregiving in infancy, it also appears to have good cross-cultural applications. The Groeneveld et al. (2011) study of childcare providers and the Webster-Stratton (1994) study of parents of

conduct disordered children also yielded moderate to large effect sizes. Because caregiving to infants and children can impact the development of later mental health concerns, additional research into VBI for these applications seems warranted. In addition, sensitivity to caregiving for other populations is also important. Caregivers for adults with developmental disabilities, and particularly for older adults with dementia (Hayden et al., 2012) or other major health concerns could also benefit from the development of new VBI targeting their special needs.

Other mental health outcomes. The studies in this grouping were interesting mostly because they demonstrate how clinical applications of VBI have been extended to different outcomes. Although each outcome included in this group did not have a great enough number to warrant subgroup analysis, the results suggest that VBI can be modified to help people with diverse mental health needs. Although most of the studies on their own did not produce a measurable effect, this group represented innovative work in broadening the scope of VBI. Only two of the studies generated individual effect sizes where the confidence interval did not include zero: the Hartlage and Johnsen (1973) study of distractibility during work periods and the Lim et al. (2005) study of parental involvement for families with adolescents. Both of these studies used VF as the intervention, and one used external ratings of behavior (Hartlage & Johnsen, 1973) while the other used a self-report measure (Lim et al., 2005).

Limitations of the Study

This meta-analytic study is limited by all possible limitations inherent in any meta-analytic study. These include heterogeneity of size and type of intervention,

differences in participant groups used in the interventions, comparison of many different outcome measures, publication bias, etc. The overall results must be cautiously interpreted based in the structure of the studies comprising the data points used for calculations. However, the limitations of meta-analysis can also be considered strengths. From this study, we can draw some tentative conclusions about the usefulness of VBI in mental health for adults precisely because the data points represent studies of numerous types of VBI in numerous treatment settings. We can infer broadly that VBI has some effectiveness, and further research appears worthwhile.

Generalizability

Inclusion criteria for this study were chosen to include as many studies as possible reflecting VBI use for mental health with adults. The broad inclusion criteria increased the possibility of heterogeneity among included studies and thus the possibility that the outcomes being measured could not be compared appropriately. This difficulty in meta-analysis is known as the "apples and oranges problem" (Sharpe, 1997, p. 884). Combining studies of different outcome variables such as anxiety and preparation for therapy (metaphorically, apples and oranges), despite these variables belonging to a larger class of outcomes (mental health outcomes for adults would be the fruit, in this example) does impose limits on how results can be interpreted. Very broad inclusion criteria for a meta-analysis will yield outcomes that are generally applicable and more informational than instructive in nature. Because there is such a limited literature on the use of VBI in adults, versus use of VBI in children (particularly children with autism), this meta-analysis was purposefully designed to be as inclusive as possible, with

subgroup analyses planned in advance. The findings from this study support the utility of VBI for adults with mental health symptoms or concerns related to mental health treatment (such as preparation for therapy). They are generalizable only to settings where VBI is planned according to a specific protocol, and where VBI are implemented with the guidance of a therapist, and not to self-help interventions or those involving distance therapy.

Validity

Validity concerns in this study have been addressed in the evaluation of risk of bias in each study used, per generally accepted guidelines for meta-analysis (Borenstein, 2009). The meta-analysis results may be considered valid only as the underlying design and results calculations for included studies were valid. The qualitative evaluation of risk of bias of each included study, as presented in Table 2, yielded important information about possible threats to validity. The most common risks for bias found were attrition greater than 10 percent of the initial sample (19 studies), non-blinding of personnel (15 studies) and the use of ad-hoc or non-standardized outcome measurements (15 studies). This suggests that although results from the meta-analysis were statistically significant, there were some underlying limitations in study design in many instances. Although no perfect study can be envisioned, those that incorporate blinding of personnel and the use of standardized instruments should be used in future to increase confidence in the internal validity of the results.

Reliability

Internal consistency reliability for this study was calculated using an intra-rater reliability estimate based on a random sample of six of the included studies. Reliability was very high, despite the complexity of the decisions needed in choosing outcome data for each study. Reliability in future meta-analyses could be improved by having more than one rater and by having a more homogeneous selection of studies. For example, if all studies included measure the outcome using similar types of instruments, reliability should be improved. Nevertheless, for the stated goals of this study and its recognized limitations, reliability of the results overall is very good.

