

Evidence of Efficacy and Translational Overconfidence in Clinical Behavioral Analysis

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Abstract

The emergence of behavioral therapies followed the same strategy that had proved successful in other fields of science: extrapolating principles, which were empirically validated in basic research, to the solution of human problems. However, the mere transposition of this knowledge to different types of clinical problems – despite the importance of these principles for therapeutic practice – does not guarantee a priori effectiveness of the intervention. One of the defining characteristics of applied behavior analysis is the strong commitment to the empirical basis of its intervention procedures. That being said, the purpose of this article is to assess the current status of the evidence of efficacy in a branch of applied behavior analysis – clinical behavior analysis or behavior-analytic therapy – and to offer a critical reflection on the commonly widespread view that these therapies are scientifically sound. To accomplish these goals, this paper clarifies terms such as *Behavior Therapy*, *Clinical Behavior Analysis* and *Behavior-Analytic Therapy*, summarizes the empirical evidence for the different types of therapies that are encompassed by clinical behavior analysis, and puts forth the argument that the field suffers from “translational overconfidence” (the belief that data from basic science are sufficient to support intervention procedures).

Keywords: Behavior therapy, behavior analysis, clinical psychology, psychotherapy, evidence-based practice.

Evidências de Eficácia e o Excesso de Confiança Translacional da Análise do Comportamento Clínica

Resumo

O surgimento das terapias comportamentais seguiu a mesma estratégia que havia se mostrado bem-sucedida em outras ciências: extrapolar princípios validados empiricamente na pesquisa básica para a resolução de problemas humanos. Entretanto, apesar da relevância desses princípios para a prática terapêutica, a mera transposição direta desse conhecimento para os diversos tipos de problemas clínicos não garante, a priori, a efetividade da intervenção. Tendo em vista que uma das características definidoras da Análise do Comportamento Aplicada é o forte comprometimento com a sustentação empírica de seus procedimentos de intervenção, o objetivo deste artigo é avaliar o status atual das evidências de eficácia de um ramo da Análise do Comportamento Aplicada – a Análise do Comportamento Clínica

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ou Terapia Analítico-Comportamental – e fazer uma reflexão crítica sobre a concepção comumente disseminada de que essas terapias são cientificamente embasadas. Para cumprir esse objetivo, o artigo apresenta um esclarecimento acerca dos termos *Terapia Comportamental*, *Análise do Comportamento Clínica* e *Terapia Analítico-Comportamental*, sintetiza as evidências empíricas sobre as diversas modalidades de terapia que são abarcadas pela Análise do Comportamento Clínica e argumenta que a área sofre de um “excesso de confiança translacional” (a crença de que os dados da ciência básica são suficientes para fundamentar procedimentos de intervenção).

Palavras-chave: Terapia comportamental, análise do comportamento, psicologia clínica, psicoterapia, prática baseada em evidências.

Las Evidencias de la Eficacia y el Exceso de Confianza Traslacional del Análisis de Conducta Clínico

Resumen

La aparición de las terapias conductistas siguió la estrategia que había dado buenos resultados en otras ciencias: extrapolar principios validados empíricamente en la investigación básica para resolver problemas humanos. A pesar de la importancia de estos principios para la práctica terapéutica, la mera transposición directa de este conocimiento a los problemas clínicos no garantiza, a priori, la eficacia de la intervención. Sabiendo que una de las características del análisis aplicado del comportamiento es el compromiso con el apoyo empírico de sus procedimientos de intervención, el objetivo de este artículo es evaluar la situación actual de las evidencias de eficacia de una rama del Análisis Aplicado del Comportamiento – el Análisis de Conducta Clínico o Terapia Analítica-Conductual – y reflexionar de manera crítica sobre la vista generalizada de que estas terapias son científicamente sólidas. Para lograr este objetivo, el artículo presenta una aclaración de los términos *Terapia Conductista*, *Análisis Clínico de Comportamiento* y *Terapia Analítica-Conductual*, resume la evidencia sobre los diferentes tipos de terapia que están abarcados por el análisis clínico del comportamiento, y argumenta que el área sufre un “exceso de confianza translacional” (la creencia de que los datos de la ciencia básica son suficientes para apoyar los procedimientos de intervención).

