CAN YOU TELL THE DIFFERENCE?
COMPARING FACE-TO-FACE VERSUS COMPUTER-BASED INTERVENTIONS.
THE “ELIZA” EFFECT IN PSYCHOTHERAPY

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Abstract
Objectives: Most studies comparing face-to-face to computer-based interventions focused on their overall efficacy, neglecting to explore the difference between common and specific factors that compose such interventions. Our study is exploratory, designed to focus on these basic therapeutic factors by comparing the performance of an internet-based software which simulates therapeutic interventions with a trained human therapist. Method: Two client-therapist interactions, one with a real therapist and one with a computer agent (the “Eliza program”), were both rated by 138 real-life professionals by use of a survey. The survey tapped into aspects relating to both performance and the quality of the therapeutic relationship. Results and conclusions: The perceived difference between the “Eliza” program and the human therapist seemed to lie in the quality of the performances, and not in some intrinsic features of either of the two. The evaluators predominantly found the human therapist to perform better on all the dimensions taken into account. Interestingly enough, what seemed to have a selective impact was the form of therapy they declared to practice. In this regard, the therapists that considered themselves CBT practitioners discriminated more clearly the internet-based program from the trained human therapist on dimensions related to specific factors (e.g., correct approach of the problem) and the overall performance, but not on dimensions related to common factors (e.g., empathy).

Keywords: common and specific factors, psychotherapy, Eliza effect

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The widespread use of Internet and technology has had a powerful impact on the practice of psychotherapy, with a rapid expansion of internet-based interventions (Barak, Hen, Boniel-Nissim, & Shapira, 2008; Ritterband et al., 2003). Despite the growing evidence indicating that internet-based interventions are effective for a variety of conditions (Barak, et al., 2008; Rochlen, Zack, & Speyer, 2004) the field still needs to clarify which are the most relevant therapeutic factors to be built in the internet-based therapeutic programs (Mallen & Vogel, 2002). The majority of the studies comparing face-to-face versus computer based interventions are centered on their overall efficacy, focusing less on the basic factors that compose such interventions (Orlinsky, 2000). The basic therapeutic factors are classified in: 1) specific (e.g., specific therapeutic techniques that are inherent to the therapeutic approach, like cognitive restructuring) and 2) common (e.g., factors that are present in any form of therapy, regardless of the approach, like the therapeutic relationship).

Our study is an exploratory one, designed to focus on these basic therapeutic factors by comparing the performance of an internet-based software which simulates therapeutic interventions, the “Eliza” software (Weizenbaum, 1976), with a trained human therapist while differentiating between specific and common factors (Lambert & Bergin, 1994; Oei & Free, 1995; Oei & Shuttlewood, 1997). Basically, we aim to assess how therapists evaluate and compare the interaction between a patient and a real therapist and the interaction between the same patient and a simple internet-based program, while differentiating between common and specific factors in psychotherapy.

To our knowledge, this is the first study to experimentally compare an internet based therapeutic software (the “Eliza” program) with a trained human therapist, from an expert point of view (not merely regarding the patient’s subjective perception of the interaction. The study was designed to include two client-therapist interactions, one with a real therapist and one with a computer agent (the “Eliza program”), which were then both rated by real-life professionals by use of a survey.

Method

Materials and procedure

Eliza program. This computer agent, developed by scientist Joseph Weizenbaum, employed simple techniques for emotional interaction (Weizenbaum, 1976). “Eliza” acted similar with a Rogersian (client-centered) therapist, rephrasing the “client's” answers as questions by using simple pattern recognition and substitution of key words into standardized questions or comments. Although the goal of the program was to explore natural language processing, Weizenbaum (1976) was surprised to discover that people attributed human-like characteristics to the program (Epstein, Klinkenberg, Wiley, & McKinley, 2001). A version of this program (http://www.abcguides.com/abcsoftware/eliza_js_noframe.htm) was chosen that
did not display any indication of the fact the subject was engaging with a computer agent and not a real person.

**Human therapist.** A trained therapist in cognitive-behavioral psychotherapy conducted the face-to-face therapist interaction. The therapist was enrolled in a Doctoral Program in Clinical Psychology and Cognitive-Behavioral Psychotherapy. She was a novice CBT therapist, with less than one year of experience.

