TRAVERSING THE JUNGLE: EXAMINING ANALOGY USE IN PSYCHOTHERAPY

Shari Lieblich

TRAVERSING THE JUNGLE: EXAMINING ANALOGY USE IN

PSYCHOTHERAPY

A thesis submitted in partial fulfillment

of the requirements for the degree of

MASTER OF ARTS

to the faculty of the

DEPARTMENT OF PSYCHOLOGY

of

ST. JOHN'S COLLEGE OF LIBERAL ARTS AND SCIENCES

at

ST. JOHN'S UNIVERSITY

New York

by

Shari Lieblich

Date Submitted __1/23/2023_____   Date Approved __2/7/2023_____

_____   _____

Shari Lieblich   Elissa J. Brown, Ph.D./Allison J. Jaeger, Ph.D.

ABSTRACT

TRAVERSING THE JUNGLE: EXAMING ANALOGY USE IN PSYCHOTHERAPY

Shari Lieblich

Analogies are an important tool for supporting learning across many domains. In the context of psychotherapeutic interventions, analogies are often used in psychoeducation and are anecdotally known to be used by clinicians in sessions with patients. However, limited research has examined the use of analogies in clinical training materials, the frequency of analogy use by clinicians, clinicians' knowledge of analogies, and the effects of analogy use on the therapeutic process. The aim of Study 1 was to investigate the presence of analogies in clinical literature. Results revealed that analogies are commonly included in treatment manuals and textbooks and that the analogies included tend to be simple and make use of real-life base concepts. The aim of Study 2 was to examine clinicians' perceptions of analogies and how they report using them in practice. Sixty-one psychotherapeutic clinicians read a set of three analogies and completed survey questions about their familiarity with and use of the provided analogies as well as questions about their use of analogies in therapy more generally. Overall, clinicians reported frequent analogy use, with more experienced clinicians reporting the highest frequency. Clinicians with a Cognitive Behavioral Therapy orientation and clinicians still completing their doctoral training identified a significantly higher number of alignments within the analogies. Results from this set of studies highlights the idea that analogies are commonly used in psychotherapeutic contexts. Future research should continue to examine analogy use in psychotherapy and more specifically examine

differences in analogy use as a function of client demographics and the relations between analogy use and therapy outcomes.

DEDICATION

To my partner, Patrick Van Kirk. Thank you for following me to a new city and everywhere afterward. I couldn't have done this without your constant, unending support.

To my parents, Alan and Bettina. Thank you for your support during this process, you have made it possible to be financially free of worry.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

General Introduction

Analogies are an instructional tool that makes comparisons between two distinct

concepts, typically for the purpose of helping to explain or clarify one of the concepts.

Analogies are currently understood to be an important tool for learners across diverse

subject matter. They are used across domains from scientists in their investigation of

microbiology to comedians telling jokes (Dunbar, 1993, 1995; Gentner & Smith, 2013;

Loewenstein & Heath, 2009).

Analogies allow learners to understand new concepts through the mapping of

familiar knowledge, sometimes referred to as a base or source concept, onto an

unfamiliar target concept (Gentner, 1983). In the context of psychotherapy, clinicians

anecdotally report using analogies in sessions, and many treatment manuals analogies in

the context psychoeducation (Stoddard & Afari, 2014). However, little research has

examined when, how, what, and by whom analogies are used in therapy. As such,

beginning to document or examine this is a critical first step in being able to empirically

investigate the usefulness of analogies in psychotherapy. Consequently, the goal of the

present research is to analyze analogy use in treatment manuals and gather quantitative

and qualitative data on clinicians' understanding of analogies and their reported use of

analogies in sessions across modalities.

Functions and Processes of Analogical Reasoning

Analogical reasoning is the process of understanding a novel situation in terms of

one that is already familiar. According to the structure-mapping theory, processing

analogies takes place by mapping the relations between the base (or familiar) domain to

the target (or new) domain (Gentner, 1983). Mapping refers to how knowledge about the

base is carried over to the target and allows learners to generate inferences and construct a mental representation of the target. The primary goal is not just to provide an anchor, but also to invoke a comparison between the two domains. The process of comparison can help the learner to comprehend something new or complex by pointing out its similarities, or differences, to something familiar (Kurtz et al., 2001). For example, if a student understands how a camera works, it may help them to better understand how the human eye works. Analogies are believed to aid the learning of unfamiliar concepts and to improve understanding when included in learning materials (Gentner, 1983; Gick & Holyoak, 1980; Halpern et al., 1990). Further, it has been suggested that analogies may be especially beneficial for novice or low-ability learners because they provide more scaffolding or guidance (Braasch & Goldman, 2010; Brown & Clement, 1989; Jaeger et al., 2016).

It is important to note that not all analogies are good or effective and that there are some general criteria for what makes a good analogy (Gentner, 1982). For an analogy to be effective, learners must have a good understanding of the base domain prior to engaging in analogical processing (Duit, 1991; Wilbers & Duit, 2002). That is, the base concept needs to be familiar to the learner. For example, if a learner is not familiar with how a camera works, then it will likely not be an effective analogy for helping them to understand how the human eye works. Analogies can vary in their abstractness, that is, whether the mappings are between relations (more abstract) or between attributes (less abstract). Research has demonstrated that analogies based on relational matches rather than object matches, based solely on physical attributes, are more effective (Gentner & Kurtz, 2006). Another important consideration is the clarity of the analogy, or how

precisely the alignments (or alignable differences) are defined. Evidence from science education research has demonstrated that analogies in which the mappings are more clearly defined for the learner lead to an increased understanding of target concepts (Kim et al., 2010). As a result, clearly and effectively describing relational alignments between the base and target concepts is thought to be important in creating effective analogies.

Analogies in Science Education and Physical Health

A substantial body of research has examined the impact of analogies on learning in science. Research has indicated that analogies are frequently used in science textbooks (Curtis & Reigeluth, 1984; Newton, 2003; Orgill & Bodner, 2006; Thiele et al., 1995; Thiele & Treagust, 1994). Areas of text in science education textbooks that include analogies have been demonstrated to increase learning in students compared to text directly discussing scientific concepts with no analogies (Clement & Yanowitz, 2003). In terms of individual differences, analogy-enhanced text may be more supportive for those with low prior knowledge of target concepts and learners with low spatial skills due to the increased connections and scaffolding provided by the analogies (Braasch & Goldman, 2010; Brown & Clement, 1989; Jaeger et al., 2016).

Analogy use has also been examined in the context of supporting understanding of physical health outcomes and doctor-patient communication. Galesic & Garcia-Retamero (2013) found that the use of analogies in explaining more complicated medical problems was more helpful to high-numeracy people and their use in explaining simple medical problems was more helpful to people with low-numeracy. Towards increasing vaccine knowledge, Gazzinelli and colleagues (2010) found that an educational video including analogies increased 72 adults' knowledge of a Hookworm vaccine in Brazil.

In the context of oncology treatment, Vogel (2015) offers healthcare providers specific examples of analogies that can be used. For example, a recommended analogy in describing cancer treatment modalities relates killing bears to treating cancer:

> "Killing cancer is like killing bears in the woods. First, you remove any bears you can see. This may be accomplished with surgery—the physical removal of a cancer. However, some bears may be hiding, so often the next step is to spray the underbrush with 'bear-killer spray.' This represents adjuvant systemic treatment, such as chemotherapy. This bear-killer spray works to destroy any bears that cannot be seen. But some bears can climb trees and hide in the treetops. These bears can be removed with a controlled fire, which represents radiation therapy." (Vogel, 2015, pg. 174)

Towards understanding the effectiveness of communication between physicians and seriously ill patients, Casarett and colleagues (2010) found that analogies were used frequently in conversations with oncology patients, and patients of physicians that used more analogies rated their physician's ability to communicate higher than those who did not.

