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Using Big Data in Psychotherapy Research: Possibilites and Perils

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by

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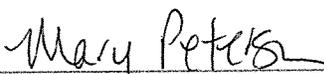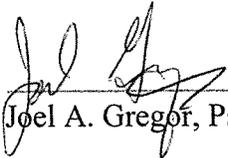Mary A. Peterson, PhD, ABPP/CL   2/2/2016
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Abstract

Traditionally, psychotherapy research has used efficacy and effectiveness studies. Efficacy studies have been considered the gold standard for studying clinical interventions and effects due to their stringent controls. While not as scientifically rigorous as efficacy studies, effectiveness studies examine clinical interventions with larger and more diverse populations and more real-to-life treatment protocols. Unfortunately, effectiveness studies tend to be based on retrospective report, sometimes many months or even years after the conclusion of psychotherapy. The growth of technology, in particular smartphone applications (apps) has opened the door to a form of effectiveness study that allows for real-time data collection. The Therapy Outcome Management System (TOMS) is an iOS app that offers the potential to collect "big data." The data set for this study included 323 Norm Development Associates, who tracked the outcome and alliance of a total 4,110 clients. Five research questions were considered. The first research question yielded a statistical difference in therapeutic alliance variables between short-term and long-term psychotherapy, indicating that long-term psychotherapy patients report statistically improved therapeutic alliance across 3 of the 5 variables used. The second research question yielded no significant differences in therapeutic alliance between gender-matched and mixed-gender client-therapist dyads. The third research question investigated theoretical orientation/ modality in relation to treatment duration and outcome rating, with three of the four variables used to measure outcome revealing differences. The fourth research question observed therapy outcome and treatment duration in various countries where psychotherapy is being conducted, with significant differences observed. The fifth research question observed outcome and therapeutic alliance between various diagnostic groups. Individuals with a child/adolescent

disorder were found to have had statistically higher average outcome ratings in the first 8

sessions when compared to mood disorders, and those in the substance abuse disorder group

reported statistically lower therapeutic alliance scores when compared to adjustment disorder,

anxiety disorder, and child/adolescent disorder. The 5 research questions reported here illustrate

and explore the potential of a novel research method involving big data. Implications and

limitations are considered.

Chapter 1

Introduction

Research evaluating psychotherapy process and outcomes is crucial in the field of clinical psychology. Indeed, commitment to research has become a hallmark of health service psychology insofar as it shapes training, guides treatment, and influences policies established by the American Psychological Association (APA). For example, the American Psychological Association 2005 Presidential Task Force on Evidence-Based Practice in Psychology (EBPP) defined and discussed evidence-based practice in psychology (APA, 2006), emphasizing the importance of integrating science and practice, and the commitment to EBPP.

Other organizations are also evaluating evidence-based psychological psychotherapy, such as the National Institute for Health and Clinical Excellence Guidelines (NICE Guidelines) and Cochrane Reviews. Given the centrality of research in understanding psychotherapy, it is not surprising that various systems have been identified to study psychotherapeutic process and outcome.

Two primary outcome research systems have been identified in the literature: efficacy studies and effectiveness studies (Singal, Higgins, & Waljee, 2014). Now the ubiquity of smartphone applications (apps) make a modified form of effectiveness studies possible, akin to what is known in the popular media as "big data." The purpose of the current study is to introduce and illustrate a new possibility for psychotherapy research based on data collected by

psychotherapists using mobile devices. To put this study in context, it is first important to

summarize the two traditional approaches to psychotherapy research.

Efficacy Studies

The efficacy study has been considered the "gold standard" in psychotherapy research

and is often favored in evaluating clinical treatments. Efficacy studies have been used for

conducting clinical trials to evaluate specific interventions in treating psychological disorders.

Thousands of examples of efficacy studies could be offered. For example, a study by Gloster et

al. (2011) evaluated whether therapist-guided exposure within cognitive-behavioral

psychotherapy (CBT) was more effective than CBT treatment without therapist-guided exposure

in the treatment of agoraphobia. The results demonstrated that the therapist-guided exposure was

better for agoraphobic avoidance, overall functioning, and reduction in panic attacks. This study

used randomized assignment, control group, 12-session written manualized treatment, specific

exposure methods, and outcome measures to demonstrate that therapist-guided exposure added

to the effectiveness of CBT in treatment of agoraphobia. As this example illustrates, efficacy

studies tend to be highly controlled and specific to their conditions. Efficacy studies typically

include several key elements.

First, specific inclusion and exclusion criteria are used in order to keep the sample as

uniform as possible. In the example cited here, Gloster et al. (2011) accomplished this by using

participants that met diagnostic criteria of the *Diagnostic and Statistical Manual of Mental*

Disorders (4th Ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) for panic

disorder with agoraphobia. In addition to meeting *DSM-IV-TR* diagnostic criteria, individuals

had to score significantly elevated on the Hamilton Anxiety Scale (HAM-A) and the Clinical

Global Impression (CGI). The study used exclusion criteria such as reporting suicidal intent,

borderline personality disorder diagnosis, psychotic disorders, and alcohol dependence. All

participants were required to discontinue all psychopharmacological medication and any other

psychotherapy.

Second, participants are randomly selected to be in a control group or the experimental

group. Randomization is a key feature of true experiments (as opposed to quasi-experimental

studies), making this an important part of efficacy studies. Gloster et al. (2011) also used

stratified sampling that was conducted by the study center. There were two treatment groups that

used two variations of CBT. Both of these groups used the same content, structure, and

treatment duration, but had different implementation of exposure.

Third, there is a control condition where some participants are not receiving the same

intervention that is being delivered to the experimental group. Again, this is a requirement of a

true experiment, and therefore an essential part of efficacy studies. In the Gloster et al. (2011)

study, a single wait-list control was used that did not receive either of the CBT interventions.

Fourth, the treatment is standardized. That is, researchers assure that the treatment is

delivered in a predictable and uniformed way across the various therapists and participants of the

study. Often this involves developing a treatment manual and then testing to be sure that

therapists maintain fidelity to the manual. Gloster et al. (2011) accomplished this by using a 12-

session written manualized treatment protocol that was used over 6 weeks and followed with two

other sessions. There were two variations of the CBT protocol in this study. One variation used

therapist-guided exposures outside the psychotherapy room. The other had the therapist rehearse

the exposure procedure with the client and encouraged the patient to implement the procedure

outside of the psychotherapy session.

Fifth, there are efforts to keep evaluators uninformed regarding the identity of particular

participants and whether they are in the control group or the experimental group. In some cases,

there is also an effort to keep participants from knowing which group they are in, or even an

effort to keep treatment providers from knowing some information about the treatment group of

participants. The Gloster et al. study had their clinical coordination center create the randomized

list of patients by personnel that were not a part of patient care.

Sixth, standardized outcome measures with established reliability and validity are used to

evaluate the efficacy of the intervention. This typically involves a repeated-measures design

where the outcome measures are given before and after treatment, and again after a suitable

follow-up period has passed. The same measures are given for the control and experimental

groups. In the Gloster et al. (2011) study outcome variables were assessed at baseline, mid-

treatment (4th session), post-treatment, and during a 6-month follow-up. The assessment tools

included a Structured Interview Guide for the Hamilton Anxiety Scale, Clinical Global

Impression, number of panic attacks, and agoraphobic avoidance.

Because of these criteria for efficacy studies, they are particularly well-suited for meta-

analysis. Meta-analysis is a systemic quantitative review of efficacy research looking at specific

treatments of a particular mental disorder. Meta-analytic studies look at a collection of efficacy

studies to consider the overall effectiveness of treatments, which may then be used for purposes

of treatment planning and subsequent research. An example of such a meta-analysis was

conducted by Vøllestad, Nielsen, and Nielson (2012). The researchers considered mindfulness-

and acceptance-based interventions (MABIs) for treatment of anxiety disorders and other

comorbid symptoms. They considered 19 efficacy studies that employed MABIs for patients

with anxiety disorders and found that MABIs are associated with significant reductions in

anxiety and comorbid depressive symptoms. Hundreds of similar examples could be cited.

It should be noted that efficacy studies may consider treatment groups as compared to

control groups, evaluate various adaptions of established psychotherapies, and directly compare

treatments. An outcome study by Scheeringa, Weems, Cohen, Amaya-Jackson, and Guthrie

(2011) serves as a good example of comparing treatment to no treatment. The researchers

studied whether trauma-focused CBT was effective in treating posttraumatic stress disorder

(PTSD) in young children. The patients were assigned to either a 12-session manualized

treatment or a 12-week wait-list. The study used interviews and checklists to assess for

symptoms of PTSD, major depressive disorder, seasonal affective disorder, oppositional defiant

disorder, and attention deficit/hyperactivity disorder. The results suggested that the treatment

was more effective than the wait-list no-treatment group in reducing PTSD symptoms and

reducing symptoms from comorbid disorders.

A study by Wagley, Rybarczyk, Nay, Danish, and Lund (2013) provides a good example

of how an efficacy study can be used to study an adaption to an already established

psychotherapy. The research tested the efficacy of a two session abbreviated CBT intervention

aimed at treating insomnia as a supplement treatment for psychiatric patients. The study

employed a group that did not receive the supplement intervention and randomly assigned the

patients in the groups. The Pittsburgh Sleep Quality Index (PSQI) and a Patient Health

Questionnaire-9 (PHQ-9) were used as the outcome instruments. Results demonstrated that the

abbreviated supplemental CBT treatment is beneficial for insomnia and depression in long-term

psychiatric outpatients.