Palabras clave: Terapia conductista, análisis de la conducta, psicología clínica, psicoterapia, práctica basada en la evidencias.

The development of the behavioral model of clinical intervention followed the same strategy that had proved successful in other fields of science: extrapolating principles that were empirically validated in basic research to the solution of applied problems. In the same way that medicine was based on physiology and microbiology, and engineering on physics and chemistry, the argument put forth by the pioneers of behavioral therapy (e.g., Watson, Jones, Lazarus and Wolpe) was that any intervention should derive from the scientific understanding of the basic behavioral processes, which strongly opposed the clinical psychology that was dominant at the beginning of the 20th century (mainly psy-

choanalytic and humanist therapies; Branch & Hackenberg, 1998; O’Donohue, 1998).

The 1920s were marked by the first attempts at transposing knowledge about the principles of respondent conditioning, investigated in animal laboratories by Pavlov early in the century, to the analysis of clinical phenomena. Some examples include the demonstration of how the reaction of fear could be learned through respondent conditioning (Watson & Rayner, 1920) and unlearned through gradual exposure to the feared stimulus (Jones, 1924a, 1924b). In the 1950s and 60s, Skinner’s (1938/1991) findings about the basic behavioral processes of operant conditioning (e.g., reinforcement) with laboratory ani-

mals were extended to human behavior. Initially, researchers had the sole purpose of assessing if such processes could also explain and modify human behavior, and subsequently the interest became explicitly therapeutic, thus giving rise to applied behavior analysis (Kazdin, 1978; Moskorz, Kubo, Luca, & Botomé, 2012; for a didactic introduction to the history of behavioral therapies, see Leonardi, 2015).

Thus, it can be said that, since its beginning, applied behavior analysis has presented a strong commitment to the empirical foundations of its therapeutic procedures. In this sense, the *Statement on the Right to Effective Behavioral Treatment*, developed by a task force from the Association for Behavior Analysis (Van Houten et al., 1988), states the following:

An individual is entitled to effective and scientifically validated treatment. In turn, behavior analysts have an obligation to use only those techniques that have been demonstrated by research to be effective, to acquaint consumers and the public with the advantages and disadvantages of these techniques, and to search continuously for the most optimal means of changing behavior. (p. 383)

Similarly, the *Guidelines for Responsible Conduct for Behavior Analyst*, developed by the Behavior Analyst Certification Board (2010), an organization that regulates and issues professional certification to behavior analysts in several countries, repeatedly states that service provisions in applied behavior analysis should be based on the best possible available evidence, as the following items illustrate:

1.01 Reliance on Scientific Knowledge. Behavior analysts rely on scientifically and professionally derived knowledge when making scientific or professional judgments in human service provision, or when engaging in scholarly or professional endeavors. (p. 1).

2.10 Treatment Efficacy. (a) The behavior analyst always has the responsibility to recommend scientifically supported most effective treatment procedures. Effective treatment procedures have been validated as

having both long-term and short-term benefits to clients and society. (b) Clients have a right to effective treatment (i.e., based on the research literature and adapted to the individual client). (p. 6)

Therefore, the premise of applied behavior analysis seems to be in perfect harmony with the Evidence-Based Practice movement in psychology, which is currently one of the most discussed topics in the international field of psychology (for a historical treatment about the many theoretical, conceptual and methodological perspectives regarding this topic, see Leonardi & Meyer, 2015). However, despite the fact that applied behavior analysis has, as a central tenet, the need to empirically support its procedures, it is of fundamental importance for the field to assess to what degree it is actually producing evidence for the efficacy of its procedures.

In view of this, the purpose of this article is to assess the current status of the evidence of efficacy in a branch of applied behavior analysis – clinical behavior analysis or behavior-analytic therapy – and to offer a critical reflection on the commonly widespread view that these therapies are scientifically sound. To accomplish these goals, this paper will clarify the terms *Behavior Therapy*, *Clinical Behavior Analysis* and *Behavior-Analytic Therapy*, summarize empirical evidence for the different types of therapies that are encompassed by clinical behavior analysis, and put forth the argument that the field suffers from “translational overconfidence” (the belief that data from basic research are sufficient to support intervention procedures).