Analogies in Psychotherapy

Analogies and metaphors are also commonly used by clinicians as a vehicle for psychoeducation. A significant number of treatment manuals direct clinicians to use analogies as a means of educating psychotherapy patients (e.g., Stoddard & Afari, 2014).

A limited number of studies have been conducted on the frequency and perceived helpfulness of analogies and metaphors in a psychotherapy context. In a first-of-its-kind experimental investigation of the processes behind therapeutic analogical effectiveness,

Donnelly and Dumas (1997) gave 141 university students vignettes describing stress encountered by college students. The participants were asked to rate the helpfulness of analogical advice or literal advice for a stressor described in the vignette. For example, participants were given a vignette describing a recent breakup and asked which kind of advice would be more helpful in dealing with the breakup; analogical advice which related the experience of being in love to that of designing a computer program or literal advice which included succinct suggestions for understanding how to learn from past romantic failures. Analogical advice was rated as significantly more helpful than literal advice in each vignette and overall. In a similar study using vignettes with 84 college students in China, Tay (2020) found that metaphorical therapist-patient dialogue was perceived as more effective in terms of therapist communication, collaboration, and expressing emotions accurately than literal language dialogues. However, both experimental studies have limited relevance to real-life psychotherapy sessions because of their laboratory condition environment.

Many treatment manuals suggest using analogies or metaphors and provide specific examples of analogies/metaphors that can be used. However, there is limited empirical research supporting the idea that using analogies/metaphors positively affects patient outcomes. Blenkiron (2005) gives a review of the possible use of analogies, metaphors, and stories in sessions including aiding in client understanding of therapeutic processes, providing emotional distance from sensitive topics, and increasing therapist-client rapport among others. Other descriptive research has been used to make recommendations regarding the use of specific analogies and metaphors for individualized concerns such as treatment adherence and reduction of treatment

resistance with depressed clients, clients involved in the justice system, and Latino clients (Dunlop & Dunlop, 2005; Romig & Gruenke, 1991; Zuniga, 1991).

Two studies have examined analogy components in sessions more directly. It is important to note that while these studies referred to their analogical components as metaphors, by our previously reported definition the content of this language would be considered analogies. Martin and colleagues (1992) found that patients in person-centered, experiential therapy sessions perceived the therapeutic sessions in which analogies were used as more helpful than those where analogies were not used. From a frequency perspective, Mathieson and colleagues (2016) examined analogy use in 48 CBT sessions from 12 clients and 3 therapists and found a high rate (31.5 per 1000 words) of analogies used by therapists.

Taken together, analogies are present within psychotherapy and psychoeducation. Specifically, there are several case studies and recommendations regarding when and with whom analogies should be used in sessions. However, there is limited quantitative and experimental research on clinician-reported analogy use, understanding, and effectiveness on patient and therapy outcomes.

The Present Studies

Because there is limited research examining analogies in psychotherapy, the goal of Study 1 was to analyze the presence and type of analogies in clinically relevant texts. After gaining a more quantitative understanding of the presence of analogies in treatment manuals, the goal of Study 2 was to examine clinicians' reported use of analogies and their understanding of analogy structure. Although this line of research is in its early stages and still exploratory, some predictions were made in the two studies. In the text

analysis (Study 1) we expected to find analogies that used familiar base concepts (concepts that were not psychological, but from everyday experience), analogies that made use of relational alignments more so than object/attribute matches, and we also expected to find that the important alignments would be clearly described. As treatment manuals are a more direct instruction for in-session behavior, we also predicted that they would include more analogies than the other texts analyzed.

For Study 2, we selected a set of analogies from the text analysis to use in a clinician questionnaire. Because the analogies were taken from common treatment manuals and texts, we hypothesized that clinicians would recognize and use these common analogies. Considering the increased amount of research and treatment manuals recommending analogy use in cognitive behavioral-related therapy modalities, we hypothesized that clinicians with a primary CBT orientation would be more likely than non-CBT clinicians to use analogies more frequently in sessions. Due to prior research examining the relationship between experience level and therapeutic skill (Hill et al., 2015), we predicted that clinicians with more experience would report using analogies more frequently, and we predicted that more experienced clinicians would identify more alignments and misalignments in analogies.

Study 1

Introduction

The purpose of this initial study was to provide an analysis of the use of analogies in clinical psychology. Specifically, we focused on analogy use in treatment manuals, clinical textbooks, and clinical research reports. Based on cognitive and science education research highlighting the features of effective analogies, the main goal of this study was to document how analogies are used in clinical psychology and psychotherapy. We predicted that collected analogies would use familiar base concepts, make use of relational alignments more so than object/attribute matches, and clearly describe important alignments between base and target concepts. Treatment manuals were also expected to garner the highest number of analogies due to their more direct relationship with clinical practice.

Methods

Materials

A total of 15 texts were analyzed. Three publicly available undergraduate-level psychology and abnormal psychology textbooks were chosen to gather analogical information first on a broad psychology level (Bridley & Jr, 2019; Spielman et al., 2020; Tyler, 2020). Two graduate-level textbooks focusing on psychopathology diagnosis and CBT treatment were analyzed to garner analogy use at the clinical student level (Beidel et al., 2014; Tolin, 2016). A selection of CBT-based treatment manuals including three adult-oriented treatments, three child and adolescent treatments, and one CBT guide to metaphors were analyzed (Barlow et al., 2011; Bergman, 2013; Foa et al., 2007; Nezu et al., 2013; Pincus et al., 2008; Stott et al., 2010; Theodore, 2016). Finally, three research

articles were analyzed that focused on clinician-collected analogies and related client vignettes (Killick et al., 2016; Mathieson et al., 2016; Romig & Gruenke, 1991). Because all the texts analyzed for this study were in electronic form, we were able to use search terms to identify the analogies used in each. For example, search terms including "resembles", "is like", "just as", and "analogous to" were used to identify the analogies. In total, we used 20 different search terms which can be found in Appendix I.

Procedure

After creating a database of all the analogies found in the texts, they were coded for three characteristics. First, each phrase returned by the search was coded for whether it fit the full definition of an analogy. Specifically, phrases were coded as true analogies if they detailed similarities across two concepts. Following previously outlined criteria by past research, phrases that simply explained examples of concepts or did not demonstrate any relationship between the two concepts were not considered analogies (Gentner & Markman, 1997).

Next, each analogy was coded based on its level of enrichment, that is whether it was simple, enriched, or extended (Curtis & Reigeluth, 1984). Simple analogies are the most basic level in which the three main parts of the analogy (the target topic, the base, and the connector "is like") are presented with no explanation or alignment provided and typically only have a single relational match (e.g., "Just like putting your oxygen mask on first in an airplane, enacting self-care is necessary before caring for others"). Enriched analogies go further by having at least two relational matches and by stating the grounds for the analogous relationship between the base and the target (e.g., "When on a plane, flight attendants tell passengers to place their oxygen mask over their own face first. This

is especially important for parents traveling with children because if you lose consciousness, you won't be able to help your child. Similarly, getting adequate levels of self-care is important so that you don't experience burn out which will prevent you from caring for others"). Finally, extended analogies are those that have at least three relational matches and the grounds for the analogous relationship are highly detailed and use multiple vehicles to explain the target topic. For example:

"On airplanes, they say in case of a change in cabin pressure, place the oxygen mask over your own face first before assisting children. This instruction opposes most parents' instincts. However, if your children lose consciousness, they are still breathing. If you lose consciousness, you can't help your children. Even if you get their masks on them before you pass out, you won't be able to help them with what comes next. Similarly, some people think it is their duty to put everyone else's needs first. Without adequate levels of self-care, you will eventually experience sleep disturbances, fatigue, and many other health problems" (Brave Acorn Counseling, 2015).