Recommendations

The overall results from this meta-analysis suggest that VBI can be adapted for use with adults in a variety of mental health applications. VBI may be particularly effective in individual and group therapy for anxiety and to develop positive parenting practices of infants, young children, and adolescents. PV can also be used in a number of mental health applications, including role induction for clients into therapy, preparation for medical procedures, and learning how to improve adjustment to traumatic events.

Future Research

Despite the compilation of results from 60 studies to conduct this meta-analysis, there remain many unanswered questions for future research. How can VBI continue to be adapted for use in therapy with different client populations? What specific training is needed for therapists to develop competence in designing and using VBI interventions? How many sessions of VBI are needed to produce change in the short-term, and what is

the needed dose of VBI for change in the long term? More studies are needed in order to answer these questions. A future meta-analysis of single subject design studies may yield more information regarding the value of personalizing videos for instruction, modeling, and feedback. Because this meta-analysis only included between-group studies, this may have reduced applicability to applications by providers of individual therapy in community (rather than large clinic or university) settings.

In addition, there may be important participant variables to consider when designing VBI for mental health outcomes. What specific client characteristics predict success using VBI? Are there differences between younger and older adults in their acceptance of VBI in a therapy setting? How does the use of VBI in therapy compare with the use of video in self-help applications with no guidance from a therapist? Future research into all of these areas may serve as data to support (or not support) VBI as evidence-based mental health practice.

Implications

Positive social change. Reduction of psychological symptoms and improved mental health benefit individuals, families, and the greater society. With reduced mental health symptoms, people not only enjoy improved quality of life for themselves, but they can be more creative, productive, and strengthen society. Evaluating mental health interventions contributes to positive social change in that it helps identify practices that help people function better, and may rule out those that have a high risk of side-effects. This may mean not only better reduction in symptoms but greater safety to the public overall.

Evidence-based practice. This study supports consideration of VBI in development of future evidence-based practice in mental health therapy. VBI can be adapted to the treatment of different systems and can be tailored to the needs of specific patient populations, including adults with and without diagnoses. More research is needed to guide the development of VBI in both between-group and within-subject designs, but this study provides evidence that in some circumstances VBI has at least moderate effectiveness with extremely limited possibility of side effects.

Expanded use of technology to deliver interventions. The field of mental health services delivery has changed over the past few decades, and technology (including video) has become increasingly more accepted as part of an array of therapeutic tools that can be used (Kazdin & Rabbitt, 2013). Parameters for the ethical use of technology and specific protocols to guide therapists in using VBI and other technology, such as virtual reality will require evidence about VBI to support their use. This meta-analysis contributes to the larger questions about evidence of using VBI to address a number of different mental health concerns among different populations of adults. Further advances through expanded research in this area, emphasizing standardized treatment protocols and standardized outcome measures, can build upon the findings from this study.

Conclusion

VBIs are potentially useful interventions for adults experiencing mental health symptoms. This study employed a meta-analytic strategy to explore the applications of VBI allowed for evaluation of treatment effect across a broad range of mental health problems, as well as examination of the potential moderating effects of the type of VBI

and the type of mental health outcome being measured. The finding of an overall effect size for VBI of 0.34 suggests impact of this treatment modality is small to medium in strength. Balancing the potential small to medium beneficial effect of VBI with minimal known potential side effects should make the use of VBI attractive to both patients and therapists.

Video based interventions have been demonstrated effective in treatment of adults targeting symptoms of anxiety and depression. VBI have also been shown to positively impact patients' attitude toward participating in therapy, improved caregiver attitude toward infants and children, and could potentially be useful in reducing distractibility during work assignments. Additional research into VBI is warranted, and an emphasis on use of standardized measures to evaluate outcomes will be important in analyzing results for validity and reliability.