Last, a study by Arch et al. (2012) demonstrates how efficacy studies can be used to

compare different forms of psychotherapy treatments. This study compared CBT to acceptance

and commitment therapy (ACT) for the purpose of treating anxiety disorders. Results suggested

that ACT and CBT showed similar improvement and that ACT is a viable treatment for anxiety

disorders. Efficacy studies show strong possibilities for comparative and explanatory

psychotherapy outcome research.

Due to stringent requirements in efficacy research, the results are considered to be

empirically valid and can easily suggest whether certain psychotherapy approaches should or

should not be used with particular diagnoses. But efficacy studies also have limitations. One of

the biggest challenges for efficacy studies is their cost. They are expensive to conduct, almost

always requiring external funding. Cost also limits the number of sessions that can be included

in clinical trials as well as the number of participants included, which means that some efficacy

studies report the results of relatively brief interventions when longer interventions might be

common in naturally occurring psychotherapy settings. Shean (2012) suggests that efficacy

studies make the assumption that lasting and significant changes occur within a relatively short

time frame, which is not always the case. Most efficacy studies used operationalized and/or

manualized approaches to treatments, and the question is often raised whether these treatments

reflect the real-life practice of clinicians in the field. Another limitation of efficacy studies is

that they often have strict inclusionary and exclusionary criteria. While this is helpful in the

laboratory, it may not reflect the complexity of clients most often seek help for mental health

concerns. It is common practice to select participants diagnosed with a single Axis I disorder, which is not always indicative of real-life clinical practice where comorbidity can be present with various psychological disorders (Shean, 2012). Another limitation can be a lack of cultural sensitivity. Dependence on manualized treatment might neglect cultural factors that might be impacting patient's symptoms and functioning. Finally, clinical trials are well suited for outcome studies, but not for psychotherapy process. As a result, the studying of outcome and process is typically segmented into separate studies rather than looking at the two in concert.

Effectiveness Studies

Effectiveness studies, like efficacy studies, can be utilized to evaluate mental health treatment and outcome. Effectiveness studies attempt to examine clinical interventions more similar to real-life routine conditions. These studies use more diverse populations, less-standardized treatment, and focus on more routine clinical settings (Singal et al., 2014). Effectiveness studies attempt to answer whether the clinical intervention in question works in real life practice. Whereas efficacy studies have high internal validity, effectiveness studies are able to achieve high external validity and generalize the results to many settings (Patsopoulos, 2011). Efficacy studies are able to determine causal relationships between variables, but effectiveness studies are more cost-effective which allows them to have larger samples sizes, simpler designs, and look at interventions that are difficult to study under a typical efficacy study method. Seligman (1995) used the Consumer Reports study, which evaluated whether patients benefited from psychotherapy, as a prime example to demonstrate how effectiveness studies are able to provide a different way to study psychotherapy outcome.

Effectiveness studies are typically simpler to conduct than efficacy studies and can lack the strict structural requirements. The Consumer Reports study utilized a short 26-question survey about mental health treatment that was sent out embedded in their annual questionnaire in 1994. The questions asked what kind of therapist the individual met with, what presenting problem was addressed, type of psychotherapy, whether the psychotherapy helped, and other questions tailored to mental health counseling (Seligman, 1995). The results provided a large sample size of 2,900 individuals that specifically met with mental health professionals and a total of 4,100 that saw a combination of mental health professionals, family doctors, and support groups (Seligman, 1995).

Effectiveness studies also allow for larger-scale and more diverse populations. One study, if simple enough, can be used to reach population groups in various countries, cultures, and communities. Though the Consumer Reports survey was sent out only to their subscribers, it could have been distributed in hospitals, medical clinics, mental health clinics, churches, community organizations, and any place that has potential contact with individuals that received psychotherapy in the past. Moreover, the Consumer Reports survey could have been translated and sent overseas to obtain psychotherapy outcome data from other countries. The research itself can then be used to observe differences and patterns across cultures, ethnicities, geographic location, communities, religious, and other demographic domains.

Also, effectiveness studies can be used to assess a wider range of interventions than efficacy studies. Efficacy studies typically require standardized and/or manualized treatment protocols, but effectiveness studies can observe a large variety of treatments that do not fit these stringent requirements. Treatments can be continuous and long term. Seligman (1995) notes that

the Consumer Reports study included treatment durations from one month or less through two

years or more. This allows the study of longer-term psychotherapy approaches such as

psychodynamic, psychoanalytic, existential, gestalt, and other relational approaches to

psychotherapy.

Notably, there are no control groups in effectiveness studies, as there are in efficacy

studies. This has significant disadvantages from a scientific perspective, though it does allow for

cost-effective studies of large samples where hypotheses can be generated for more rigorous

scientific evaluation in the future.

Finally, effectiveness studies can look at many domains and variables related to the

treatment process. These variables can include client-clinician rapport, attention, motivation,

expectation of gain, and many other variables that are often times not observed through

traditional efficacy studies. The Consumer Report survey asked for therapist competence and

reasons for termination, psychotherapy cost, patient satisfaction, health care reimbursement

policies and limitations on coverage, and other domains parallel to psychotherapy (Seligman,

1995).

Although there are various advantages to an effectiveness study, there are a number of

important limitations. Due to the less stringent requirements for controls and manualized

procedures, experimenters might inadvertently introduce bias into the study by way of sampling

and item selection on survey questions. Also, effectiveness studies typically need large sample

sizes in order to have enough credibility to form conclusions about findings and suggest future

areas of investigation. Moreover, results from effectiveness studies are sometimes too general

and do not possess enough causal or explanatory data for in-depth analysis. The Consumer

Reports study, for example, points to general conclusions suggesting that no specific

psychotherapy approach was better than another when considering patient satisfaction, and that

psychologists, psychiatrists, and social workers were not different in their effectiveness as

therapists (Seligman, 1995), but it was unable to evaluate the nuanced treatment questions that

can be considered in a highly controlled trial of a manualized treatment.

Mobile Applications for Outcome Data Collection

While efficacy and effectiveness studies have traditionally been used to gather

psychotherapy outcome data, developing technology has provided a potential new method to

gather such information. Specifically, smartphone applications and their widespread reach have

a large potential for psychologists and other psychotherapists to gather data for psychotherapy

research. Using software to gather psychotherapy research can be seen as an extension of the

effectiveness study method. Mobile applications can help gather data quickly and on a

potentially larger scale then traditional effectiveness and efficacy methods. Whereas

effectiveness studies have traditionally been retrospective, asking participants to evaluate their

experiences months or years after the conclusion of psychotherapy, mobile app technology

allows for effectiveness data to be collected in real-time, as psychotherapy is occurring.

One example of this is the Therapy Outcome Management System (TOMS), an

application (app) for iPhone/iPad operating system (iOS) devices that is currently being used to

gather psychotherapy outcome data and alliance data (Wiarda & McMinn, 2012). This app

allows for clinicians to obtain feedback from their clients regarding psychotherapy outcome and

session feedback. Software such as the TOMS and other applications tailored to gather

psychotherapy data have substantial advantages for clinical and research practices.

Using mobile applications that are readily available through common distribution channels such as the Apple iTunes Store promotes large distribution and usage. The open availability of the software allows clinicians all over the world to use the app and track patient outcome. The client outcome, session feedback, and demographic information is de-identified and stored on a cloud server for research access. This method allows researchers to access the data from anywhere and the data can come from a large number of settings such as psychology clinics, primary care clinics, and other centers where psychotherapy is conducted. Traditional efficacy and effectiveness studies can be limited by the sample sizes. Outcome mobile applications such as the TOMS allow for public distribution which encourages very large sample sizes for research analysis.

The adaptability of mobile applications is important when considering psychotherapy research applications. Mobile applications are usually developed and coded by one or more programmers. The software can be tailored and modified to fit specific research needs such as client type, intervention method, clinical settings, demographics information, and other domains for study. Even after an application is initially launched the application can be updated, modified, and altered for improvements and needed changes. Using software for psychotherapy outcome research adds a level of versatility and adaptability that is difficult to reach with other methods of study. Traditionally once studies have started, there are no ways to modify for potential problems. For example, the TOMS app gathers demographic information and outcome data using the ORS and SRS outcome measures. Hypothetically, the TOMS app could be modified to gather other information such as physical characteristics like weight, height, and even use other outcome measures that are already established in a clinical setting. The software

can be translated into various languages to accommodate the diversity of the clinical population

and setting. Although making modifications to an application would takes resources and time,

the adaptability of the software allows the data collection to account for all the specific

characteristics the specific clinical settings needs to observe.

Thus, one application can be set up to collect information in various clinical settings, with

multiple language groups, and potentially gather extremely large sample sizes for psychotherapy

outcome research. The ability to adapt the software to account for all the demands and needs of

the clinical settings, and also the ability to endlessly collect psychotherapy outcome data with no

additional difficulties offers a new potential for psychotherapy outcome research that is not

common in today's research.