Lastly, analogies were coded based on the content of the base concept, that is whether the analogy was based on real-life or health-related examples. Analogies coded as "real-life" used base concepts that involved content from daily life such as watching television, whereas analogies coded as "health-related" used base concepts that involved content requiring medical knowledge such as the processes of a virus. Coding for the base-concept content served as a proxy for familiarity, or the knowledge needed to understand the base concept in the analogy because, as mentioned previously, analogies based on

more familiar concepts are easier to understand. The number of words in each analogy was also coded. A sample of categorized analogies can be found in Appendix II.

Two coders rated the analogies, an undergraduate research assistant and the first author. To capture interrater reliability, 20% of analogies were double-coded on both analogy type (real-life base, health base, or not analogy) and level of enrichment (simple, enriched, or extended). Interrater reliability was moderate to substantial for analogy type and level of enrichment. The percent agreement for the 18 analogies double coded for analogy type was 88.9% with a Cohen's Kappa of 0.438. The percent agreement for the 18 analogies double coded for level of enrichment was 77.8% with a Cohen's Kappa of 0.635.

Results

The search returned a total of 94 phrases. Of these 94, 14 were not kept for analysis because they did not meet the complete criteria for an analogy. Thus, the final sample of analogies included in the present analysis was 80.

As shown in Table 1, the highest number of analogies were found in the treatment manuals, followed by the undergraduate and graduate level textbooks, and then research articles, this difference resulted in a significant z-test, $z = 6.71$, $p < .001$. Analogies ranged widely in word length from 11 to 599 words ($M = 142.16$, $SD = 121.40$). There was no difference in analogy word length as a function of text type, $F(2, 77) = 1.06$, $p = .35$. However, analogy word length did differ as a function of level of enrichment, $F(2, 77) = 11.38$, $p < .001$, $\eta^2 = .23$. Follow-up Tukey HSD tests indicated that extended analogies were significantly longer than enriched ($p = .05$) and simple ($p < .001$), and enriched were significantly longer than simple ($p = .02$). Most of the analogies in our

dataset included real-life base concepts ($n = 73$, 77.6%) and this did not differ as a function of text type, $X^2(2) = 2.85$, $p = .24$, Cramer's $V = .19$. Most analogies were categorized as simple ($n = 37$), 29 as enriched, and 14 as extended. This also did not differ as a function of text type, $X^2(4) = 1.99$, $p = .74$, Cramer's $V = .11$.

Discussion

Overall, the results of Study 1 indicated that analogies are commonly included in treatment manuals and textbooks. The analogies tended to use real-life base concepts and the majority only detailed one relational match between the base and target concepts. Treatment manuals, as expected, included more analogies than the other texts analyzed. As the treatment manuals are a more direct instruction for in-session behaviors, this indicates that CBT-based therapy tends to include analogies, at least in written materials. In terms of limitations, the current study examined mostly CBT-oriented psychotherapy texts which limits the author's ability to draw conclusions about the presence of analogies in psychotherapy training materials more broadly.

Study 2

Introduction

The results of Study 1 provided evidence that analogies, especially those with real-life base concepts, are present in psychotherapeutic texts, especially treatment manuals. However, it is still unclear as to clinicians' use of analogies in actual sessions with clients. Thus, the goal of Study 2 was to test for differences in clinicians' self-reported use of analogies and their understanding of the basic components of analogies.

Overall, we predicted that clinicians would report using analogies in a high number of sessions with patients as this aligns with current anecdotal evidence. Considering results from Study 1 indicated a high level of analogies present in cognitive behavioral-oriented treatment manuals, we predicted that clinicians with a primary CBT orientation would be more likely to report frequently using analogies in their sessions with clients than non-CBT clinicians.

A recent study found that doctoral clinician trainees with more experience tended to perform better than their less experienced counterparts in terms of higher-order clinical duties including conceptualization of their client's presentations (Hill et al., 2015). Consequently, we predicted that clinicians with more experience would report using analogies more frequently due to a higher level of understanding of psychological constructs. Additionally, we predicted that more experienced clinicians would identify more alignments and misalignments in analogies as identification of these structural characteristics would likely require a higher level of understanding of psychological constructs. We also predicted that clinicians would report recognition and use of common clinical analogies gathered from treatment manuals in Study 1.

Participants

Inclusion criteria consisted of being either a student in a post-graduate program or having a post-graduate degree and having current psychotherapeutic patient contact, telehealth or in-person. Participants were recruited via email, Facebook, and other social media platforms. A total of 81 clinicians participated in the study. Out of 81 participants, 20 were removed for not completing the demographic questions, resulting in a final sample of 61 participants (see Table 2 for a summary of demographic information).

Materials

Demographics. Participants were asked to indicate both basic and clinician-related demographic information. Gender was requested with the following options: *Male, Female, Non-binary/third gender,* or *Prefer not to say*. Education level was requested with the following options: *Masters, Ph.D.*, *Psy.D.,* and *Graduate Student* (from 1st to 4th year+). Years of experience practicing psychotherapy were requested with the following options: *less than 1 year, between 1 and 4 years, between 5 and 10 years, between 11 and 16 years,* and *more than 16 years*. To create equivalent groups for analysis, clinicians were placed into one of three groups: 0-4 years, 5-10 years, or 11 or more years. Participants indicated their primary psychotherapeutic orientation with the following options: *Psychoanalytic, Psychodynamic, Humanist/Existential, Interpersonal, Cognitive, Behavioral, Cognitive-Behavioral,* and *Other* with an open text box asking participants to specify. This variable was grouped dichotomously into CBT and Non-CBT. The CBT group comprised clinicians who indicated Cognitive, Behavioral, or Cognitive-Behavioral along with related orientations such as Dialectical Behavior

Therapy (DBT) in the Other option. The Non-CBT group comprised clinicians who reported Psychodynamic, Humanistic/Existential, Interpersonal, and other orientations.

Participants were asked to indicate the primary age of their clients with the following options: *Children (3-12 years old), Adolescents (13-17 years old), Adults (18-64 years old), Older Adults (64+ years old),* and *Other* with an open text box asking participants to specify. To create equivalent groups for analysis, this variable was dichotomized: Children/Adolescents and Adults only. Participants' patient contact in terms of weekly therapy hours was requested with the following options: *less than 3 hours, 3-7 hours, 8-21 hours, 22-34 hours, and 35 or more hours*. The participants were collapsed into three groups: 0-7 hours, 8-21 hours, and 22 or more hours per week.

Lastly, participants were asked to indicate how often they use analogies during therapy with patients with the following options: *Never, Rarely (in one or two sessions), Sometimes (in less than half of sessions), Often (more than half of sessions),* and *Almost always (almost all sessions).* Participants were also given an open-text response option to describe any other analogies they use in practice with patients.

Individual Analogies. The first half of the survey presented each participant with three analogies (randomly chosen from a sample of six), the individual target concept of the analogy, and analogy-specific questions. All six analogies were identified in Study 1 and can be found in Appendix III. In an effort to provide analogies with familiarity and a high level of descriptiveness, each of the selected analogies was categorized as extended and included real-life base concepts.

Participants were asked to identify and describe alignments and misalignments between the base and target concepts in each analogy with an open-text response. For

purposes of analysis, identified alignments and misalignments were counted. Participants were asked to indicate their familiarity with the entire analogy as well as its target concept on a 5-point Likert scale (1 = *Not familiar at all,* 2 = *Slightly familiar*, 3 = *Moderately familiar*, 4 = *Very familiar*, 5 = *Extremely familiar*). Participants were asked how frequently they use each analogy with patients on a 4-point Likert scale (1 = *Never,* 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*). They were asked to indicate the likelihood of use for the described analogy and/or any other analogy when discussing the target concept with patients on a 5-point Likert scale (1 = *Extremely unlikely, 2 = Somewhat unlikely, 3 = Neither likely nor unlikely, 4 = Somewhat likely, 5 = Extremely likely*). Lastly, participants were asked to describe with an open-text response any analogy they are likely to use when discussing the indicated target concept. A sample of the survey can be reviewed in Appendix IV.