**Client.** One participant (female, age=23, no psychiatric conditions, no previous history of receiving psychotherapy) took part in the study and interacted with both the human and the computer agents. The client was seeking psychotherapy for optimization and personal development. Prior to this study, she had been evaluated in regards to psychological problems. Apart from this evaluation, she did not have other therapy sessions.

**Procedure.** The client underwent two short therapeutic interventions focused on the same psychological problem, chosen by her. The participant was told that this was a study comparing two therapists, one face-to-face therapist and another one, who was in a different location and could be contacted by the means of a chat system. She was instructed to pick a mild psychological problem (e.g., like procrastinating chores) from her own life. After having consented to the study, she was placed in front of a computer where the Eliza program was already launched (http://www.abcguides.com/abcsoftware/eliza_js_noframe.htm). After 15 minutes, the interaction was stopped and the participant entered the session with the face-to-face therapist. The same problem (being too self-critical) was discussed for 15 minutes at the beginning of the session. The computer interaction was saved, and the interaction with the therapist was recorded and then transcribed. At the end of the program the volunteer was debriefed on the nature of the study and offered the possibility to get further therapeutic sessions. Transcripts of both interactions were translated into English. Subsequently, they were sent together with a survey (detailed further) to Romanian and foreign therapists who learned about this study from postings on various professional listservs, Romanian and foreign (e.g., the Association of Psychologists in Romania, the Association of Behavioral and Cognitive Therapies, The Association of Contextual Behavioral Science). Therapists that consented to participate had to read both of the two transcripts and then fill a survey questionnaire about each of them. They had the option of completing the questionnaire online on a dedicated site or returning it by e-mail to one of the authors.

The study was approved by the Institutional Review Board of the authors’ University. The client whose transcripts were used as material was asked whether she would like to take part in the study and she gave her consent. There was no mention of her name or any other personal or biographical details in the transcripts.
Measures
A survey was constructed for the purpose of this study, with the help of an expert panel of licensed clinical psychologists led by the corresponding author (D.D.). It asked therapists to rate each intervention, using a 5-point Likert scale (1=strong disagreement; 5= strong agreement), on the quality of the therapeutic relationships. Common factors sustaining relationship development (Lambert & Barley, 2002) were included in the survey: (a) empathy; (b) unconditional acceptance of client/patient; (c) collaboration; (d) attention to the client/patient; (e) care about what the client says. Apart from these, brief specific and outcome related variables were also included: (a) the efficiency of the discussion; (b) the evaluation of the therapist’s approach (i.e., correct approach of the problem), and (3) overall performance of the therapist. The survey also collected information about the therapists’ demographic information and professional information (i.e., level of expertise, therapeutic approach). Besides the survey, therapists had the possibility to make additional comments about the two transcripts.

Results
A number of 138 therapists responded to our query. Out of these 116 (84.1%) were Romanian and 22 (15.9%) foreign. The gender distribution was: 28 males (20.3%), 97 female (70.3%), and 13 (9.4%) did not report their gender. 87 participants (63%) listed themselves as novice therapist, while 36 participants (26.1%) as experts and 15 participants (10.9%) did not report their level of expertise. Regarding the form of therapy practiced, 59 participants (42.8%) reported practicing cognitive-behavioral therapy (CBT), 59 participants (42.8%) other forms of therapy and 20 participants (14.5%) did not declare the type of therapy they practiced.

The reliability of the scale we constructed was checked by computing Cronbach’s Alpha and showed excellent reliability for both versions completed (0.92 for therapist 1/Eliza program and 0.91 for therapist 2/human). Means and standard deviations for therapist 1 (Eliza program) and therapist 2 (human) for all the dimensions considered in the questionnaire are displayed in Table 1.

We conducted the paired samples t-test for each of the dimensions included in the questionnaires. The results, displayed in Table 1, showed significant differences between the Eliza program and the real therapist on each of the aspects taken into account (all ps<.01). Effect sizes (Cohen’s d) were for these differences were consistently large.