Clinical Behavior Analysis and Behavior-Analytic Therapy

Ever since the term *Behavior Therapy* was used for the first time in the 1950s, a wide variety of practices were grouped under this label, often without there being any philosophical, conceptual or methodological similarities between them (Moskorz et al., 2012; O’Donohue, 1998).

With the aim of differentiating a behavior therapy based on the philosophical, conceptual, methodological and empirical foundations of

behavior analysis from all of the other existing behavior therapies, some authors (e.g., Kohlenberg, Hayes, & Tsai, 1993; Kohlenberg, Tsai, & Dougher, 1993) coined the term *Clinical Behavior Analysis* (CBA). CBA was defined as a branch of applied behavior analysis, which is characterized by the types of clients served (verbally competent adults), clinical problems addressed (psychiatric disorders, stress, obesity, heavy smoking, everyday difficulties, marital problems, improving quality of life, etc.), procedures used (verbal interactions between therapist and client), and the setting in which interventions occur (the consulting room; Guinther & Dougher, 2013). However, CBA is not comprised of a single therapeutic model but encompasses several therapies such as Acceptance and Commitment Therapy (ACT), Functional Analytic Psychotherapy (FAP), Dialectical Behavior Therapy (DBT), Behavioral Activation (BA), among others (Pérez-Álvarez, 2006).

In Brazil the development of a therapy based on the foundations of behavior analysis followed a different route than that which occurred in the USA (cf. Leonardi, 2015). Here, the basic principles learned in behavior analysis textbooks (e.g., Keller & Schoenfeld, 1950/1995) and in research published in *Journal of the Experimental Analysis of Behavior*, as well as the Skinnerian approach to verbal behavior and subjectivity, were transposed to the field of psychotherapy (Guilhardi, 2003; Vandenberghe, 2011). Bellodi (2011), after interviewing several pioneers of behavior therapy in Brazil, stated that these pioneers gradually developed their own model of intervention, since, at that time (1970s), foreign behavior analysts worked with severely handicapped populations (e.g., autistic and psychotic individuals) in institutions, and clinical practices in the USA were dominated by cognitive therapists.

Throughout the 1970s and 2000s, various terms were used to refer to this clinical practice. Some examples include *Behavior Psychotherapy* (e.g., Lettner & Rangé, 1988), *Behavior Therapy* (e.g., Guedes, 1993) and *Behavior Clinical Psychology* (e.g., Silveira, 2000/2012). In 2001, Tourinho and Cavalcante proposed using the term *Behavior-Analytic Therapy* (TAC, from the

Portuguese *Terapia Analítico-Comportamental*), which became the consensus among therapists from different regions in Brazil as the best designation for their professional practice, as the name itself already specifies the practice's philosophical, conceptual and methodological foundations. It must be emphasized that the creation of the term was not an attempt to propose a new form of psychotherapy but rather to standardize the name of a clinical practice founded on Skinnerian behavioral science that had been practiced in Brazil since the beginning of the 1970s (Zamignani, Silva, & Meyer, 2008). Ultimately, as summarized by Vandenberghe (2011), the term *Behavior-Analytic Therapy* refers to a clinical approach founded on behavior analysis that emerged and developed in Brazil.

Defining CBA and TAC as therapies founded on behavior analysis may seem to suggest, at first glance, that the different therapeutic models encased under these labels are mutually compatible, and that they are all based on the philosophical, conceptual and methodological foundations of behavior analysis (for a detailed presentation of these foundations, see Moore, 2008). However, the relation between them is not so simple. Not all CBA therapies (FAP, ACT, BA, and DBT) seem compatible with behavior analysis (or even with each other), especially because of the detachment of therapeutic procedures from basic principles (reinforcement, discrimination, etc.), and because of the use of a language that sounds mentalistic to the majority of behavior analysts that value Skinnerian jargon (Vandenberghe, 2011). While offering a critical analysis about the compatibility between each of these therapeutic models and the foundations of behavior analysis is beyond the scope of the present article, empirical evidence of efficacy that exist for FAP, ACT, DBT, BA, and TAC will be presented below.