Procedure

Clinicians with current psychotherapeutic patient contact were recruited for participation through academic listservs, clinician-oriented Facebook groups, and Instagram. A link to the study survey was associated with recruitment posts in which clinicians could immediately participate. After consenting, participants completed an online survey through Qualtrics. Each participant was asked to read three randomly selected analogies, from a set of six, and complete a demographic survey. Random assignment to analogies was completed by using Qualtrics' Randomizer survey function with the option chosen to evenly present analogies. Completing the entire set of surveys took approximately 30 minutes of time.

Results

For means and standard deviations of all reported results, refer to Table 3.

General Analogy Use

Most clinicians (n = 49, 80.3%) reported using analogies in more than half of sessions with patients, with the rest of the sample reporting use in less than half of sessions (n = 12, 19.7%). To examine clinician-reported analogy use as a function of years of experience, a one-way Analysis of Variance (ANOVA) was conducted and revealed a significant effect, $F(2, 58) = 3.17$, $p < .05$, $\eta^2 = 0.1$. Follow-up pairwise contrasts indicated that clinicians with 11 or more years of experience reported using analogies in their sessions significantly more often than clinicians with 0-4 years of experience (p = .04). There was a marginal difference in reported analogy use between the 0-4 years group and 5-10 years group (p = .06), with the 5-10 years group reporting greater use. There was no difference in reported analogy use between the 5-10 years and 11 or more years groups (p = .69)

We also examined differences in analogy use as a function of psychotherapeutic orientation, education level, age of clients, and individual weekly therapy hours. Independent samples t-tests indicated no differences in self-reported analogy use as a function of therapeutic orientation ($t(59) = .502$, p = .62) or client age group ($t(59) = .970$, p = .56). A one-way between subjects ANOVA demonstrated no difference in reported analogy use as a function of clinician education level, $F(2, 58) = .411$, p = .67. Similarly, a one way between subjects ANOVA revealed no difference in reported analogy use as a function of individual weekly therapy hours, $F(2, 58) = .991$, p = .38.

Analogy Structure

In examining reported analogy structural elements, clinicians were able to identify an average of 3.34 (*SD* = 1.74) alignments per analogy. An independent samples t-test revealed that the CBT clinicians identified a significantly higher number of alignments across analogies than Non-CBT clinicians, $t(59) = 4.05$, $p < .001$, $d = 1.08$. Similarly, a one-way ANOVA revealed a significant effect of education level on alignment identification, $F(2, 58) = 6.39$, $p = .003$, $\eta^2 = 0.18$. Follow-up pairwise contrasts indicated that pre-doctoral clinicians had the highest mean number of identified alignments, and identified significantly more than master's level clinicians, $p = .002$. However, neither pre-doctoral and doctoral clinicians, nor master's and doctoral level clinicians differed significantly in identification of alignments ($p = .129$ and $p = .54$ respectively). Results indicated no difference in identification of alignments as a function of years of experience ($F(2, 58) = 1.31$, $p = .28$), age of clients ($t(59) = .311$, $p = .86$), or individual therapy hours per week ($F(2, 58) = 2.60$, $p = .08$).

In terms of misalignments, clinicians were able to identify an average of 1.95 (*SD* = 1.31) misalignments, which, as indicated by a paired samples t-test, was significantly lower than the number of identified alignments, $t(60) = 5.70$, $p < .001$, $d = .73$. Qualitatively, when asked to identify misalignments some clinicians stated a dislike of "canned" analogies that were not individualized to patients. Clinicians did not differ in identification of analogy misalignments as a function of psychotherapeutic orientation ($t(59) = 1.00$, $p = .16$) or education level ($F(2, 58) = .01$, $p = .99$). Results indicated no difference in identified misalignments as a function of years of experience ($F(2, 58) =$

1.80, $p = .17$), age of clients ($t(59) = 1.43$, $p = .36$), or individual therapy hours per week ($F(2, 58) = 1.41$, $p = .25$).

Clinician Perception of Chosen Analogies and Favorite Analogies

On average, clinicians reported minimal use of the six analogies gathered from Study 1 ($M = 1.55$, $SD = 0.71$). When asked about the likelihood of their future use of the provided analogies, clinicians reported being neither likely nor unlikely on average ($M = 3.25$, $SD = 1.09$). An independent samples t-test revealed that clinicians who work primarily with children or adolescents were significantly more likely than those working only with adults to endorse using these analogies in the future, $t(59) = 2.23$, $p = .01$, $d = 0.66$. Additionally, clinicians in the CBT group were significantly more likely than Non-CBT clinicians to report current use of the provided analogies ($t(59) = 1.74$, $p = .04$, $d = 0.46$) and plans to use these analogies in the future ($t(59) = 3.32$, $p = .001$, $d = 0.89$). There was no difference in the current use of the provided analogies as a function of education level, years of experience, age of clients, or individual therapy hours per week (all p values were greater than 0.11). Similarly, there was no difference in future likelihood of use of the provided analogies as a function of education level, years of experience, age of clients, or individual therapy hours per week (all p values were greater than 0.11).

Although most clinicians did not endorse the use of the analogies provided in the survey, most offered examples of analogies they do use in their own practice. Several were repeated across clinicians such as, "…when on an airplane and parents are told to put on their oxygen mask first." Similarly, multiple clinicians reported using the analogy

of feeding a tiger when explaining the function of symptoms of Obsessive Compulsive

Disorder (OCD) as shown in the quote below.

> "You're given a baby tiger and have to feed it. It's so cute! It's just a baby.
> So you feed the baby tiger when it asks for food. You keep feeding it so it
> eventually grows bigger and stronger. It still needs food. It eventually gets
> huge and when it asks for food its louder and more demanding and will
> continue to grow when fed. This is an analogy for OCD and how
> continuing to give into compulsions makes OCD worse and worse. We
> frame each urge to do a compulsion as a choice of either "starving or
> feeding the tiger" to recognize that every compulsion makes OCD stronger
> and louder."

Participants also repeatedly reported using Acceptance and Commitment Therapy

analogies often in practice with patients. On the other hand, some clinicians were hesitant

to report specific analogies they use in clinical practice stating they use analogies that are

individualized to specific patients in specific contexts and therefore are not repeated

across patients.

Discussion

Study 2 investigated clinicians' understanding of analogies and their use of

analogies with patients in psychotherapy. Overall, results revealed that clinicians reported

using analogies in more than half of their sessions, with more experienced clinicians

reporting a significantly higher frequency of analogy use than less experienced clinicians.

Importantly, this provides evidence that clinicians are putting into practice the analogies

that treatment manuals are suggesting (as demonstrated in Study 1). These results align

with our predictions that clinicians use analogies with patients and that more experienced

clinicians may be more readily able or willing to use them in sessions. More experienced

clinicians, as Hill and colleagues (2015) have demonstrated with trainees, may be better

able to manage higher-level processes inherent within psychotherapy. This could be due

to more direct client contact, more experience teaching psychoeducation, or greater

experience with analogy use and positive patient outcomes. Future research should

examine the possible association of these variables and others related to higher-order

therapeutic processes with frequency of analogy use.

Differences as a Function of Orientation

Contrary to our initial prediction, there was no difference in self-reported analogy

use overall as a function of therapeutic orientation; clinicians with a primary CBT

orientation reported analogy use at similar rates to non-CBT-oriented clinicians.