Another appeal for using smartphone applications for outcome research is the simplicity

of use. Efficacy studies are usually more complicated and take longer to develop than

effectiveness studies. Clinicians must usually be trained on a specific intervention and follow a

specific manualized treatment for a particular study. In contrast, using a mobile app requires

only minor changes in how the clinician practices psychotherapy. The app must be used at the

beginning and/or end of the psychotherapy to obtain outcome and alliance information but other

than that, it does not affect the flow of psychotherapy during clinical practice. The TOMS app,

as an example, would require the therapist to possess a mobile tablet or phone with the TOMS

software and simply ask the client to fill out the outcome and alliance measures to gather the

patient's feedback. The ease of use promotes using the app in every psychotherapy session as

long as the clinician brings it into the psychotherapy room. Using the app also allows for rapid

data collection and secure storage of the data. The software automatically stores and uploads de-

identified outcome data to a large database for research purposes. From the clinician's point of view, the application offers outcome tracking and secure storage which is easily accessible for clinical purposes. The amount of outcome data obtained would only be limited by distribution and the clinician's use of the software. Thus, if the distribution and accessibility is on a world-wide scale a single app could monitor outcome on multiple continents, and monitor outcome data on potentially millions of clients.

However, there are also potential downsides with using mobile software for psychotherapy outcome data collection. The first and most significant issue is how the app will reach the psychotherapy room. The software app needs to run on a certain type of device, like a tablet, so the clinic, clinician, or organization must obtain these devices in some way. People might ask whether certain organizations even allow the use of such software to track outcome data, and will the organization deem the software secure enough for confidentiality purposes? These questions need to be answered before a large organization adopts a mobile app for outcome data collection. Private practice or smaller organizations might have an easier time adopting the software, but the cost of the tablet or device needed to run the software might be a challenge for private practitioners and smaller clinics. A significant challenge is also to figure out a method to integrate mobile applications with the electronic health/medical records (EHR/EMR). Although possible, there are formidable obstacles to incorporating a new measure in a EHR. However, there are many relevant applications for the outpatient environment. The most obvious is for clinical feedback, but it could also create efficient and accurate information for payers who require outcome data for continued authorization of care. This method might be a way to cleanly collect the research data, but poses many challenges in security and integration.

Another potential issue is the cost of the software. Even if the software is free to use, it needs to

provide substantial benefits for the clinician or clinical organization. The application also needs

to be in line with the expectations of the clinician. If the software is not directly benefiting the

clinical practice and if it does not meet the clinician's expectations, the software might not be

used.

Another issue results directly from the software's distribution. If the application is not

readily available or commonly used, will the application have enough exposure for

psychotherapy outcome research? This is especially the case when talking about studying

specific populations or groups. If there are significant issues with reaching psychotherapists and

instilling regular use of the application, the data gathered might not have enough power for

research purposes. Even if the device and app are readily available, and are adopted by many

clinical organizations, there is a question whether clinicians or organizations will use it regularly.

The software might appear promising and used regularly for a period of time, but it is unknown

whether the software will be used for weeks, months, or years regularly and consistently. The

consistency and regularity of use will affect data collection and whether the data can be used for

longer-term longitudinal analyses.

Another issue regarding outcome tracking applications is the developer and development

costs of such applications. Although learning how to code and program software is possible, the

task is usually performed by experts outside the psychotherapy and psychology research fields.

Developing and modifying such applications requires extensive skill, time, and resources which

often means hiring professional software developers to build such programs. Hiring

professionals for the purposes of application development adds additional expenses to collect the

research data. Even if the application were developed by a researcher, additional modification

and maintenance of the application might require additional expenses and resources. The long-

term use of an outcome application for data collection can be cost-effective, but there can be a

large amount of start-up costs with no fail-proof way to ensure that the application is successful

in reaching a large number of clinicians and clients.

Finally, one must consider ethical issues in using software for gathering psychotherapy

outcome data. According to the APA (2009), confidentiality and privacy are significant

challenges that arise when incorporating technology into psychological practice. Security of the

information obtained using such applications is essential and must be done with high standards.

Using mobile applications for patient outcome tracking might require special methods of de-

identification client's personal information but at the same time allowing long-term tracking of

each client's outcome feedback. If de-identification is not possible from the programming

standpoint, both obtaining patient consent and ensuring the security of the database are essential.

Another ethical consideration is how the outcome data will be used. Will the information be

used for pure research purposes set by the developer/researcher who created the application, or

will the data be available for the general or limited public for research and other reasons? If an

outcome tracking application becomes vastly popular and accepted by psychotherapy

practitioners and organizations, third-party payers might eventually want to base psychotherapy

reimbursements on outcome data obtained for specific clinicians and interventions. For example,

if the outcome data and research demonstrates that a specific clinician was able to achieve

symptom reduction and good outcome using a CBT approach within eight weeks for a specific

disorder, third-party payers might not want to pay clinicians or interventions that take longer to achieve similar results.

Ethics regarding confidentiality and how this data collection method will be used is something that will need to be addressed and analyzed. However, the potential for using outcome tracking software is unprecedented. To demonstrate the potential use of a psychotherapy outcome application, the TOMS app will be used to answer a number of research questions pertaining to psychotherapy.

The first study will observe changes in therapeutic alliance over various treatment durations. Specifically, the study will compare therapeutic alliance in short-term versus long-term psychotherapy. Research has suggested that client's with lower therapeutic alliance are more likely to drop out of psychotherapy (Sharf, Primavera, & Diener, 2010). Within the TOMS app this would be observed within shorter psychotherapy treatment durations. For the purposes of this study, short-term psychotherapy will include psychotherapy that lasts 1 to 8 sessions. Treatment that continues past 8 sessions will be considered long-term.

The second question will ask whether gender differences between client and therapist are related to therapeutic alliance and treatment duration. A study by Wintersteen, Mensinger, and Diamond (2005) observed whether gender and racial differences between patient and therapist affect therapeutic alliance and treatment retention in adolescents. Their results suggested that gender-matched dyads have higher therapeutic alliance and that the clients in these dyads were more likely to complete treatment. Racial matching suggested higher retention but no significant differences between patient-rated alliance. The TOMS data set will be used to observe the

relationship between client/therapist demographics and therapeutic alliance and treatment duration.

The third research question will ask whether theoretical orientation/modality is related to treatment duration and outcome. There are many different theoretical orientations that are used by practicing psychotherapists. From traditional psychoanalysis to newer approaches such as Acceptance and Commitment Therapy, most theoretical orientations have some idea of how long psychotherapy should last to obtain significant improvements in functioning and symptom reduction. Some approaches traditionally have been known for longer-term psychotherapy such as psychoanalytic psychotherapy. However, long-term psychotherapy has been harder to study and as a result less supported empirically. Cognitive-behavioral psychotherapy and similar approaches such as Trauma Focused Cognitive Behavioral Therapy have been shown to be effective forms of short-term psychotherapy (Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011). A study by McClelland (2014) suggests that CBT initially demonstrated higher scores on outcome measures when compared to those of psychodynamic psychotherapy. However, the overall-interaction between time, theoretical modality, and length of psychotherapy suggests that patients who stayed in psychotherapy for an average treatment duration achieves similar results regardless of theoretical modality. The TOMS large data set will be used in an attempt to replicate these findings and further analyze the interaction between theoretical orientation/modality, treatment duration, and patient outcome.

The fourth question will study whether the psychotherapist's country of orgin affects outcome or alliance ratings. The TOMS' app collects information such as age, gender, ethnicity of client, and the country where psychotherapy is being conducted. Factors such as

client/therapist demographics and their relationship to psychotherapy are extremely difficult to study due to confounding variables that are present within psychotherapy sessions. However, with large amounts of data on thousands of clients, the data might have the power to suggest differences in initial outcome ratings related to demographic factors. The outcome scores will be assessed during the first eight sessions of psychotherapy and analyzed.

The fifth question will observe differences in outcome and alliance ratings related to various diagnostic criteria. A study by Falkenström, Granström, and Holmqvist (2013) observed a relationship between alliance and symptom change in psychotherapy patients. Reduction in patient symptoms suggested improvements with therapeutic alliance, and oppositely, diminished alliance correlated with worsening of symptoms. Furthermore, the results suggested that patients with reported personality problems showed stronger variance in alliance between sessions when compared to other patients. Though the data from the TOMS app does allow this sort of nuance to be investigated, it also allows for large-scale consideration of diagnosis in relation to outcome and alliance. The TOMS app looks at 13 diagnostic categories: adjustment disorder, anxiety disorder, child/adolescent disorder, cognitive impairment, dissociative disorder, eating disorder, mood disorder, personality disorder, schizophrenia, sexual disorder, sleep disorder, somatoform disorder, and substance abuse.