Advances in technology and decreases in cost for producing VBI make further research into using VBI for mental health a practical and cost-effective endeavor. The use of video has become common in all age groups and can be easily produced and distributed, making it more likely that patients will accept the use of video technology as part of a psychotherapeutic treatment plan. In addition, lessons learned from research into VBI may be relevant to the production of advanced technological interventions, such as Virtual Reality applications (Opris et al., 2012) and the expansion of telehealth services (Backhous et al., 2012). Improvement in preparation of clients for mental health therapy, and increasing the evidence base for use of VBI with adults, will support positive social change by potentially improving quality of life and reducing costs to society.

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Appendix A: Coding Categories

SOURCE CHARACTERISTICS

- Article # - Code from 1 to X
- Author(s) citation
- Year of publication – Code XXXX
- Publication title
- Type of study/report
    1. Primary qualitative research (exclusion criterion)
    2. Primary quantitative research
    3. Systematic review
    4. Meta-analysis
    5. Theoretical treatise or opinion paper
    6. Other (describe)
- How article found
    1. Database search key terms
    2. Forward searching (cited by)
    3. Backward searching (reference list)
    4. Other source (describe)

STUDY SAMPLE CHARACTERISTICS

- Participants
    1. Total number of participants
    2. Gender (If both indicate n of each)
    3. Adult? (Yes if 18 years of age or older; if no, exclusion criterion)
    4. Age range
    5. Ethnicity
    6. Clinical diagnosis?
    7. History of prior treatment?
    8. Also using psychotropic medication?

DESIGN CHARACTERISTICS

- Design
    1. Single Subject (exclusion criterion)
    2. Group
    3. Number of Groups in Study

- Type of control group
    1. No treatment/waitlist
    2. Psychological treatment not including VBI
    3. Medication only

- Setting
    1. Outpatient clinic/research center
    2. Therapist's office
    3. Residential treatment
    4. Home
    5. Correctional institution
    6. Other (name)

- IV (Type of VBI)
    1. Video instruction – standard for entire group
    2. Video instruction – individualized
    3. Video modeling (modeling of other)
    4. Video self-modeling/video feed-forward
    5. Video feedback
    6. Other (identify)

- DV (Mental health symptom/construct being addressed)
    1. Anxiety
    2. Depression
    3. Adjustment
    4. Coping skills
    5. Social skills
    6. Positive parenting skills
    7. Therapy role induction
    8. Other MH (describe)
    9. Autism (exclusion criterion)

- Type of measure used for DV
    1. Self-report measure/devised for study (name/describe)
    2. Norm-referenced self-report measure (name/describe)
    3. Therapist rating/devised for study (name/describe)

4. Peer/other rating/devised for study (name/describe)
5. Norm-referenced measure completed by therapist or other (name/describe)

- Length of treatment
  1. Number of sessions
  2. Number of weeks

RESULTS

- Results per DV – Control group
  1. Baseline (M1) mean and s.d.
  2. Post-study (M2) mean and s.d.
  3. Follow-up (M3) mean and s.d.
  4. Length of time from study initiation to follow up (days)
  5. Number of participants in group

- Results per DV – Treatment group 1
  1. Baseline (M_0) mean and s.d.
  2. Post-study (M_1) mean and s.d.
  3. Follow-up (M_2) mean and s.d.
  4. Length of time from study initiation to follow up (days)
  5. Number of participants in group

- Results per DV – Treatment group 2 (add similar section if more than two groups receiving VBI)

  1. Baseline (M_0) mean and s.d.
  2. Post-study (M_1) mean and s.d.
  3. Follow-up (M_2) mean and s.d.
  4. Length of time from study initiation to follow up (days)
  5. Number of participants in group

STUDY QUALITY CHARACTERISTICS

- Report of treatment fidelity included?
- Participants blind to condition?
- Reliability of measure reported?
- Validity of measure reported?
- Random assignment to groups?
- Attrition rate reported?

Appendix B: Excluded Studies

Acierno, R., Rheingold, A., Amstadter, A., Kurent, J., Amella, E., Resnick, H., . . . Lejuez, C. (2012). Behavioral activation and therapeutic exposure for bereavement in older adults. *American Journal of Hospice & Palliative Medicine, 29*(1), 13-25. doi:10.1177/1049909111411471

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