However, CBT clinicians did report using the provided analogies taken from Study 1

more often than non-CBT clinicians and further reported a greater likelihood of using

these specific analogies with clients in the future. These results provide partial support for

our prediction that there would be a relationship between orientation and analogy use. In

line with these results regarding analogy use, our results also demonstrated that CBT-

oriented clinicians were able to identify more alignments in the provided analogies than

non-CBT-oriented clinicians. One hypothesis to explain these findings centers around our

use of CBT analogies. As the presented analogies were drawn from CBT-oriented

treatment manuals, it is likely that CBT-oriented clinicians are more familiar with these

particular analogies even though they may not be using analogies, in general, more often

than their non-CBT counterparts. This could be further examined by presenting a mixture

of analogies from different orientations in future studies. Additionally, CBT training may focus more on analogies as a method of providing psychoeducation in comparison to other treatment orientations, as indicated by their frequency of use in training manuals (Study 1).

Analogy Structure

Clinicians were able to identify at least one or more alignments and misalignments in the presented analogies. Interestingly, clinicians still in the process of completing their doctoral training were able to identify more alignments in presented analogies. This may indicate that the structure of analogies is more salient to clinicians still in training because they are actively learning about their function and use in therapy. These psychotherapy students may be more eager to unpack the structural aspects of metaphorical language in psychotherapy as a result. However, these differences did not translate to the identification of misalignments. One possibility for this discrepancy is that clinician training around the use of analogies may focus on finding alignments between base and target concepts, rather than noticing and avoiding misalignments. Both aspects of structural knowledge are important as the ability to point out both the consistent and inconsistent parts of analogies can mitigate the development of misconceptions patients may acquire during psychoeducation or therapeutic intervention. The importance of pointing out misalignments within analogies is further highlighted by prior research in science education that indicates learners often pay attention to superficial aspects of analogies, such as interest level, which leads to a false sense of understanding of the target concept (Wiley et al., 2018). Future research should

investigate the level of training and encouragement clinicians receive around the use of analogies during their clinical training experiences.

Limitations

Although this study represents a step forward in understanding the use of analogies in psychotherapy, there were several limitations to the current research. The sample size was small, having only 61 clinicians participating in the survey, which limits the generalizability of the results. The sample itself was also limited by clinicians who self-selected to participate in the study. These clinicians may have characteristics that separate them from the population of psychotherapists as a whole. This research is some of the first of its kind and therefore there is not a substantial body of literature or evidence to rely on or use to motivate this work.

Similarly, the survey did not collect patient demographics of the clinician's current client load, which limits results. This data would allow for analyses of possible relations between therapist characteristics, patient characteristics, and both frequency and type of analogy use during sessions. Considering current research that has demonstrated an effect of client culture/lack of therapist understanding of client's culture on therapeutic rapport, exploring this relationship in the context of analogy use would be important for future research (Anderson et al., 2019). An important challenge to consider when examining the impact of analogy use in treatment is the possible need for an individualized approach fitting analogies to the specific needs, knowledge, and interest of patients. This may point to a larger focus on teaching the general structure and recommended best use of analogies conceptually, rather than recommending specific analogies to clinicians. Further research is needed to make this distinction clear.

General Discussion and Conclusions

Overall, the results from the present set of studies provide evidence that investigating analogy use in the context of psychotherapy is warranted. Evidence from science education and health research investigating both text-based and verbal analogy use has demonstrated that analogies support learning (Casarett et al., 2010; Clement & Yanowitz, 2003), especially in novice or low-ability learners where they provide more scaffolding (Braasch & Goldman, 2010; Brown & Clement, 1989; Jaeger et al., 2016). Limited research in psychotherapy suggests that analogies, as a form of psychoeducation, may aid in client understanding of therapeutic processes, provide emotional distance from sensitive topics, and increase therapist-client rapport (Blenkiron, 2005; Martin et al., 1992). Similarly across psychopathologies, psychoeducation more generally has been linked to the reduction of symptoms, an increase in disorder knowledge, and an increase in treatment engagement (for example, Lincoln et al., 2007; Rabelo et al., 2021; Zhao et al., 2015). While there are some guidelines to suggest empirically based content and structure of psychoeducation interventions (Bhattacharjee et al., 2011; Sarkhel et al., 2020), the methodological structures such as the use of figurative language and analogies, have not been studied with rigor.

It is clear from the present data that analogies are included and commonly taught in treatment manuals, frequently used by clinicians in sessions, and generally perceived as useful by clinicians. However, the current research was limited by its ability to demonstrate how clinicians use analogies with patients and for what purpose. Additionally, the data is limited by a lack of prior research. Since both Study 1 and Study 2 focused on analogies from CBT-oriented practice, the results are limited to this

orientation of treatment and cannot be generalized to other psychotherapy practices. The

results of the current studies represent a first step in understanding the use of analogies in

the context of psychoeducation and psychotherapeutic treatment. Future research should

examine differences in analogy use as a function of client demographics and cultural

knowledge as well as "real-time" use of analogies in sessions and the possible

relationship to patient outcomes and therapeutic rapport.

Tables

Table 1

Study 1 Descriptive Statistics

	Textbook (n = 25)	Treatment Manual (n = 45)	Research Article (n = 10)
Word Length	139.0 (145.3)	132.4 (105.1)	193.9 (124.9)
Simple	13 (52.0%)	21 (46.7%)	3 (30.0%)
Enriched	7 (28.0%)	17 (37.8%)	5 (50.0%)
Extended	5 (20.0%)	7 (15.6%)	2 (20.0%)
Real Life Example	21 (84.0%)	42 (93.3%)	10 (100%)
Health Example	4 (16.0%)	3 (6.7%)	0

Note. Values for word length reflect means and standard deviations in parentheses. All other values included in the table reflect frequency data with percentages in parentheses.

Table 2

Study 2 Sample Demographics

	N	%
Gender		
Female	51	83.6%
Male	9	14.7%
Non-binary/third gender	1	1.6%
Level of Education		
Pre-Doctoral	17	27.9%
Master's degree	31	50.8%
Doctoral degree	13	21.3%
Years Practicing Psychotherapy		
Less than 1	5	8.2%
Between 1 and 4	28	45.9%
Between 5 and 10	17	27.9%
Between 11 and 16	4	6.5%
More than 16	7	11.5%
Primary Orientation		
Psychodynamic	5	8.2%
Humanistic/Existential	4	6.5%
Interpersonal	2	3.2%
Cognitive-behavioral	39	63.9%
Other	11	18.0%
Age of Primary Clients		
Children/Adolescents	15	24.6%
Adults Only	45	75.4%
Weekly Individual Therapy Hours		
0-7	21	34.4%
8-21	30	49.2%
22 or more	10	16.4%

Table 3

Study 2 Descriptive Statistics

	Overall Analogy Use	Alignments Identified	Misalignments Identified	Presented Analogy Use	Presented Analogy Future Use
Level of Education					
Pre-Doctoral	4.29 (0.85)	4.47 (1.94)	1.94 (1.39)	1.41 (0.53)	3.59 (0.92)
Master's degree	4.26 (0.96)	2.74 (1.36)	1.93 (1.24)	1.54 (0.68)	3.01 (1.09)
Doctoral degree	4.54 (1.05)	3.31 (1.65)	2.00 (1.47)	1.80 (0.71)	3.38 (1.21)
Years Practicing					
0-4 Years	4.06 (0.90)	3.67 (1.80)	1.67 (1.31)	1.43 (0.67)	3.43 (0.98)
5-10 Years	4.59 (0.94)	3.06 (1.39)	2.35 (1.22)	1.72 (0.73)	3.10 (1.08)
11+ Years	4.73 (0.90)	2.82 (1.99)	2.18 (1.33)	1.67 (0.82)	2.93 (1.36)
Primary Orientation					
CBT	4.28 (0.97)	3.95 (1.55)	2.08 (1.34)	1.67 (0.79)	3.57 (0.95)
Non-CBT	4.41 (0.91)	2.27 (1.55)	1.72 (1.24)	1.35 (0.51)	2.68 (1.09)
Age of Primary Clients					
Child/Adolescent	4.53 (0.83)	3.47 (1.81)	1.53 (1.12)	1.75 (0.96)	3.78 (0.93)
Adults Only	4.26 (0.98)	3.30 (1.74)	2.09 (1.35)	1.49 (0.61)	3.08 (1.09)
Weekly Therapy Hours					
0-7	4.10 (0.83)	4.00 (1.70)	2.24 (1.30)	1.48 (0.54)	3.28 (0.93)
8-21	4.43 (0.90)	3.10 (1.62)	1.93 (1.14)	1.63 (0.76)	3.32 (1.03)
22 +	4.50 (1.27)	2.70 (1.89)	1.40 (1.71)	1.50 (0.91)	2.97 (1.55)

Note. Standard deviations are presented in parentheses following each provided mean.