We wanted to explore this result further and see if there were some variables that could act as moderators for the proficiency to distinguish the Eliza program from the real therapist on the dimensions considered. Therefore we constructed difference scores between the scores of therapist 2 (human therapist) and therapist 1 (the Eliza program) for each of the variables considered. Given that the computer agent was unanimously rated as lower for each of these variables, we viewed the difference score as an indicator of the proficiency in
distinguishing the human therapist from the computer agent. We then conducted independent t-tests on these difference scores using the demographic and professional variables. The gender of the therapists (male versus female), their nationality, as well as their level of expertise (expert versus novice) did not have any influence on their proficiency in distinguishing the Eliza therapist from the human therapist (all \( p > .05 \)). However, the type of therapy practiced did have an influence on some of the dimensions taken into account. We divided completers into two categories: cognitive behavioral therapy/CBT (including traditional cognitive-behavioral therapy and new so called “third wave” approaches, like Acceptance and Commitment Therapy, Dialectical Behavior Therapy) and non-CBT including other forms of therapy (e.g., psychodynamic, humanistic). There were significant differences between CBT experts and the others, favoring CBT.

**Table 1.** Means, standard deviations (SD), and paired samples t-tests for therapist 1 (Eliza program) and therapist 2 (human) on the dimensions considered in the study.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Therapist 1/Eliza Mean (SD)</th>
<th>Therapist 2/Human Mean (SD)</th>
<th>df</th>
<th>t–test value</th>
<th>Effect size (Cohen's ( d ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency of discussion (Q1)</td>
<td>1.54 (0.94)</td>
<td>3.87 (0.85)</td>
<td>137</td>
<td>-20.26*</td>
<td>2.54</td>
</tr>
<tr>
<td>Unconditional acceptance of the client (Q2)</td>
<td>1.92 (1.03)</td>
<td>4.30 (0.78)</td>
<td>137</td>
<td>-19.73*</td>
<td>2.6</td>
</tr>
<tr>
<td>Collaboration (Q3)</td>
<td>2.00 (1.02)</td>
<td>4.30 (0.73)</td>
<td>137</td>
<td>-18.89*</td>
<td>2.59</td>
</tr>
<tr>
<td>Empathy (Q4)</td>
<td>1.83 (1.00)</td>
<td>4.13 (0.85)</td>
<td>137</td>
<td>-18.33*</td>
<td>2.47</td>
</tr>
<tr>
<td>Attention to the client (Q5)</td>
<td>2.13 (1.14)</td>
<td>4.39 (0.86)</td>
<td>137</td>
<td>-17.25*</td>
<td>2.23</td>
</tr>
<tr>
<td>Care about what the client says (Q6)</td>
<td>2.10 (1.10)</td>
<td>4.23 (0.82)</td>
<td>137</td>
<td>-16.42*</td>
<td>2.19</td>
</tr>
<tr>
<td>Correct approach of the problem (Q7)</td>
<td>1.60 (0.88)</td>
<td>3.96 (0.90)</td>
<td>137</td>
<td>-19.44*</td>
<td>2.65</td>
</tr>
<tr>
<td>Overall performance (Q8)</td>
<td>1.50 (0.88)</td>
<td>4.10 (0.85)</td>
<td>137</td>
<td>-22.21*</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note.* \( * p<.01 \)
experts, on the dimensions regarding: (1) the efficiency of the discussion, \( t(86.18) = 2.89, p < .05, \) Cohen’s \( d = 0.62; \) (2) the degree of collaboration exhibited, \( t(102.5) = 2.69, p < .05, \) Cohen’s \( d = 0.53; \) (3) the correct approach of the problem, \( t(87.5) = 4.73, p < .05, \) Cohen’s \( d = 1.01; \) and (4) the overall appreciation of the therapeutic performance \( t(90.4) = 3.41, p < .05, \) Cohen’s \( d = 0.71. \) More specifically, the CBT experts rated the human therapist as better than the computer program on all of these aspects.