Chapter 2

Methods

Instruments

  Therapy Outcome Management System (TOMS). The TOMS has been available in

the Apple App store since May, 2012. Therapists who have bought the app or received a

redemption code from the developer have been tracking outcome, therapeutic alliance, and

demographic data for their individual clients. The app can be used on an iPad or iPhone/iPod

and is intended to be used in every psychotherapy session to collect therapeutic alliance and

outcome scores. The TOMS app has been used to gather psychotherapy outcome and/or working

alliance data from over 20,000 sessions, with that number continuously increasing. The TOMS

app uses two measures, the Session Rating Scale (SRS; Duncan et al., 2013, see Appendix A) to

measure therapeutic alliance and the Outcome Rating Scale V3.0 (ORS; Miller, Duncan, Brown,

Sparks, & Cloud, 2013, see Appendix B) to measure psychotherapy outcome. Both measures

use a visual analog scale to measure four items in each of the measures. Traditionally, patients

were asked at each treatment session to make a visible mark were using paper and pen on the

spectrum where their perceptions are in the various items. Each item spectrum on the SRS and

ORS is ten centimeters in length. The SRS and ORS are scored by measuring the distance in

centimeters between the patient's mark and the left pole of each spectrum. Once each item is

scored, the four items in each assessment are added together to obtain the total score. The TOMS

app uses an iPad or iPhone to administer the SRS and ORS with the same consistency and

accuracy, though the actual length of the item spectrum depends on the device size rather than

being ten centimeters. The TOMS app handles scoring automatically rather than using the

manual procedures used with the pencil-and-paper versions.

The TOMS app allows for the data to be collected electronically in real time on a session-

by-session basis during mental health treatments. The patient and therapist information is then

de-identified through security algorithms and the data is uploaded for analysis. In addition to

gathering outcome and therapeutic alliance data, the TOMS app provides the option for

psychotherapists to report demographic information about themselves and their clients, such as

age, gender, country of practice, level of training, theoretical orientation/modality, and the

diagnostic category of the presenting problem.

Session Rating Scale (SRS). The SRS is a 4-item visual analog measure designed to

assess working alliance in psychotherapy. During psychometric evaluation the SRS was

compared to the Helping Alliance Questionnaire II (HAQ-II; Luborsky et al., 1996).

Psychometric testing of the SRS suggests that it is a valid and reliable measure of alliance and

has moderate test-rest stability. When compared to the HAQ-II, the SRS showed a Cronbach's

coefficient alpha of .88, which is similar to the HAQ-II (.90). Test-rest reliability which was

calculated using Pearson's r was .64 (HAQ = .63). Concurrent validity testing showed there was

a .48 correlation between the SRS and HAQ-II, suggesting a reasonable degree of concurrent

validity of the SRS. The SRS also demonstrated a correlation of .29 between outcome measures

administered at the end of psychotherapy and during second and third psychotherapy sessions.

The validity testing suggests that the SRS is moderately related to an established self-report

measure of alliance (Duncan et al., 2003).

Outcome Rating Scale (ORS). The ORS is a 4-item visual analog measure of overall patient well-being. During development it was compared to the Outcome Questionnaire 45.2 (OQ-45.2; Lambert et al., 1996). When compared to the OQ-45.2, the ORS showed an internal consistency of .93 (Cronbach's alpha) (OQ-45.2 = .93). Concurrent validity was compared with the OQ-45.2 at various administration times using the Pearson's *r*. The overall correlation between the ORS and OQ-45.2 was .59, which indicates moderate concurrent validity. The validity testing suggested that the ORS is similar to an established self-report outcome scale (Miller et al., 2003).

Participants

Participants for study include the therapists that are currently using the app for outcome tracking. When first installing the app, they are given opportunity to participate as a "Norm Development Associate," which means the data collected from their use of the app are de-identified and uploaded to a server for psychotherapy research purposes. Agreeing to be a Norm Development Associate constitutes consent for purposes of this study. As is true of all informed consent procedures, users of the TOMS app can choose at any time to discontinue serving as a Norm Development Associate.

As of February, 2015, the TOMS app had 504 Norm Development Associates (140 male, 173 female, 189 gender not specified, 2 other; age range: 15-72 years) who were tracking outcome of a total of 7,318 clients (1,217 male, 3,700 female, 2,401 gender not specified, age range: 1-91 years). Patients are ethnically diverse with individuals identifying themselves with a specific ethnicity, but most patients did not select an ethnicity (22 Asian, 112 Black, 49 Dutch, 3 Niet-Dutch, 38 Hispanic/Latino, 17 Indigenous, 714 White, 27 mixed, 28 that indicated other

ethnicities, and 6,308 did not select an ethnicity). Note that ethnicities must be categorized

somewhat differently than what is typically done in the United States in order to accommodate

the worldwide distribution and use of the app. Therapists have various theoretical

orientation/modality for treating mental health problems.

Although the TOMS app obtains a large amount of session data, not every therapist that

uses the app completes all the demographic and diagnostic information about themselves or their

patients. Thus, depending on the research question, the data set has been filtered to include only

the patients and therapists that fill the requirements for that study.

Procedures

This is an archival research endeavor. Data is securely stored in a web-based server and

was de-identified so that therapists' and clients' identity can never be known. Each session,

patient, and therapist has a unique identification number, generated by an MD5 hash technology.

This allows for a unique and secure identification number to be created with assurance that it

cannot be unencrypted. Currently there are two separate data files stored in the server – one for

the SRS and one for the ORS.

Data from the two data files was reorganized and merged using custom software. Once

the custom data file was created, it was exported to SPSS for the purposes of this study. Each of

the five research questions was analyzed with SPSS.

Chapter 3

Results

Question 1

The first research question investigated therapeutic alliance between short-term and long term therapy. A series of independent samples t-tests were conducted to compare therapeutic alliance (measured by the SRS) in short-term versus long-term psychotherapy. For this analysis short-term psychotherapy referred to treatment that consisted of eight or less psychotherapy sessions. Long-term psychotherapy referred to treatment that consisted of nine sessions or more. In addition, the data were filtered to include only clients that completed the SRS. Five variables were used to measure differences in therapeutic alliance: SRS slope, most recent SRS total score, average SRS total rating, SRS total ratings from first and eighth session. A linear regression was used to calculate the SRS total slope by measuring the slope between each session until the eighth session. The average slope for the first eight sessions was observed for both short-term and long-term therapy groups. The SRS total score from each client's most recent psychotherapy visit was identified and a mean was determined for the patients found within their first eight sessions and those individuals that are past eight visits. The average SRS total variable was determined by finding the average SRS total score for each client in both the long-term and short-term psychotherapy groups. SRS ratings from the first and eight sessions were identified as snapshots of SRS scores in both the short-term and long-term psychotherapy groups. Table 1 describes t-test results and differences found between the variables.

Table 1

Results for Question 1: Differences in Therapeutic Alliance in Short-Term and Long-Term Psychotherapy

Variable	Short-term Group	Long-term Group	Differences
	Mean (Std dev)	Mean (Std dev)	
Session 1 SRS Total	34.55 (5.51) $N = 1419$	35.38 (5.09) $N = 852$	$t(1906) = 3.64, p < .001$, Cohen's $d = 0.156$
Session 8 SRS Total	36.77 (4.50) $N = 139$	36.90 (4.64) $N = 758$	$t(895) = .06, p = .950$
Most Recent SRS Total	36.02 (5.22) $N = 1182$	37.53 (4.52) $N = 652$	$t(1510) = 6.44, p < .001$, Cohen's $d = 0.309$
SRS Slope first 8 sessions	.19 (.75) $N = 125$	.22 (.64) $N = 672$	$t(795) = .59, p = .555$
Average SRS Total	35.30 (4.65) $N = 1642$	36.69 (3.83) $N = 985$	$t(2380.74) = 8.33, p < .001$, Cohen's $d = 0.326$

Note. Short-term group consists of those completing 8 sessions or fewer. Long-term group consists of those completing 9 or more sessions.

Question 2

The second research question investigated therapeutic alliance and treatment duration between gender-matched and mixed-gender client-therapist dyads. An independent samples *t*-test was conducted to compare therapeutic alliance and treatment duration between gender-matched and mixed-gender client-therapist dyads. Therapist alliance was again measured by the SRS and treatment duration was measured by number of attended sessions. Data analysis of the

SRS included these four variables: most recent SRS total score, average SRS total rating, average

SRS in first 8 session, and average SRS change. The most recent SRS total score is the

measured SRS score at the most recent therapy session. The average SRS total rating was the

calculated mean of all the completed SRS total ratings from each client. The average SRS in

first eight sessions was the calculated mean of the SRS total ratings obtained in the first eight

sessions of psychotherapy. The average SRS change was calculated by computing the difference

from one session to the next and then averaging these change scores. Table 2 describes *t*-test

results and differences found between the variables.

Table 2

Results for Question 2: Difference in Therapeutic Alliance and Treatment Duration in Gender-Matched and Mixed-Gender Client-Therapist Dyads.

Variable	Mixed Gender Dyad Group (*N* = 1494)	Matched Gender Dyad Group (*N* = 1433)	Differences
	Mean (Std dev)	Mean (Std dev)	
Most Recent SRS Total	35.24 (5.87)	34.89 (6.01)	*t* (2116) = 1.34, *p* = .181
Average SRS Total	35.03 (5.22)	34.66 (5.48)	*t* (2618) = 1.78, *p* = .075
Average SRS in first 8 Sessions	34.95 (5.24)	34.58 (5.49)	*t* (2614) = 1.77, *p* = .077
Average SRS Change	.28 (2.80)	.46 (3.38)	*t* (1635) = 1.15, *p* = .248
Treatment Duration	5.82 (8.02)	5.49 (7.25)	*t* (3082) = 1.15, *p* = .250

Note. A matched gender dyad group consists of a client-therapist pair that shares the same gender. A mixed gender dyad group consists of a client-therapist pair that does not share the same gender. The data set only allowed for use of female and male in the gender category.