Empirical Evidence of Efficacy for Clinical Behavior Analysis and Behavior-Analytic Therapy

Firstly, it is important to recognize that there is controversy within the literature about

what constitutes good quality evidence, which methods should be employed to establish the efficacy of a therapy, the best ways of measuring outcomes, and how the evidence can be applied to the clinical psychologist's practice (Reed, Kihlstrom, & Messer, 2006). Describing in detail each of these different methods of research and types of outcome measures, as well as indicating their advantages and disadvantages, is beyond the scope of this article. Nevertheless, a brief explanation for readers not familiarized with clinical research methodology will be presented below.

Research methods considered appropriate for investigating the efficacy of therapies are the randomized controlled trial, the single-case experiment, and the case study. The randomized controlled trial is a group experimental design used in pharmacological research that has been employed in the field of psychotherapy since the 1960s. It consists of the selection of a large sample of participants with the same diagnosis who are then randomly allocated in an experimental group (in which the treatment in question is present) or in a control group (in which the treatment in question is absent). To assess the results of exposure to the intervention, one or more quantitative measures (generally standardized self-report scales, see below) are carried out with each participant. Finally, the obtained data are summarized by way of statistical tests, which make it possible to assert if a certain treatment is, on average, effective for a particular psychiatric disorder (Kendall, Comer, & Chow, 2013). In spite of its limitations (cf. Borkovec & Castonguay, 2006; Starcevic, 2003), randomized controlled trials allow for a rather precise assessment of causal relationships and, because of this, have been considered the gold standard for determining the efficacy of psychotherapies.

The single-case experiment submits the same individual to all conditions in a study, and, rather than having their performance compared to that of a group, they serve as their own control. The experiment is divided into two conditions: during baseline, the dependent variable (one or more target behaviors, self-report questionnaire scores, etc.) is repeatedly measured to

obtain the individual's standard performance in the absence of the intervention. This condition is analogous to the control group in randomized controlled trials. In the treatment condition, the independent variable (one or more therapeutic actions) is introduced, and new measures of the dependent variable are carried out (Barlow, Nock, & Hersen, 2008; Hurst & Nelson-Gray, 2006). In this manner, the efficacy of an intervention can be assessed by the continued measuring of an individual's performance before, during and after introducing and removing the intervention.

The case study is a faithful, systematic and longitudinal report of a therapeutic process, generally based on the therapist's memory, which encompasses the client's life history, interventions that were carried out, observed changes, and other relevant information that may lead to a better understanding of the case. In this way, the case study does not seek to investigate the effect of a specific variable or to test pre-established hypotheses, but rather to carefully describe in detail a single therapeutic process in all of its complexity (Serralta, Nunes, & Eizirik, 2011; Stiles, 2006). It is important to note that the case study is not an experimental method and, because of this, has little value as scientific evidence for supporting a therapeutic practice.

The production of empirical evidence for the efficacy of a therapy (be it through randomized controlled trials, single-case experiments or case studies) requires some type of measure that represents the patient's clinical status before and after the therapeutic process (Ogles, Lambert, & Fields, 2002). Various types of outcome measures can be used in research and in psychotherapeutic practices, such as standardized self-report questionnaires, which involve a set of questions created with the intent of obtaining a sample of one's psychological functioning (e.g., The Beck Depression Inventory; Beck, Steer, & Brown, 2012; Outcome Questionnaire; Lambert et al., 1996); individualized self-report instruments (e.g., Goal Attainment Scaling; Kiresuk, Smith, & Cardillo, 1994); third-party reports, which can involve people who are close to the client (wife, father/mother, offspring, coworkers, friends) or

health professionals (therapeutic companion, nurse, occupational therapist, doctor); behavioral measures, in which the focus is on what the individual does and not on what they report (e.g., time engaged in an activity, frequency of self-injurious behavior, quantity of smoked cigarettes, etc.); physiological measurements (heart beats, blood pressure, blood volume, muscle tension, respiration, skin conductance, hormones, brain imaging, etc.).

After this brief digression about the various research methods in clinical psychology, the empirical evidence of efficacy for the different modalities of clinical behavior analysis will be presented below.