Appendices

Appendix I

Study 1 Search Terms

to illustrate this
is like
is not like
is similar to
is not similar to
are like
are not like
are similar to
are not similar to
as if
similar to
not similar to
like
not like
analog
analogous
analogy
unlike
comparable to
resembles
just as

Appendix II

Study 1 Coding Examples

Level of Enrichment Examples:

Category	Definition	Example
Not analogy (n = 14)	Examples of target concept.	Act like a detective and gather more information about aspects of the fear that are not yet a part of the hierarchy or recognized safety behaviors (e.g., track if the child is asking his mom to call a friend to make sure a dog is kept away from the child during a visit), so the safety behavior can be addressed in session.
Simple analogy (n = 37)	One relational match.	It's like the old saying— "Give a person a fish, he eats for a day . . . teach a person to fish, he eats for a lifetime." In other words, PST is like learning to fish— you will be able to use these skills throughout your lifetime.
Enriched analogy (n = 29)	Two relational matches and grounding of the relationship between the concepts.	When we feel *anxious, we can be rigid and stiff*[1] like a *strand of uncooked spaghetti*[1]. This feeling can make us feel even more nervous. But when we are relaxed[2], we're more like cooked spaghetti[2] .
Extended analogy (n = 14)	At least three relational matches and extensive grounding of the relationship between the concepts.	Suppose you have eaten a very large and heavy meal (or spoiled food) and now you have *symptoms such as stomachache, nausea, etc*[1]. These symptoms will stay until you have digested the food[2]. After the food has been **digested you will feel great relief**[3]. *Flashbacks, nightmares, and troublesome thoughts*[1] continue to occur because you have not digested the traumatic memory[2]. Today you are going to start digesting or **processing your heavy memories so that they will stop interfering with your daily life**[3].

Real-life versus health-related Examples:

Category	Definition	Example
Analogies with real-life base concept	Base concepts with content from daily life.	After all, there are good things about psychodynamic and humanistic therapies, and there are good things about CBT, so sampling the best from each ought to be as great as combining peanut butter and jelly, right? Well, sometimes it is, but I have heard of a lot of cases in which it was more like peanut butter and ketchup. They're great separately, but together, not so much.
Analogies with health-related base concept	Base concepts with content requiring medical knowledge such	Just as a surgeon does not scratch at the surface but goes to the site of the problem, we will progress quickly to the more difficult of your situations. We will work together to decide which of these situations to work on and in what order. Like surgery, exposure therapy requires informed consent. Just like a patient can choose to keep a cancerous

	as the processes of a virus.	organ, you can decide to keep living a life restricted by fear. Or, you can choose to courageously endure some amount of pain and discomfort in order to break the back of panic disorder and recover your health and freedom.

Appendix III

Study 2 Analogies

Introduction to Analogy	Analogy Text
Some patients in therapy struggle with impulsive decision making. Below is an example of an analogy relating a detective investigation with decision making.	Just like a detective's job is to gather clues to solve problems, you want to follow the same technique to make decisions. If a detective is investigating a crime and rushes without considering all possible evidence, they might come to an incorrect conclusion and possibly send an innocent person to jail. Similarly, when a person makes an impulsive decision, they might make a choice that has negative consequences for their life. Instead, the detective should carefully gather evidence, consider how it fits together, and then make a decision based on that evidence. In the same way, a person making a decision should slow down and consider the outcomes of 2 or more potential choices, the pros and cons of those outcomes, and whether those outcomes align with their goals.
One technique utilized in therapy to reduce fear responses in patients is habituation. Below is an example of an analogy that relates a wave to habituation.	A wave ebbs and flows in the ocean. It naturally reduces in size as it reaches the shoreline. Similarly, the habituation process will bring panic sensations back to baseline levels over time. Like a surfer who might be riding that wave until it naturally brings him back to the shore, a person needs to "ride the wave" of panic until fear comes down.
Some patients in therapy experience cognitive distortions related to depression. Below is an example of an analogy that relates blinders on a horse pulling a carriage to cognitive distortions.	When people are depressed, it's also as if they're wearing blinders, like you might see on a horse that is pulling a carriage. All it can see is what is straight ahead. Depression leads people to see only what is straight ahead of them, too – all of which seems negative and distressing. If a horse's blinders are removed, it can see everything that is around them. Similarly, as you move out of a depressed state you are able to view the world from a broadened perspective. Without negative distortions of the world, you can see all of the information that's out there. In this way you can see all of reality, not just the negative aspects.
Some patients in therapy experience emotional avoidance. Below is an example of an analogy that relates shutting off a TV to avoid watching distressing news to the issue of emotional avoidance.	Imagine a television news story about an important, yet potentially distressing topic. As soon as you realize that the story is about this distressing topic you choose to turn off the television rather than continue hearing the story. This is analogous to how a person may "shut-down" or detach themselves from distressing emotions they may experience. Although turning off the television does keep you from having to hear the distressing news story, it also prevents you from being able to learn about the important event and how it might impact yourself and your community. Similar to missing the important news story, shutting down your emotions can prevent you from listening to valuable feelings about your own experiences, goals, values, or dreams. Like shutting down a television set, an emotional system "shut-down" means that you detach yourself altogether. This happens automatically after years of learning to turn off the television to

	prevent distress. After years of emotional shut-downs, perhaps growing up in a house where distressing events were constantly occurring, they become automatic.
Some patients in therapy experience panic attacks. Below is an example of an analogy that relates the behavior of a watchdog to panic attacks.	A watchdog or guard dog is a dog that is supposed to guard areas for its owner. When a watchdog notices anything that seems to signal danger, it sends a message to its owner. Over time, the watchdog begins to learn that certain situations signal danger. Similarly, when your body enters a situation in which you previously had a panic attack, the watchdog (your mind) perks up and says, "Something scary happened here before, I better be on the lookout to make sure nothing dangerous is around." Your body listens to your mind say that something dangerous could happen and responds by starting to prepare for this possibility. Your heart beats a little faster, your breathing speeds up, and so forth. However, the watchdog, who is looking very carefully for anything that might signal danger, notices that your heart is beating faster and interprets this as a signal that something scary might happen. It sends a message to your body that says "Oh no! The scary feelings are starting to happen again." The body then becomes more alarmed when it hears the watchdog say that something scary might happen, so it gets even more prepared by making the heart beat even faster, creating adrenaline, and so forth. In this way, the mind and the body continue to play off each other in a sort of vicious cycle that leads to a panic attack. When these feelings continue, you may respond by having the urge to avoid or escape ("I need to get out of here!"). However, these responses usually increase anxiety in the long-term because they prevent us from practicing, getting used to, and learning to handle the situation.
Some treatment techniques for post-traumatic stress disorder involve asking patients to produce a narrative of their trauma. Below is an example of an analogy that relates cleaning out a wound after falling off a bike to the treatment component of trauma narratives.	Think about a person who is riding their bike, falls off and skins their knee. In this situation we really have two choices to deal with the skinned knee. One option is to ignore the wound—not wash it off nor put medicine on it. Sometimes this works out fine with a small surface level wound, but other times, the wound gets infected and over time gets worse and worse. A second option is to wash out the wound very carefully and methodically, getting all the dirt and germs out without putting more pressure on any one part of the wound at a time. With this option, the wound will not get infected and begin to heal. Similarly, giving a narrative of what happened during a traumatic event(s) is like cleaning out the wound. Cleaning out the wound is painful and stings. However, afterwards the pain goes away and the wound can heal once and for all. Overall, this hurts much less than if the wound gets infected. Talking about the traumatic event(s) will also be done carefully, at just the right pace so that it never hurts more than a little bit.