Question 3

The third research question investigated theoretical orientation/modality in relation to treatment duration and outcome ratings. A one-way ANOVA was conducted to compare treatment duration and outcome ratings of therapy sessions from different psychotherapist orientation/modalities. A Scheffe post-hoc test was used to obtain specific comparisons between the theoretical orientation/modalities. There are nine options for psychotherapists to choose from on the TOMS application for theoretical orientation/modality: Cognitive-Behavioral, Integrative, Eclectic, Psychodynamic, Family Systems, Humanistic, Interpersonal, Emotion-Focused, and other. The treatment duration variable was measured by number of sessions that were recorded per client in the TOMS. The variables used to measure outcome were average ORS change, most recent ORS total, average ORS total rating, and average ORS total in first eight sessions. These four outcome variables were calculated identically to the SRS variables in Question 2. Treatment duration was again measured by number of attended sessions. Tables 3 displays the one-way ANOVA and Scheffe post hoc differences between the theoretical orientation/modalities. Statistical differences were determined measured by a *p* value < 0.05.

Table 3

Results for Question 3. One-way ANOVA and Scheffe post hoc results for outcome rating and treatment duration variables in theoretical orientation/modality groups.

Variable	F (df)	p	Post Hoc differences
Most Recent ORS Total	F (8, 4939) = 10.346	$p < 0.001$	CBT < IN, EC, OTH OTH > CBT, FS, IP IP < IN, EC, OTH
Average ORS Total	F (8, 5046) = 10.896	$p < 0.001$	OTH > CBT, IN, EC, FS, IP
Average ORS in first 8 Sessions	F (8, 5046) = 10.677	$p < 0.001$	OTH > CBT, IN, EC, FS, IP
Average ORS Change	F (8, 3465) = .945	$p = 0.478$	No statistical differences
Treatment Duration	F (8, 5202) = 10.722	$p < 0.001$	CBT < IN, EC, FS IN > CBT, HU, IP, EFT FS > CBT, IP, EFT EFT < IN, EC, FS, OTH

Note. Results include comparing outcome and treatment duration variables between nine theoretical orientation/modality groups: Cognitive-Behavioral (CBT), Integrative (IN), Eclectic (EC), Psychodynamic (PD), Family Systems (FS), Humanistic (HU), Interpersonal (IP), Emotion-Focused (EFT), and Other (OTH).

Question 4

The fourth research question investigated outcome ratings and treatment duration between countries where psychotherapy is being conducted. A one-way ANOVA was conducted to compare outcome ratings of therapy sessions from various countries where the TOMS application is being used. The Scheffe post hoc test was used to measure individual differences in outcome ratings between the different countries. There are currently eleven countries being represented within the TOMS data: Australia, Canada, Denmark, Netherlands, New Zealand, Norway, Philippines, Romania, Sweden, United Kingdom, and USA. The variables used to

measure outcome were average ORS change, most recent ORS total, average ORS total ratings, average ORS total in first eight sessions, and average ORS slope. The first four variables were calculated identically to the ORS variables in Question 2. The average ORS slope was calculated by averaging the measured slope of the total ORS ratings from each session to the next. Treatment duration was again measured by number of attended sessions. Table 4 displays the one-way ANOVA and Scheffe post hoc differences between countries in which therapy was conducted. Statistical differences were identified by a p value < 0.05.

Question 5

The fifth research question investigated potential differences in outcome and session ratings between various diagnostic groups. A one-way ANOVA was conducted to compare outcome and session ratings of therapy sessions from various diagnostic groups within the TOMS data. A Scheffe post hoc test was used to measure individual differences in outcome ratings and therapeutic alliance between the various diagnostic groups. There were at total of 8 diagnostic categories that had adequate sample size within the TOMS data: Adjustment disorder, anxiety disorder, child /adolescent disorder, eating disorder, mood disorder, personality disorder, substance abuse, and other. The variables used to measure outcome were most recent ORS total, average ORS total, average ORS in first 8 sessions, average ORS change, and average ORS slope. The variables that are measuring therapeutic alliance are: most recent SRS total, average SRS total, average SRS in first 8 sessions, average SRS change, and average SRS slope. These variables were calculated identically to the ORS and SRS variables in previous research questions. Table 5 displays the one-way ANOVA and Scheffe post hoc differences between diagnostic criteria label of clients. Statistical differences were identified by a p value < 0.05.

Table 4

Results for Question 4. One-way ANOVA and Scheffe Post Hoc Results for Outcome Rating

Variables in Country of Origin Groups

Variable	F (df)	p	Post Hoc Differences
Most Recent ORS Total	F (10, 4924) = 16.363	$p < 0.001$	AU < NL, UK, US UK > AU, CA, DK, NZ, SE, US
Average ORS Total	F (10, 5030) = 31.363	$p < 0.001$	NL > AU, CA, NZ, UK UK > AU, CA, DK, NL, NZ, NO, RO, SE, US US > AU, CA, NZ, UK
Average ORS in first 8 Sessions	F (10, 5030) = 29.379	$p < 0.001$	AU < NL, UK, US NL > AU, CA, NZ NZ < NL, UK, US UK > AU, CA, DK, NL, NZ, NO, RO, SE, US
Average ORS Change	F (10, 3462) = 7.142	$p < 0.001$	AU > US NZ > NL, UK, US
Average ORS Slope	F (10, 3412) = 6.191	$p < 0.001$	NZ > NL, US, US < AU, NZ
Treatment Duration	F (10, 5187) = 24.863	$p < 0.001$	PH > AU, CA, DK, NZ, RO > AU, CA, NZ UK > AU, CA, DK, NL, NZ, SE, US US > AU, CA, NZ, UK

Note. Results include comparing outcome and treatment duration variables between eleven country groups: Australia (AU), Canada (CA), Denmark (DK), Netherlands (NL), New Zealand (NZ), Norway (NO), Philippines (PH), Romania (RO), Sweden (SE), United Kingdom (UK), and United States (US).

Table 5

Results for Question 5. One-way ANOVA and Scheffe Post Hoc Results for Outcome and Session

Ratings Between Diagnostic Groups

Variable	F (df)	p	Post Hoc Differences
Most Recent ORS Total	F (7, 541) = 2.103	$p = .042$	No post hoc differences < .05
Average ORS Total	F (7, 565) = 2.535	$p = .014$	No post hoc differences < .05
Average ORS in first 8 Sessions	F (7, 565) = 2.546	$p = .014$	MD < CD
Average ORS Change	F (7, 385) = .982	$p = .444$	No statistical differences
Average ORS Slope	F (7, 372) = .209	$p = .983$	No statistical differences
Most Recent SRS Total	F (7, 425) = 2.087	$p = .044$	No post hoc differences < .05
Average SRS Total	F (7, 515) = 3.118	$p = .003$	SA < AD, AX, CD
Average SRS in first 8 Sessions	F (7, 515) = 3.175	$p = .003$	SA < AD, AX,CD
Average SRS Change	F (7, 327) = .949	$p = .469$	No statistical differences
Average SRS Slope	F (7, 319) = .856	$p = .542$	No statistical differences

Note. Results include comparing outcome and session ratings between eight diagnostic criteria groups: Adjustment Disorder (AD), Substance Abuse (SA), Anxiety disorder (AX), Eating disorder (ED), Personality disorder (PD), Mood disorder (MD), Child/adolescent disorder (CD)

Chapter 4

Discussion

This study explored the use of the Therapeutic Outcome Management System (TOMS) mobile app to gather psychotherapy research data. Five research questions were used to explore the potential of using the TOMS and also the limitations of using such technology. The five questions explored differences in (a) therapeutic alliance when compared to treatment durations, (b) therapeutic alliance and treatment duration when comparing gender between client and therapist, (c) treatment duration and outcome ratings between various theoretical orientations/modalities, (d) outcome ratings and treatment duration between country of origin, and (e) therapeutic alliance and outcome ratings across diagnostic criteria.

Summary of Findings

In response to the first research question, it appears that shorter-term therapy is associated with lower therapeutic alliance. This was evident in the first session ratings, most recent session ratings, and average session rating scores. Though significant differences were found, effect sizes are quite small. It is also important to consider that within shorter-term psychotherapy group there might have been a significant number of drop outs that occurred for various reasons. A meta-analysis by Sharf et al. (2010) indicates that there are higher levels of drop-outs when therapeutic alliance is lower—a finding which is consistent with the results reported here. The present findings also suggest that when treatment reaches eight sessions there were no significant

differences observed in therapeutic alliance between the shorter-term and longer-term psychotherapy groups.

The second research question suggested no significant differences between gender-matched and mixed-gender client-therapist dyads in the current study. Add The most recent SRS total, average SRS total, average SRS in first 8 sessions, and average SRS change variables did not provide significant differences between the two groups. Likewise, the analysis on the treatment duration between the two groups suggested no significant differences. This was contrary to the results reported by Wintersteen et al. (2005) which suggested that gender-matched dyads have higher therapeutic alliance and that their clients are more likely to complete treatment.