**Discussion and conclusions**

One of the most interesting and revealing results was that the participants who evaluated the transcripts from the two therapists (“Eliza” software and human therapist) seemed to view them both as human therapists. At no point did any of them mention that the interaction with therapist 1 (the “Eliza” program) displayed unusual features or that it was a strange, unnatural therapist-patient interaction. This result is consistent to the main body of research pointing to the “Eliza effect” (Hofstadter, 1996), a psychological phenomenon that describes the anthropomorphic tendency of people to attribute human-like characteristics to embodied computer agents.

The perceived difference between the “Eliza” program and the human therapist seemed to lie in the quality of the performances, and not in some intrinsic features of either of the two. The evaluators predominantly found the human therapist to perform better on all the dimensions taken into account. It pays to notice that these dimensions dealt with different aspects of the therapeutic process: while some had to do with common factors, such as the construction the therapeutic relationship (unconditional acceptance, empathy, collaboration, attention given to the client, care for what the client says), others were related to specific factors, such as the efficiency of the intervention for solving the problem and the correct approach of the problem.

If most evaluators concurred in considering both therapists human agents, but of notably different competences, we envisioned an interesting question one might pose is whether there are any therapist related variables that can moderate the ability to distinguish between the computer-based program and the human on some of the dimensions we took into account. The variables we took into account were selected based on therapist outcome studies, which try to identify therapist-related values that may affect therapy outcomes (Hersoug, Monsen, Havik, & Hoglund, 2002; Orlinsky & Howard, 1980). We found that the gender of the therapists, their nationality, or their level of expertise had no impact on their capacity to distinguish the “Eliza” program from the human on any of the variables taken into account.

Interestingly enough, what seemed to have a selective impact was the form of therapy they declared to practice. In this regard, the ones that considered themselves CBT practitioners discriminated more clearly the internet-based program from the trained human therapist on dimensions related to specific
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Factors (i.e., the efficiency of the interaction in solving the problem, the correct approach of the problem) and the overall performance/confidence in recommending the therapist to other patient, but not on dimensions related to common factors. There was one exception to this: collaboration, where CBT practitioners again more proficient at making the distinction. These results are consistent with the idea that, while the aspects regarding the construction of a good therapeutic relationship are common across different forms of psychotherapy, things look different when it comes to efficiency, approach of the problem, and other variables having to do with specific factors in psychotherapy. Regarding the variable of collaboration, it must be pointed out that it plays a special part in the construction of a therapeutic alliance in CBT, as a collaborative relationship is the trademark of CBT interventions. Other types of therapy orientations, such as psychodynamic and/or humanistic/existential ones, do not necessarily place a high emphasis on collaboration (i.e., highly structured and an explicitly agreed agenda). This might explain why CBT practitioners were especially proficient in separating the human and artificial agent therapist on this dimension.

Therefore, our study brings three new important insights. First, all therapists displayed anthropomorphic effects; none of them mentioned that there is something unnatural with the therapeutic script of the artificial agent. While – based on previous research - this effect is expected from patients and paraprofessionals, it is somewhat surprising coming from professional therapists as well. Second, all therapists tended to evaluate the artificial therapist as worse than the human therapist. Still, “Eliza” is not among the complex therapeutic internet-based programs; its principles are very basic and it operates following simple script rules. Modern computer softwares designed for computer-aided therapy have much more complex features. Third, the evaluation of the artificial therapist was influenced by the theoretical background of the expert human therapist evaluators; indeed, CBT practitioners rated the artificial agent as worse on specific dimensions they considered important for therapy but the artificial agent failed to implement (e.g., specific factors). Moreover, the evaluation of the overall efficacy was influenced by the evaluation of these specific dimensions. Forth, as it was an exploratory, small-scale study, we used a measure designed for the purpose of this specific research question. Future studies should use validated measures of both specific and common factors in therapy.

We believe that these insights can inform computer-based therapy developments, especially those related to artificial intelligence therapy agents, and can stimulate further, more complex, research in this field. A useful next step would be to compare more complex computer-based therapy programs with human therapists in order to see if this pattern of results remains consistent. However, before doing this, it was important to understand how experts (i.e., professional psychotherapist) react to computer-based therapy programs in a simple but controlled setting.

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REFERENCES