Appendix IV

Study 2 Questionnaire

Directions

Analogies aid in the transfer of knowledge about one concept or situation to another. They consist of two basic units called the source and the target. The source is a concept that is already familiar to the learner and the target is the new concept being compared to the source.

Today you are going to read some analogies that may be used in a psychotherapy context. After reading the analogies you will be asked to answer questions about the analogies and your experience with them.

Please take your time and read carefully.

ANALOGY TEXT

An alignment is when there is an accurate mapping between a part of the source concept and a part of the target concept in an analogy.

Please identify and describe any alignments you see between the source and target in the previous analogy.

[   ]

A misalignment is when there is inaccurate or no mapping between a part of the source concept and a part of the target concept in an analogy.

Please identify and describe any misalignments you see between the source and target in the previous analogy.

[   ]

How familiar are you with this analogy?

| *Not familiar at all* | *Slightly familiar* | *Moderately familiar* | *Very familiar* | *Extremely familiar* |
| *(1)* | *(2)* | *(3)* | *(4)* | *(5)* |

How familiar are you with the target concept?

| *Not familiar at all* | *Slightly familiar* | *Moderately familiar* | *Very familiar* | *Extremely familiar* |
| *(1)* | *(2)* | *(3)* | *(4)* | *(5)* |

How often have you used this analogy in therapeutic practice with patients?

Never   Rarely   Sometimes   Often

(1)   (2)   (3)   (4)

If you were discussing [target concept], how likely would you be to use this analogy (or any other analogy) with patients?

Extremely unlikely	*Somewhat unlikely*	*Neither likely nor unlikely*	*Somewhat likely*	*Extremely likely*
(1)	*(2)*	*(3)*	*(4)*	*(5)*

Is there a different analogy (or multiple analogies) you are more likely to use when discussing decision making with a patient? Please describe.

References

Anderson, K. N., Bautista, C. L., & Hope, D. A. (2019). Therapeutic alliance, cultural competence and minority status in premature termination of psychotherapy. *American Journal of Orthopsychiatry*, *89*, 104–114. https://doi.org/10.1037/ort0000342

Barlow, D. H., Farchione, T. J., Fairholme, C. P., & Ellard, K. K. (2011). *Unified protocol for transdiagnostic treatment of emotional disorders: Therapist guide*. Oxford University Press.

Beidel, D. C., Frueh, B. C., & Hersen, M. (Eds.). (2014). *Adult psychopathology and diagnosis*. John Wiley & Sons.

Bergman, R. L. (2013). *Treatment for children with selective mutism: An integrative behavioral approach*. Oxford University Press.

Bhattacharjee, D., Rai, A., Singh, N., Kumar, P., Munda, S., & Das, B. (2011). Psychoeducation: A measure to strengthen psychiatric treatment. *Delhi Psychiatry Journal,*, *14*, 33–39.

Blenkiron, P. (2005). Stories and analogies in cognitive behaviour therapy: A clinical review. *Behavioural and Cognitive Psychotherapy*, *33*(1), 45–59. https://doi.org/10.1017/S1352465804001766

Braasch, J., & Goldman, S. (2010). The role of prior knowledge in learning from analogies in science texts. *Discourse Processes*, *47*, 447–479. https://doi.org/10.1080/01638530903420960

Bridley, A., & Jr, L. W. D. (2019). *Abnormal Psychology: Washington State University*. SUNY OER Services, A Division of SUNY Press.

Brown, D. E., & Clement, J. (1989). Overcoming misconceptions via analogical

    reasoning: Abstract transfer versus explanatory model construction. *Instructional*

    Science, *18*(4), 237–261. https://doi.org/10.1007/BF00118013

Casarett, D., Pickard, A., Fishman, J. M., Alexander, S. C., Arnold, R. M., Pollak, K. I.,

    & Tulsky, J. A. (2010). Can metaphors and analogies improve communication

    with seriously ill patients? *Journal of Palliative Medicine*, *13*(3), 255–260.

    https://doi.org/10.1089/jpm.2009.0221

Clement, C. A., & Yanowitz, K. L. (2003). Using an analogy to model causal

    mechanisms in a complex text. *Instructional Science*, *31*, 195–225.

    https://doi.org/10.1023/A:1023238902950

Curtis, R. V., & Reigeluth, C. M. (1984). The use of analogies in written text.

    Instructional Science, *13*(2), 99–117. https://doi.org/10.1007/BF00052380

Donnelly, C. M., & Dumas, J. E. (1997). Use of analogies in therapeutic situations: An

    analogue study. *Psychotherapy: Theory, Research, Practice, Training*, *34*, 124–

    132. https://doi.org/10.1037/h0087699

Duit, R. (1991). On the role of analogies and metaphors in learning science. *Science*

    Education, *75*(6), 649–672. https://doi.org/10.1002/sce.3730750606

Dunbar, K. (1993). Concept discovery in a scientific domain. *Cognitive Science*, *17*(3),

    397–434. https://doi.org/10.1207/s15516709cog1703_3

Dunbar, K. (1995). How scientists really reason: Scientific reasoning in real-world

    laboratories. *The Nature of Insight*, *18*, 365-395.

Dunlop, B. W., & Dunlop, A. L. (2005). Counseling via analogy: Improving patient

adherence in major depressive disorder. *Primary Care Companion to The Journal

of Clinical Psychiatry*, *07*(06), 300–303. https://doi.org/10.4088/PCC.v07n0606

Foa, E., Hembree, E., & Rothbaum, B. O. (2007). *Prolonged exposure therapy for PTSD:

Emotional processing of traumatic experiences*. Oxford University Press.

Galesic, M., & Garcia-Retamero, R. (2013). Using analogies to communicate information

about health risks. *Applied Cognitive Psychology*, *27*(1), 33–42.

https://doi.org/10.1002/acp.2866

Gazzinelli, M. F., Lobato, L., Matoso, L., Avila, R., Marques, R. de C., Brown, A. S.,

Correa-Oliveira, R., Bethony, J. M., & Diemert, D. J. (2010). Health education

through analogies: Preparation of a community for clinical trials of a vaccine

against Hookworm in an endemic area of Brazil. *PLOS Neglected Tropical

Diseases*, *4*(7), e749. https://doi.org/10.1371/journal.pntd.0000749

Gentner, D. (1983). Structure-mapping: A theoretical framework for analogy. *Cognitive

Science*, *7*(2), 155–170. https://doi.org/10.1207/s15516709cog0702_3

Gentner, D., & Kurtz, K. J. (2006). Relations, objects, and the composition of analogies.

Cognitive Science, *30*, 609–642. https://doi.org/10.1207/s15516709cog0000_60

Gentner, D., & Markman, A. B. (1997). Structure mapping in analogy and similarity.