The third research question considered the association between psychotherapist theoretical orientation/modality, outcome rating, and treatment duration. The "other" theoretical orientation/modality was statistically greater in the average ORS total and average ORS in first 8 sessions when compared to cognitive-behavioral, integrative, eclectic, family systems, and interpersonal approaches. Apart from the "other" theoretical orientation/modality option, few differences were observed in the outcome rating variables across the various theoretical orientation/modalities. The cognitive-behavioral group was found to have lower most recent ORS total scores than integrative, eclectic, and those with "other" as a theoretical orientation/modality. Statistical significant differences were also observed among treatment duration and theoretical orientations/modalities. Integrative and Family Systems groups were found to have the statistically higher number of sessions. Cognitive-Behavioral and Emotion-Focused groups were found to have the least number of sessions.

The fourth research question considered therapy outcome and treatment duration in various countries where psychotherapy is being conducted. Many differences were observed between outcome ratings and selected country. Individuals in the United Kingdom tended to rate their outcome more favorably when compared to most of the other countries. This was evident across three different variables for outcome ratings scores. Interestingly, the results also indicated that clients in the UK also stayed in treatment statistically longer than clients in most other countries. Individuals in Australia tended to have statistically significantly lower outcome ratings on their most recent rating when compared to the United States, United Kingdom, and Netherlands.

The last research question considered outcome and therapeutic alliance between various diagnostic groups. These results revealed few statistical differences among groups. However, individuals with a child/adolescent disorder had statistically higher average outcome ratings in the first eight sessions when compared to mood disorders. The substance abuse disorder group was also found to have statistically lower therapeutic alliance scores when compared to adjustment disorder, anxiety disorder, and child/adolescent disorder.

Implications

The use of the Therapy Outcome Management System (TOMS) iOS app has many implications for researchers of psychotherapist data. One of the most important implications is that the app allows for collection of big data due to its ease of access and public availability. The app is available to anyone that has a device that allows iOS applications, thereby allowing for a very large sample size and providing the researcher with enough power to identify small statistical differences.

Detecting small differences has both advantages and disadvantages. One advantage is that the power of the large samples may help detect subtle nuances that would otherwise not be observed in traditional efficacy studies. Conversely, it is likely that these small differences – some of which have tiny effect sizes – might be exaggerated when considering clinical implications.

The data collection reported here happens in real-time and continues to change with added Norm Development Associates and new clients. This has at least two implications for the researcher. First, the data and thus the results are continuously changing. Second, the research can access a worldwide sample of therapists and their patients. As is true of science in general, this calls for holding conclusions with some tentativeness and replicating studies often to see which conclusions stand the test of time.

While traditional efficacy studies attempt to control for many variables and use manualized treatment when possible, using a mobile app to enables the researcher to sample therapeutic alliance and outcome directly in "real-life" clinical settings. This means that the app collects information from clinics, clinicians, and patients from all over the world where this iOS app is available. Global access to participate in psychotherapy research such as this app is due to the technological advances in smartphone technology. With more countries and people around the world obtaining access to such technology, these types of apps that have the potential to gather psychotherapy data could be significant contributors to developments in clinical psychology literature.

This type of data gathering is currently being utilized on a somewhat smaller scale in many large medical organizations in the collection of screeners such as the Patient Health

Questionnaire (PHQ-9) and SBIRT (Screening, Brief Intervention, Referral to Treatment). Although screeners and other measures are often used within both primary care and outpatient mental health clinics, the data are usually self-contained within that specific organization. Many times they are being stored but not analyzed. Moreover, paper and pencil are still being used in some primary care offices with patients, but with developments in technology these medical organizations might start using tablets and other forms of mobile technology for convenience, ease of service, and data analysis purposes. If organizations start utilizing tablets and other mobile device the development of application such as the TOMS creates more opportunities for data collection across many organizations and the ability to reach those in smaller practices. The benefit of this technology is that it does not only benefit individual organizations and researcher, but its individual benefit for clinicians.

The TOMS app specifically provides good incentives for clinicians by its use of statistically valid and reliable measures. The app is fairly easy to use, quick to administer, and shown to have no difference from paper and pencil administration of the SRS/ORS (Wiarda, 2012). The app allows clinicians to measure and monitor their therapeutic alliance and outcome of their clients, while contributing to an ever-growing data pool.

This study looked at only five research questions, but the growing database might allow for research into more nuanced relationships within the SRS (such as relationship, goals and topics, approach or method, and overall). For example, might there be observable differences between how clients within certain diagnostic criteria rate these specific variables within the SRS? The larger the database grows the more opportunities there will be for finding statistical differences between individual variables.

Growing this type of research database can happen in at least two ways. First, the application itself must be beneficial enough for clinicians to purchase and use regularly to continue growing the data. Second, the app could be adopted by mental health or primary care organizations that have psychotherapy treatment. Both of these routes pose some interesting ethical considerations.

Security and de-identification of client information is a crucial practice of mental health clinicians that must be extended when using technology such as the TOMS. The TOMS app de-identifies information through security algorithms and the data is uploaded for analysis. However, if and when using technology such as the TOMS app becomes more prevalent throughout private practice and medical organizations, extensive efforts will need to be taken to ensure the de-identification and security of the data, especially if the data will be used for research analysis. Access to this data is another thing that should be considered. Nunan and Domenico (2013) point out how currently in our society big data is gathered through a number of high-technological firms such Facebook, Google, and other companies that obtain a vast amount of market research. The collection of big data raises the question of data ownership and how this data is potentially used. It is important that respondents, both the clinician and client understand how this data will be used. Some organizations might use outcome data to demonstrate whether a certain clinician is effective as therapist, which could have implications for compensation and employability. Another ethical concern is misinterpreting statistical significance from big data. As noticed in the results, although there were statistical significance found in the data, the effect sizes were quite small. Competent and careful interpretation of this data is very important, and similarly the limitations of this research technique must be understood.

Limitations

Many of the limitations of using an app such as the TOMS for data gathering are identical to the traditional limitations of effectiveness studies. There are no stringent controls like in traditional efficacy studies. This leads to a high likelihood of confounding variables. Although it might be interesting to study differences between geographic differences and ratings scores, the researcher cannot assess for cultural, social, economic, and clinical factors that are present in each therapy room where the app is being used. Lack of stringent controls and framework of the app allows for certain data not to be entered. This makes it difficult to obtain complete results in each therapy session input. For example, most patients did not have an entered ethnic group which makes it difficult to observe cultural and ethnic sensitivities.

Another limitation is the need for large sample sizes. Depending on the research question in mind, certain observations and comparisons might not have enough sample to make the appropriate analysis. One challenge in the current study was the vast discrepancy in sample sizes of different groups when trying to compare country of origin or diagnostic criteria differences. There were certain countries and diagnostic criteria that were more prevalent and had a significantly larger sample sizes. This type of data gathering tool is largely dependent on the sample size and more importantly on the diversity of data that is obtained. In efficacy studies, the researcher has the privilege to find the population or sample they want to study. In effectiveness studies, particularly Seligman's (1995) Consumer Reports study, the data gathering was open ended and voluntary. This is similar in the case of the TOMS app, in which the researcher is extremely dependent the app is utilized in its entirety by mental health clinicians.

Another limiting factor of this type of psychotherapy research gathering method is that

the mobile application in question must provide strong benefits and incentives to the user.

Clinicians must benefit from the purchase and use of this technology. This technology must be

easy to use, regularly maintained, updated for new devices and software, and stay relevant to

clinician's needs. If independent clinicians find little incentives to use this app, or encounter

issues with the software, the sample sizes and data gathering will slow. If organizations decide

to adopt this type of outcome and therapeutic alliance measurement tool, there might be

challenges around security and successful integration of the app into the electronic

health/medical record. Smaller samples sizes will significantly hinder the potential study of this

data set. Regularly updating this type of software also becomes paramount as clinical

psychology research is developing. For example, this application was developed using *DSM-IV-*

TR diagnostic criteria domains and currently the profession of clinical psychology has adopted

the *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edition (*DSM-5*, 2013).

Future Directions

As technology has developed, so have the implications for researcher and clinicians in the

field of clinical psychology. The TOMS has obvious implications for research and clinical use.

This technology has much potential, which can be explored by continuous developments and

data gathering by the TOMS and similar applications. Larger samples and diverse distribution of

the app will offer more usable data and will allow better analysis.

New developments including mobile applications that utilize other screeners or

measurement tools for clinical use could serve a similar purpose as the TOMS. Currently, many

clinicians and organizations benefit from using the Patient Health Questionnaire (PHQ-9),

Patient Activation Measure (PAM), SBIRT, and other measures that health track patient data.

Mobile applications, especially if adopted for use by large medical organizations, will provide a

way to gather research data easier and effectively.

The TOMS app itself has strong potential and offers many other paths for data analysis

that were not observed in this study. One specific study that would help evaluate the

effectiveness of using the TOMS for research data gathering is to observe how much of the data

collected is complete and "usable" for research. Consistency of clinician use of the TOMS app

after purchase is another question that might warrant research. This will also provide important

feedback to the developer of the app regarding how regularly and consistently clinicians use their

application. Further in-depth research can also be conducted into looking at the whether there

are observed differences between the four individual variables in each of the SRS and ORS

measures. This particular study looked primarily at overall SRS and ORS scores. However, if

the database grows to a substantial size, individual differences and correlations might be

observed between the various variables of the SRS and ORS.