Mangabeira, Kanter, and Del Prette (2012) reviewed the literature, covering publications in Portuguese, English and Spanish, with the purpose of analyzing the development of FAP since its emergence. Among the 80 articles found by the authors, only 42% were empirical studies. Half of these were case study reports, which lacked both internal and external validity, because they recounted the therapeutic process without precisely describing procedures and without employing objective outcome measures. In addition, the authors called attention to the scarcity of single-case experiments and to the inexistence of randomized controlled trials, which are considered the gold standard of research in psychotherapy. Considering that these authors did not analyze efficacy results for FAP in these publications, Leonardi (2016) carried out a systematic review of empirical studies about FAP (and TAC, see below) that dealt with typically developing adult clients (aged 18 years or over) and with interventions that occurred exclusively in the consulting room. The author identified 17 case reports and three single-case experiments, all of which reported positive efficacy (i.e., improvement in the client's initial clinical complaint). However, the results of eight of these 20 studies (i.e., 40%) were only assessed by way of the therapist's and/or client's perceptions about the changes that occurred (i.e., without any objective measurements), which decreases their scientific value. In this manner, though there is

some favorable evidence for FAP, there is still a lack of rigorous empirical data proving its efficacy.

ACT, on the other hand, is one of the most researched modalities of psychotherapy in the world. In June 2015, the website² of the *Association for Contextual Behavioral Science* listed 102 randomized controlled trials for various types of clinical conditions, such as depression, anxiety, borderline personality disorder, obsessive-compulsive disorder, trichotillomania, eating disorders, substance abuse, stress, chronic pain, fibromyalgia, obesity, heavy smoking, among others. However, a recently published systematic review with meta-analysis (Öst, 2014) revealed that the overwhelming majority of randomized controlled trials about ACT contain serious methodological problems that invalidate their results. Among them, the following stand out: 51% of the studies only used one or two therapists in the ACT groups, and 76% did not assess intervention integrity (i.e., a therapist's adherence to the intervention protocol) – in both cases, the improvement that was observed would only prove the efficacy of the therapist but not of the protocol; in 67% of the studies, the control groups had less hours of therapy than the ACT group – in this case, the improvement observed could be due to the duration of therapy and not to a specific intervention; 45% of the studies that demonstrated ACT's superiority to other types of interventions used the wrong statistical tests to compare the results between groups. Even though there are methodologically sound randomized controlled trials about ACT, the fact that the majority contain serious biases makes it impossible to conclude with certainty if this therapeutic modality is effective and, if so, for what types of clinical problems.

DBT, a type of behavior therapy developed for the treatment of borderline personality disorder, has been the subject of 20 published randomized controlled trials according to the *Lineham*

² http://contextualscience.org/ACT_Randomized_Controlled_Trials

Institute website³. Recently, a systematic review with meta-analysis (Stoffers et al., 2012) by the *Cochrane Collaboration* (which adheres to the most stringent criteria for analyzing the quality of empirical evidence) recognized DBT as the best available intervention for borderline personality disorder, even surpassing results obtained with pharmacological treatments. Although it was originally developed as an intervention for the treatment of borderline personality disorder, DBT has been adapted and empirically tested as treatment for other clinical conditions, such as substance abuse (Dimeff & Linehan, 2008) and eating disorders (Bankoff, Karpel, Forbes, & Pantalone, 2012), among others.

BA is a treatment for depression that originated in the comparative analysis of the active components of cognitive-behavioral therapy, which showed that the behavioral portion of the treatment, without the use of cognitive techniques, improved symptoms as much as the application of the entire treatment package (cf. Jacobson et al., 1996). Over 30 randomized controlled trials have demonstrated BA's efficacy (for reviews, see Cuijpers, van Straten, & Warmerdam, 2007; Ekers, Richards, & Gilbody, 2008; Mazzucchelli, Kane, & Rees, 2009).

Finally, the empirical evidence for the efficacy of TAC, the Brazilian model of clinical behavioral analysis, is rather scarce. In reviewing 142 Brazilian publications about behavioral therapy from 1949 to June 2001, Nolasco (2002) found that 86% of these were conceptual papers, which led the author to conclude that behavior-analytic therapists "have scarcely communicated with the scientific community about the models of their intervention methods and about the practical results obtained with them" (p. 64). More recently, Leonardi (2016) systematically reviewed Brazilian empirical literature about behavior therapy and located 34 studies (besides the 19 previously mentioned works about FAP), of which three were single-case experiments and 31 were case reports. Nonetheless, the vast majority of these publications lack the scientific rigor required for