American Psychologist, *52*, 45–56. https://doi.org/10.1037/0003-066X.52.1.45

Gentner, D., & Smith, L. A. (2013). Analogical learning and reasoning. *The Oxford

Handbook of Cognitive Psychology*, 668-681.

https://doi.org/10.1093/oxfordhb/9780195376746.013.0042

Gick, M. L., & Holyoak, K. J. (1980). Analogical problem solving. *Cognitive Psychology*, *12*(3), 306–355. https://doi.org/10.1016/0010-0285(80)90013-4

Halpern, D. F., Hansen, C., & Riefer, D. (1990). Analogies as an aid to understanding and memory. *Journal of Educational Psychology*, *82*, 298–305. https://doi.org/10.1037/0022-0663.82.2.298

Hill, C. E., Baumann, E., Shafran, N., Gupta, S., Morrison, A., Rojas, A. E. P., Spangler, P. T., Griffin, S., Pappa, L., & Gelso, C. J. (2015). Is training effective? A study of counseling psychology doctoral trainees in a psychodynamic/interpersonal training clinic. *Journal of Counseling Psychology*, *62*, 184–201. https://doi.org/10.1037/cou0000053

Jaeger, A. J., Taylor, A. R., & Wiley, J. (2016). When, and for whom, analogies help: The role of spatial skills and interleaved presentation. *Journal of Educational Psychology*, *108*, 1121–1139. https://doi.org/10.1037/edu0000121

Killick, S., Curry, V., & Myles, P. (2016). The mighty metaphor: A collection of therapists' favourite metaphors and analogies. *The Cognitive Behaviour Therapist*, *9*, e37. https://doi.org/10.1017/S1754470X16000210

Kim, Y. J., Park, W., & Noh, T. H. (2010). The characteristics of analogies generated by science-gifted students depending on the consideration of attributes and relationships in the processes of generating analogies. *Journal of the Korean Chemical Society*, *54*. https://doi.org/10.5012/jkcs.2010.54.5.621

Kurtz, K. J., Miao, C. H., & Gentner, D. (2001). Learning by analogical bootstrapping. *Journal of the Learning Sciences*, *10*, 417–446. https://doi.org/10.1207/S15327809JLS1004new_2

Lincoln, T., Wilhelm, K., & Nestoriuc, Y. (2007). Effectiveness of psychoeducation for

relapse, symptoms, knowledge, adherence and functioning in psychotic disorders:

A meta-analysis. *Schizophrenia Research*, *96*(1–3), 232–245.

https://doi.org/10.1016/j.schres.2007.07.022

Loewenstein, J., & Heath, C. (2009). The repetition-break plot structure: A cognitive

influence on selection in the marketplace of ideas. *Cognitive Science*, *33*(1), 1–19.

https://doi.org/10.1111/j.1551-6709.2008.01001.x

Martin, J., Cummings, A. L., & Hallberg, E. T. (1992). Therapists' intentional use of

metaphor: Memorability, clinical impact, and possible epistemic/motivational

functions. *Journal of Consulting and Clinical Psychology*, *60*, 143–145.

https://doi.org/10.1037/0022-006X.60.1.143

Mathieson, F., Jordan, J., Carter, J. D., & Stubbe, M. (2016). Nailing down metaphors in

CBT: Definition, identification and frequency. *Behavioural and Cognitive

Psychotherapy*, *44*(2), 236–248. https://doi.org/10.1017/S1352465815000156

Newton, L. D. (2003). The occurrence of analogies in elementary school science books.

Instructional Science, *31*(6), 353–375. https://doi.org/10.1023/A:1025706410666

Nezu, A. M., Nezu, C. M., & D'Zurilla, T. J. (2013). *Problem-solving therapy: A

treatment manual*. Springer Publishing Company.

Orgill, M., & Bodner, G. M. (2006). An analysis of the effectiveness of analogy use in

college-level biochemistry textbooks. *Journal of Research in Science Teaching*,

43, 1040–1060. https://doi.org/10.1002/tea.20129

Pincus, D. B., Ehrenreich, J. T., & Mattis, S. G. (2008). *Mastery of anxiety and panic for adolescents: Riding the wave, therapist guide*. Oxford University Press. https://doi.org/10.1093/med:psych/9780195335804.001.0001

Rabelo, J. L., Cruz, B. F., Ferreira, J. D. R., Viana, B. de M., & Barbosa, I. G. (2021). Psychoeducation in bipolar disorder: A systematic review. *World Journal of Psychiatry*, *11*(12), 1407–1424. https://doi.org/10.5498/wjp.v11.i12.1407

Romig, C. A., & Gruenke, C. (1991). The use of metaphor to overcome inmate resistance to mental health counseling. *Journal of Counseling & Development*, *69*(5), 414–418. https://doi.org/10.1002/j.1556-6676.1991.tb01536.x

Sarkhel, S., Singh, O. P., & Arora, M. (2020). Clinical practice guidelines for psychoeducation in psychiatric disorders: General principles of psychoeducation. *Indian Journal of Psychiatry*, *62*(Suppl 2), S319. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_780_19

Spielman, R. M., Jenkins, W. J., & Lovett, M. D. (2020). *Psychology 2e*. OpenStax.

Stoddard, J. A., & Afari, N. (2014). *The big book of ACT metaphors: A practitioner's guide to experiential exercises and metaphors in acceptance and commitment therapy*. New Harbinger Publications.

Stott, R., Mansell, W., Salkovskis, P., Lavender, A., & Cartwright-Hatton, S. (2010). *Oxford guide to metaphors in CBT: Building cognitive bridges*. Oxford University Press.

Tay, D. (2020). Surveying views of metaphor vs. literal language in psychotherapy: A factor analysis. *Metaphor and the Social World*, *10*(2), 273–291. https://doi.org/10.1075/msw.00007.tay

Theodore, L. (2016). *Handbook of evidence-based interventions for children and adolescents*. Springer Publishing Company.

Thiele, R. B., & Treagust, D. F. (1994). The nature and extent of analogies in secondary chemistry textbooks. *Instructional Science*, *22*(1), 61–74. https://doi.org/10.1007/BF00889523

Thiele, R. B., Venville, G. J., & Treagust, D. F. (1995). A comparative analysis of analogies in secondary biology and chemistry textbooks used in Australian schools. *Research in Science Education*, *25*(2), 221–230. https://doi.org/10.1007/BF02356453

Tolin, D. F. (2016). *Doing CBT: A comprehensive guide to working with behaviors, thoughts, and emotions*. The Guilford Press.

Tyler, S. (2020). *Human behavior and the social environment I*. University of Arkansas Libraries.

Vogel, W. H. (2015). Analogies in oncology: Explanations made easier. *Journal of the Advanced Practitioner in Oncology*, *6*(2), 173–176.

Wilbers, J., & Duit, R. (2002). On the micro-structure of analogical reasoning: The case of understanding chaotic systems. In H. Behrendt, H. Dahncke, R. Duit, W. Graber, M. Komorek, A. Kross & P. Reiska (Eds.), *Research in Science Education - Past, Present, and Future* (pp. 205-210). Springer Dordrecht https://doi.org/10.1007/0-306-47639-8_27

Wiley, J., Jaeger, A. J., Taylor, A. R., & Griffin, T. D. (2018). When analogies harm: The effects of analogies on metacomprehension. *Learning and Instruction*, *55*, 113–123. https://doi.org/10.1016/j.learninstruc.2017.10.001

Zhao, S., Sampson, S., Xia, J., & Jayaram, M. B. (2015). Psychoeducation (brief) for

    people with serious mental illness. *The Cochrane Database of Systematic*

    Reviews. *4*, CD010823. https://doi.org/10.1002/14651858.CD010823.pub2

Zuniga, M. E. (1991). "Dichos" as metaphorical tools for resistant Latino clients.

    Psychotherapy: Theory, Research, Practice, Training, *28*, 480–483.

    https://doi.org/10.1037/0033-3204.28.3.480

Vita

Name	*Shari Lieblich*
Baccalaureate Degree	*Bachelor of Science, Temple University, Philadelphia Major:Neuroscience*
Date Graduated	*May, 2018*