Conclusion

The future of technology advancement is unforeseen, but likely monumental. The

application of apps such as the TOMS provides a new method of gathering psychotherapy

research that was previously unobtainable on such a large scale.

In 2005, the American Psychological Association Presidential Task Force on Evidence-

Based Practice wrote a report discussing the rationale and importance of Evidence-Based

Practice in Psychology (EBPP). The APA defined EBPP as "the integration of the best available

research with clinical expertise in the context of patient characteristics, culture, and preferences"

(APA, 2006, p. 273). At first, clinical research primarily focused on efficacy studies with

stringent controls to demonstrate strong relationships between treatment and outcomes. With the

Consumer Reports study, Seligman (1995) was able to demonstrate how effectiveness studies

provide an important role in the clinical research field. Effectiveness studies provide research

with potential for diverse sampling, non-manualized treatment, and high external validity. With

developments in mobile technology, using apps such as the TOMS provide a new opportunity

and larger expansion to the original format of effectiveness research. Mobile technology

promotes even larger sample sizes on a global level, data gathering directly in clinical settings,

and active participation from clinicians within private practice or larger organizations. There are

still much to learn and discuss regarding the use of mobile applications for gathering of

psychotherapy research data. There are many important benefits and limitations for both the

clinician and researcher using these types of apps. However, with developments in technology

and shifts towards big data gathering, the TOMS app demonstrates how mobile applications can

be used to gather this type of psychotherapy data. More importantly, this new method of

gathering data provides more research that promotes psychologists' efforts to integrate research

with clinical expertise in the field of clinical psychology.

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Appendix A

Session Rating Scale (SRS V.3.0)

Name _____Age (Yrs):____
ID# _____ Gender:_____
Session # ____ Date: _____

Please rate today's session by placing a mark on the line nearest to the description that best fits your experience.

Relationship

I did not feel heard, understood, and respected.   I---I   I felt heard, understood, and respected.

Goals and Topics

We did *not* work on or talk about what I wanted to work on and talk about.   I---I   We worked on and talked about what I wanted to work on and talk about.

Approach or Method

The therapist's approach is not a good fit for me.   I---I   The therapist's approach is a good fit for me.

Overall

There was something missing in the session today.   I---I   Overall, today's session was right for me.

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Appendix B

Outcome Rating Scale (ORS)

Name _____Age (Yrs):_____ Gender_____
Session # _____ Date: _____
Who is filling out this form? Please check one: Self_____   Other_____
If other, what is your relationship to this person? _____

Looking back over the last week, including today, help us understand how you have been
feeling by rating how well you have been doing in the following areas of your life, where
marks to the left represent low levels and marks to the right indicate high levels. *If you are
filling out this form for another person, please fill out according to how you think he or she
is doing.*

Individually
(Personal well-being)

I--I

Interpersonally
(Family, close relationships)

I--I

Socially
(Work, school, friendships)

I--I

Overall
(General sense of well-being)

I--I

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Appendix C

Curriculum Vitae

Timofey S. Galuza

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EDUCATION

Doctor of Psychology, Clinical Psychology   *Expected* May 2016
    George Fox University, Newberg, OR
    Doctoral Dissertation: Prelim completed Sept. 2014
    Graduate Department of Psychology: APA Accredited

    Pre-doctoral Internship   *Aug. 2015-Aug. 2016*
    George Fox Integrated Care Internship
    Newberg, OR
    APA Accredited Internship

Master of Arts, Clinical Psychology   Dec. 2013
    George Fox University, Newberg, OR
    Graduate Department of Psychology: APA Accredited

Bachelor of Arts, Psychology   May 2011
    University of Portland, Portland, OR

DOCTORAL INTERNSHIP

Aug. 2015 – Present   **George Fox Integrated Care Internship**   *Newberg, OR*
Behavioral Health Intern – PMG Happy Valley
- Provide short-term, solution focused behavioral health services within an integrated primary care and behavioral health model for patients of varying age, gender, sexual orientation, ethnicity, and socioeconomic status, including underserved populations.
- Services provided include brief solution focused psychotherapy, behavioral health consultations, treatment planning, crisis management, participation in warm handoffs,

- Engaged in coordination of care as part of multidisciplinary team of physicians, nurses, physician assistants, licensed clinical social workers, and pharmacists.
- Other responsibilities include medical chart notes, chart review, consultation with supervisors, participation in interdisciplinary meetings, and participation in weekly supervision and didactic meetings.
- Provide weekly supervision for clinical psychology doctoral candidates in community mental health clinic practicum site which includes face to face supervision, therapy video review, clinical notes review, and clinical training support.
- Conducting an evaluation on patient satisfaction and staff ability in regards to behavioral health integration across Providence Medical Group clinics with a behavioral health provider.
- Supervisors: Dr. Vanessa Casillas, Psy.D and Dr. Joel Gregor, Psy.D.

SUPERVISED CLINICAL EXPERIENCE

Aug. 2014 – July 2015   **Willamette Family Medical Center**   *Salem, OR*
Behavioral Health Intern

- Provide short-term behavioral health services within a co-located primary care and mental health model for patients for predominately underserved populations.
- Services provided include psychotherapy, psychodiagnostic assessment, treatment planning, crisis management, behavioral consultations, and participation in warm handoffs.
- Engaged in coordination of care as part of multidisciplinary team of physicians, nurse practitioners, physician assistants, and licensed clinical social workers.
- Other responsibilities include medical chart notes, chart review, consultation with supervisors, assessment report writing, and participation in weekly supervision and didactic meetings.
- Supervisors: Joel Gregor, Psy.D. and Joshua English, LCSW

Aug. 2013 – Aug. 2014   **GFU Behavioral Health Clinic**   *Newberg, OR*
Assessment Coordinator and psychotherapist

- Provided comprehensive assessments for clients seeking psychological testing for learning disabilities, Attention Deficit/Hyperactivity Disorder, Autism, personality/behavior assessments, neurocognitive disorders, conduct disorders, and other reasons for assessment. This includes conducting client interviews, test administration, scoring, report writing, diagnosis, and making post-assessment feedback and recommendations.
- Conducted intake interviews, treatment planning, and administrative duties.
- Provided psychotherapy to individuals in the community.
- Provided group therapy for clients managing chronic pain.

- Engaged in weekly didactic training that focused on assessment training, case conceptualization, group therapy skills, teaching parenting skills, and diagnosis-specific treatment.
- Assessment scoring, interpretation, reports, therapy sessions, and therapy documents were reviewed during individual supervision.
- Supervisor: Dr. Joel Gregor, Psy.D.

Sept. 2012 – June 2013   **Milwaukie High School**   *Milwaukie, OR*
School Counselor/Psychotherapist
- Provided weekly individual therapy for high school students struggling with academic, emotional, or social issues.
- Provided intake interviews, observations, consultation, treatment planning, and report writing.
- Participated in multidisciplinary meetings to design Individualized Education Plans, Functional Behavioral Assessments, and Behavioral Support Plans.
- Provide psychological assessments to determine students' levels of functioning and their eligibility for special education services.
- Therapy interventions, documents, and assessment reports were reviewed in individual and group supervision.
- Supervisors: Dr. Leslie Franklin, Psy.D. and Dr. Fiorella Kassab, Ph.D.

Jan. 2012 – May 2012   **George Fox University**   *Newberg, OR*
Pre-Practicum II
- Provided individual psychotherapy services for volunteer undergraduate students.
- Services included intake interviews, treatment planning, progress notes, and diagnosis.
- Tasks included report writing, case presentations, consultation with supervisor and clinical team members.
- Conducted personality assessments and wrote evaluations.
- Supervisor: Mary Peterson, Ph.D., and Laura Heyne, M.A.

Aug. 2011 – Dec. 2011   **George Fox University**   *Newberg, OR*
Pre-Practicum I
- Learned basic person-centered therapy skills with group members.
- Tasks included: intake interviews and treatment planning.
- All sessions were taped and reviewed during supervision.
- Supervisors: Mary Peterson, Ph.D., and Laura Heyne, M.A.

RELEVENT EXPERIENCE & UNIVERSITY INVOLVEMENT

Oct. 2013 – May 2015   **Reflex Clinic**
Consultant   *Tigard, OR*
- Provided industrial and organizational psychology consultation services to evaluate the workplace system and recommend changes to improve employee review and hiring processes.
- Conducted research-based diagnostics of workplace and performance issues.
- Continued monitoring of system improvements and processes.
- Mapping workplace system, culture, and processes for future replication and business expansion.

April – Aug. 2014   **George Fox Graduate Department of Clinical Psychology**
Graduate Teacher Assistant for Social Psychology   *Newberg, OR*
- Optimized visual presentation through review and modification of PowerPoint slides, inclusion of relevant videos, and other methods to improve visual presentations.
- Graded writing assignments and input grades.
- Provided assistance and guidance to students.
- Supervisor: Joel Gregor, Psy.D.

April 4-6, 2013   **Christian Association for Psychological Studies International Conference**
Presenter, Volunteer, and CE Monitor   *Portland, OR*
- Conducted research presentation
- Monitored attendance and CE sign in/sign out.
- Helped set up the seating and introduced presenters.
- Provide assistance and information to presenters and attendees.