assessing the efficacy of an intervention. For example, among these 34 studies, 22 (i.e., 64.7%) used the therapist's and/or client's perceptions as their only outcome measure, 25 (73.5%) did not conduct follow-up investigations, and none assessed intervention integrity, which prevents the identification of the procedures, techniques or strategies (i.e., the therapist's behavior) that constitute the therapeutic process. In light of the lack of randomized controlled trials, the small number of single-case experiments, and the limited reach of case studies for assessing the cause and effect relationship of an intervention, it is possible to say that the model of behavioral therapy developed and practiced in Brazil does not have scientifically sound data that can prove its efficacy. More than that, the lack of intervention integrity assessments makes it impossible to accurately characterize the practice of the Brazilian behavior therapist to identify the similarities and differences between this therapy and other behavioral therapy modalities, and to investigate its clinical relevance.

The Translational Overconfidence of Clinical Behavior Analysis and Behavior-Analytic Therapy

The data from the systematic literature reviews presented above (Bankoff et al., 2012; Cuijpers et al., 2007; Ekers et al., 2008; Leonardi, 2016; Mangabeira et al., 2012; Mazzucchelli et al., 2009; Öst, 2014; Stoffers et al., 2012) indicate that, with the exception of DBT and BA, there is no rigorous empirical evidence for the efficacy of FAP, ACT, or TAC. Despite the scarcity of clinical research and the low scientific rigor of the studies that investigated the efficacy of various modalities of behavioral therapy (once again, with the exception of DBT and BA), Brazilian and foreign researchers and therapists seem to be quite convinced that the therapy (if it is even possible to use the singular in this case) based on behavior analysis is empirically founded. An example of this is Forsyth and Hawkins's (1997) summary of the opinions of over 20 authors who were invited to write in a special issue of *Behavior Therapy* that marked

³ http://behavioraltech.org/downloads/Research-on-DBT_Summary-of-Data-to-Date.pdf

the 30th anniversary of the *Association for Advancement of Behavior Therapy*. According to the authors, “there is agreement that behavior therapy is generally fulfilling its promise to devise empirically derived, empirically tested, efficacious, and time-limited interventions to alleviate human suffering” (p. 327). In Brazil a similar stance can be found in the following citation from Meyer et al. (2010): “the behavior-analytic approach is empirically validated in the laboratory and in applied situations, such as the clinic, through demonstrations of orderly relations between behavior and environment” (p. 157).

The idea that a therapy founded in behavior analysis is evidence-based possibly originated in its commitment to experimental laboratory research of the basic processes that constitute behavioral phenomena (e.g., Rimm & Masters, 1974). In this sense, Branch and Hackenberg (1998) recall that “the origins of many therapeutic techniques employed by behavior therapists can be traced directly to results of research with nonhumans, and general conceptualizations employed by behavior therapists often have their roots in research with nonhumans” (p.15). Similarly, Hawkins and Forsyth (1997), when commenting the range of individuals, behaviors and environments to which behavioral procedures have successfully been applied, state that “this remarkable range of effectiveness is partly because of the relative integration of applied and basic behavior analysis” (p.12).

According to Critchfield (2014), the belief that basic research data is sufficient to support intervention procedures is a serious problem for behavior analysis – in his words, “translational overconfidence” (p. 37). A rather illustrative example of this is the notion that every and any use of punishment is harmful. Several authors (e.g., Guedes, 2011; Matos, 1981; Sidman, 1989) assert that the byproducts of punishment procedures make their use unjustifiable. Although it is possible to cite many examples, the following statement by Sidman (1989) summarizes many behavior analysts’ repudiation of the use of punishment: “punishment is a most unwise, undesirable, and fundamentally destructive method of controlling conduct” (p. 68).