May 2010 – June 2010   **Autism Intervention Internship**   *Portland, OR*
Intern
- Partook in a play-based treatment program with an autistic boy, followed specific guidelines and goals set by the Son-Rise program to help him develop language and social skills in a positive and supportive environment.
- Built a genuine and fun relationship with the child, while striving to increase communication, interactive attention span, flexibility, and eye contact.
- Focused on using the child's motivations and interests, and building upon them to improve social skills and communication.

PROFESSIONAL AFFILIATIONS

2012 – Present   Oregon Psychological Association (Student Affiliate)
2011 – Present   American Psychological Association (Student Affiliate)
2010 – Present   Psi Chi National Honor Society

RESEARCH EXPERIENCE & PRESENTATIONS

Feb. 2011 – May 2015   **Graduate Department of Clinical Psychology**
Research Vertical Team Member   *Newberg, OR*
- Participate in bi-weekly meetings to discuss research projects, including dissertations, supplemental research, research conferences, and other topics relating to research.
- Presented personal dissertation research and progress. Collaborated on group research projects, and discussed research ideas for future projects
- Faculty Advisor: Mark McMinn, Ph.D.

Doctoral Dissertation: Using Big Data in Psychotherapy Research: Possibilities and Perils
- Dissertation Chair: Mark McMinn, Ph.D., ABPP/CL
- Committee Members: Mary Peterson, PhD, ABPP; Joel Gregor, Psy.D.
- Preliminary defense completed: Sept. 24, 2014

Presentations:
Engle, N. W., Barr, B., **Galuza, T.** (2014, May). *Organizational psychology for medical clinic culture.* Poster presented at annual meeting of the Oregon Psychological Association, Portland, OR

McMinn, M. R., Birch, R., **Galuza, T**., & Rodriguez, J. M., (2013, April). *A Comparison of Religious and Spiritual Diversity Training at Religious and other Institutions*. Presentation at the annual meeting of the Christian Association of Psychological Studies, Portland, OR.

Rodriguez, J. R., Birch, R., **Galuza, T**., & McMinn, M. R. (2013, August). *Religious and Spiritual Diversity Training at Explicitly Religious Doctoral Programs*. Poster was presented at the annual meeting of the American Psychological Association, Honolulu, HI

PROFESSIONAL TRAINING AND WORKSHOPS

Nov. 7-8, 2015   **Acceptance & Commitment Therapy - An Experiential and Practical Introduction**
Dr. Jason Luoma, Ph.D. and Dr. Jenna LeJeune, Ph.D.
Site: LifeQual Center

Oct. 21, 2015   **Let's talk about Sex: Managing Emerging Sexuality in Therapy**
Dr. Joy Mauldin, Psy.D.
Site: George Fox University

Aug. 10-14, 2015   **Integrated Care Bootcamp**
                         Dr. Joel Gregor, Psy.D., Dr. Mary Peterson, Ph.D., Jeri Turgesen, Psy.D.,
                         Vanessa Casillas, Psy.D., Juliette Cutts, Psy.D., Kristin Garcia, Psy.D.,
                         Julie Oyemaja, Psy.D., and Joy Mauldin, Psy.D.
                         Site: George Fox University

March 18, 2015   **Spiritual Formation & Psychology**
                         Dr. Barrett McRay, Psy.D.
                         Site: George Fox University

Feb. 26, 2015   **Workshop on Criminal Justice-Behavioral Health Issues**
                         Dr. Annette Matthews, MD, Dr. Jonathan Barker, MD, Jason Myers, Dr.
                         Stephanie Maya Lopez, MD, and Dr. Karl Mobbs, MD.
                         Oregon Psychiatric Physician's Association in partnership with the
                         American Psychiatric Association
                         Site: DoubleTree by Hilton Portland

Nov. 19, 2014   **Face Time in an Age of Technological Attachment**
                         Dr. Doreen Dodgen-Magee, Psy.D.
                         Site: George Fox University

Oct. 15, 2014   **Understanding and Treating ADHD in Children**
                         Dr. Erika Doty, Psy.D.
                         Learning Disabilities: A Neuropsychological Perspective
                         Dr. Tabitha Becker, Psy.D
                         Site: George Fox University

Aug. 18-22, 2014   **Workplace Development for Integrated Behavioral Healthcare**
                         Dr. Joel Gregor, Psy.D., Dr. Julie Oyemaja, Psy.D., Dr. Mary Peterson,
                         Ph.D., Dr. Jeri Turgesen, Psy.D.
                         Site: George Fox University

March 12, 2014   **Evidenced Based Treatment for PTSD in Veteran Populations:**
                         Clinical and Integrative Perspectives
                         Dr. David Beil-Adaskin, Psy.D.
                         Site: George Fox University

Jan. 15, 2014   **DSM V, Essential Changes in Form and Function**
                         Dr. Jeri Turgesen, Psy.D. and Dr. Mary Peterson, Ph.D., ABPP
                         Site: George Fox University

Sept. 25, 2013   **Integrated Primary Care**
                         Dr. Brian Sandoval, Psy.D. and Dr. Juliette Cutts, Psy.D.
                         Site: George Fox University

May 31, 2013   **Psychological Assessment Conference: Using Tests of Effort in Psychological Assessment**
Dr. Paul Green, Ph.D.
Site: George Fox University

May 31, 2013   **Assessing Mild Cognitive Impairment and Dementia**
Dr. Mark Bondi, Ph.D., ABPP
Site: George Fox University

March 6, 2013   **The Person of the Therapist**
Dr. Brooke Kuhnhausen, Ph.D.
Site: George Fox University

Jan. 30, 2013   **African American History, Culture and Addictions and Mental Health Treatment**
Danette C. Haynes, LCSW, and Dr. Marcus Sharpe, Psy.D.
Site: George Fox University

Nov. 14, 2012   **Sexual Identity**
Dr. Erica Tan, Psy.D.
Site: George Fox University

Oct. 10, 2012   **Treating Gender Variant Clients: Christian Integration**
Dr. Erica Tan, Psy.D.
Site: George Fox University

June 8, 2012   **Psychological Assessment Conference: Assessment and Treatment of Anger, Aggression, & Bullying in Children and Adults; and The Mini-Mental State Examination – 2nd Edition**
Dr. Ray DiGiuseppe, Ph.D., and Dr. Joel Gregor, Psy.D.
Site: George Fox University

March 7, 2012   **Mindfulness and Christian Integration**
Dr. Erica Tan, Psy.D
Site: George Fox University

LANGUAGES SPOKEN

English, Russian

TEST ADMINISTRATION, SCORING, AND REPORT WRITING EXPERIENCE

Adult Measures (and wide age-range measures)
- 16PF – Fifth Edition
- Adaptive Behavior Assessment System – Second Edition (ABAS-II)
- Adult Asperger Assessment (AAA)
- Becks Depression Inventory-II (BDI-II)
- Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A)
- California Verbal Learning Test – 2nd Edition (CVLT-II)
- Conners' Adult ADHD Rating Scales (CAARS)
- Conners' Continuous Performance Test II (CPT II V.5)
- Controlled Oral Word Association (COWA)
- Delis-Kaplan Executive Function System (D-KEFS)
- Halstead-Reitan Neuropsychological Battery
- Millon Clinical Multiaxial Inventory – III (MCMI-III)
- Minnesota Multiphasic Personality Inventory – II (MMPI-II)
- Minnesota Multiphasic Personality Inventory – II – RF (MMPI-II-RF)
- Minnesota Multiphasic Personality Inventory – Adolescent (MMPI-A)
- Peabody Picture Vocabulary Test - Fourth Edition (PPVT-4)
- Personality Assessment Inventory (PAI)
- Rey Complex Figure Test and Recognition Trial (RCFT)
- Ritvo Autism-Asperger's Diagnostic Scale – Revised (RAADS-R)
- Test of Memory Malingering (TOMM)
- Vineland Adaptive Behavior Scales, 2nd Edition
- Wechsler's Adult Intelligence Scale – Fourth Edition (WAIS-IV)
- Wechsler's Individual Achievement Test- Third Edition (WIAT-III)
- Wide Range Intelligence Test (WRIT)
- Wide Range Achievement Test – Fourth Edition (WRAT4)
- Wide Range Assessment of Memory and Learning – Second Edition (WRAML-2)
- Wisconsin Card Sorting Test (WCST)
- Woodcock-Johnson Tests of Achievement – Third Edition (WJ-III)

Child and Adolescent Measures
- Achenbach Child Behavior Checklist (CBCL)
- Behavioral Assessment System for Children, Second Edition (BASC-II)
- Behavior Rating Inventory of Executive Function (BRIEF)
- Child Bipolar Questionnaire (CBQ) – Version 2.0
- Childhood Autism Rating Scale, 2nd Ed. (CARS2)
- Conners 3rd Edition (Conners 3)
- Gilliam Asperger's Disorder Scale (GADS)
- Millon Pre-Adolescent Clinical Inventory (M-PACI)
- Personality Assessment Inventory – Adolescent (PAI-A)
- Personality Inventory for Youth (PIY)

- Roberts Apperception Test for Children 2 (Roberts-2)
- Wechsler's Intelligence Scale for Children – Fourth Edition (WISC-IV)

REFERENCES

References from clinical supervisors or academic advisor can be provided upon request. Please send an email to tgaluza11@georgefox.edu for contact information.