However, to uphold behavior analysis’s prerogative of using objective empirical data to judge the validity of a statement, recommendations about the use or rejection of punishment should be founded on evidence rather than on an exclusively ideological a priori assumption. One should question: which data sustains the notion that punishment is harmful? Outlining an answer to this question, Critchfield (2014) recalls that seminal research about punishment, carried out between the 1940s and the 1970s, was not intended to solve application issues (the procedures involved electric shock administration to laboratory animals in very specific and limited conditions), thereby corroborating Cipani’s (2004) analysis that experiments about punishment and their byproducts differ considerably from daily situations in which punishment is generally used. Furthermore, while reviewing basic and applied research about punishment, Lerman and Vorndran (2002) concluded that, even in basic research, results concerning the maintenance, generalization and adverse effects of punishment are contradictory and that “the extent to which findings with nonhumans and response-contingent electric shock can be extrapolated to the treatment of behavior disorders in clinical populations may be substantially restricted” (p. 456). Consequently, questions such as “can punishment reduce problem-behavior?”, “what are its byproducts?”, “do the benefits outweigh the potential detrimental effects?”, “are there ways of reducing these detrimental effects?”, “which parameters make punishment more or less efficient?” need to be answered by empirical research in applied settings. In conclusion, it would be premature to prescribe or condone the use of punishment based on currently available data alone.

The translational overconfidence that circumscribes the issue of punishment illustrates that, despite the relevance of basic research data for the development of TAC and CBA, a mere direct transposition of this knowledge to more diverse types of clinical problems does not guarantee a priori the effectiveness of the intervention (Eifert & Plaud, 1998; Holden, 2007; Neno, 2005; O’Donohue & Ferguson, 2006; Plaud,

Eifert, & Wolpe, 1998). Therefore, even with a foundation in basic research, the procedures, strategies and techniques required for an effective behavior-analytic intervention need to be formulated and tested within the framework of clinical research. The following remarks made by O'Donohue (1998), a staunch defender of the importance of basic research to psychotherapeutic practice, illustrate the value, but not the adequacy, of the principles derived from the laboratory, and point to the need to empirically examine intervention procedures:

It is a crucial methodological point that lab research changes external validity for internal validity. Lab protocols are simplified in order to guarantee isolation of independent variables, and to improve the accuracy of measurement of dependent variables. In doing this, the laboratory preparation often becomes idealized and removed from naturalistic phenomena. However, after regularities are discovered in the lab, the next step is to examine whether they can be extrapolated to related (but not identical) variables in the natural environment. Similar relationships can be found in laboratory preparations and naturalistic phenomena in physiology and medicine, for example. (p. 11)

Similarly, Plaud et al. (1998) call attention to the fact that

behavior therapy researchers will need to pay more attention to the manner in which scientific knowledge is translated into something that can be used or applied by a practitioner. As learning theory has only ever provided analogies for the design of treatment, in clinical work the basic principles from theory must be translated into a secondary set of principles from which treatment may be derived. The process by which a clinician can make transformations from theory to practice most effectively is an important, complex, and poorly understood process and, therefore, a topic worthy of more detailed study. (p. 329)

In this direction, Neno (2005) argues that clinical behavior analysts should combine efforts around research programs geared at assess-

ing the efficacy of their intervention procedures, strategies and techniques. Naturally, no single research laboratory will be able to produce the body of evidence necessary to empirically support behavior-analytic therapies.

It should be noted that some groups in Brazil are already dedicating themselves to clinical research employing rigorous methods, such as the Behavior Therapy Laboratory (*Laboratório de Terapia Comportamental*) of the University of São Paulo, led by Dr. Sonia Beatriz Meyer (e.g., Oshiro, 2011; Santos, 2014); the Group on Verbal Processes in Behavior-Analytic Therapeutic Interaction (*Grupo de Processos Verbais na Interação Terapêutica Analítico-Comportamental*) of the Paradigma Center for Behavioral Sciences and Technology (*Centro Paradigma de Ciências e Tecnologia do Comportamento*), led by Dr. Denis Roberto Zamignani (e.g., Zamignani & Meyer, 2014); the Graduate Program in Psychology (*Programa de Pós-Graduação em Psicologia*) of the Federal University of Paraná, led by Dr. Jocelaine Martins da Silveira (e.g., Popovitz, 2013); and the Graduate Program in Developmental Psychology and Learning (*Programa de Pós-Graduação em Psicologia do Desenvolvimento e Aprendizagem*) of São Paulo State University (UNESP), led by Dr. Alessandra Turini Bolsoni (e.g., Rocha, 2012).

The efforts of these research groups reveal that clinical behavior analysts are abandoning translational overconfidence concerning basic research data and are gradually seeking to empirically demonstrate the efficacy of their interventions, which is certainly an enormous and important contribution to the development of behavior analysis as a science and a profession.

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