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PROVIDING EFFECTIVE INTERVENTIONS MAY NOT BE ENOUGH: THE IMPORTANCE OF COST ANALYSIS IN THE BEHAVIORAL HEALTH SYSTEM

Peter-Cornelius Dams
Western Michigan University

ABSTRACT: The restructuring of the health care delivery system with its growing emphasis on cost-efficient treatment programs constitutes a shift in metacontingencies for the practice of behavioral health services. These changes are important for behavior analysts because funding sources pay increasing attention to the financial impact of behavioral services. This paper reviews two basic types of cost analysis: cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA). Examples from the behavioral health research literature indicate that information about treatment costs plays a crucial role in the overall evaluation of behavioral treatments and that cost-effective treatments can achieve monetary benefits without compromising treatment integrity. Paraprofessional therapists are a key element of cost-effective treatments. In order to overcome historical barriers to conducting and reporting cost analyses, the behavior analysis community must establish educational and editorial contingencies.

The restructuring of the health care delivery system with its growing emphasis on cost-efficient treatment programs constitutes a shift in metacontingencies for the practice of behavioral health services that should not go unnoticed by behavior analysts. Pallack argued that the "twin motives of financial and clinical efficacy" (1995, p.76) will lead to more comprehensive outcome measures in mental health. These outcome measures are characterized by a growing emphasis on effective and *efficient* treatments (Wilson, 1995). Specifically, cost-related outcome measures of treatment programs are becoming critical components of treatment evaluation. Behavioral outcome data alone, therefore, are insufficient in the area of policy planning, where budgetary considerations require each program to demonstrate its financial worth. In other words, providing treatments that are as effective as other treatments may no longer suffice to be competitive in behavioral health.

Despite this increased importance of demonstrating the cost-effectiveness of behavior health treatments, the absence of cost analysis data from behavioral health research reports has been disconcerting (Wilson, 1995). A literature search of the American Psychological Association's Psychological Abstracts Information Services database (PsycINFO) showed that between 1967 and 1991 studies which discussed treatment outcome *and* treatment cost were outnumbered almost 20 to 1 by outcome-only studies (Yates, 1994). Using Yates's search parameters (1994, p. 734), the

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present study extended this literature search to include publications through 1996. Although one may have expected an increase in cost analysis studies based on the changes in the current political climate, results showed that this ratio had not changed over the past years. Yates (1994) suggested that the following three variables might account for the lack of research studies reporting cost analyses: (1) researchers report cost data only infrequently due to time and money required for obtaining and analyzing cost data, (2) the inclusion of cost analyses in treatment studies may not increase the probability of funding or publication, and (3) researchers may not have skills required to conduct cost analyses (see also Glass & Goldberg, 1977).

The purpose of this paper is to introduce behavior analysts to the important tole of cost analysis for behavioral health in particular, and for behavior-analytic interventions in general. First, cost-effectiveness analysis and cost-benefit analysis will be discussed; they are the two basic cost analysis methods common in the behavioral health literature. Several studies will be described to illustrate the scope of cost analyses. Finally, it is argued that in order to offer treatments that are both therapeutically effective and cost-effective, behavior analysts as well as other behavioral treatment providers might augment their professional behavior-analytic repertoire by acquiring cost-analysis skills.

Cost-Effectiveness Analysis and Cost-Benefit Analysis

The two cost analysis methods primarily reported in behavioral health treatment research literature are *cost-effectiveness analysis* and *cost-benefit analysis,* terms that are often confused by non-economists (Glass & Goldberg, 1977; Russell & Buckwalter, 1991). However, discriminating between these two methods is a skill that is important for two reasons. First, it helps practitioners and researchers to understand, evaluate, and learn from the cost analyses reported in the behavioral health literature. Second, understanding these methods allows behavior analysts to select and conduct appropriate cost analyses as part of their own work. This section reviews the methods of cost-effectiveness and cost-benefit analysis, drawing mainly from Levin (1983; see also Kazdin, 1980; Mishan, 1982; Struening & Brewer, 1983; Thompson, 1980).

Cost-Effectiveness Analysis

Definition and Purpose. Cost-effectiveness analysis (CEA) refers to the evaluation of treatment alternatives with respect to both treatment costs and clinical effectiveness. The specific components of a CEA consist of *cost of resources consumed* to produce treatment outcome and the specific *treatment outcome* itself (e.g., days abstinent, pounds lost). Typically, treatment costs consist of direct and indirect treatment costs. Examples of direct costs are costs for inpatient and outpatient treatment such as salaries, medication and hospitalization. Indirect costs may include costs incurred by (1) social service agencies, sheltered workshops, community agencies, state employment services, and private medical providers; (2) law enforcement costs such as overnights in jail, court contacts, probation and parole, and police contacts; and (3) family burden costs such as income lost due to the

patient. The cost-effectiveness (CE) of a treatment program may be expressed as the ratio of units of therapeutic outcome to monetary dimensions of treatment:

$$(1) \qquad \text{CE ratio} = \frac{\text{Units of treatment outcome}}{\text{Cost of treatment resources}}$$

This ratio is appropriate for the evaluation of treatment alternatives that provide the maximum effectiveness per level of cost. It answers the question of how much treatment outcome one can obtain for a certain amount of money.

Reversing this CE ratio computes the cost per unit of therapeutic outcome:

$$(2) \qquad \text{CE ratio} = \frac{\text{Cost of treatment resources}}{\text{Units of treatment outcome}}$$

This CE ratio allows us to determine which of several treatments requires the least overall cost per level of outcome; that is, which treatment costs the least to achieve a specific outcome.

The following example illustrates how these CE ratios were used to compare the cost-effectiveness of two rehabilitation programs for alcoholic patients. McCrady and her colleagues (1986) compared partial hospital treatment (PHT) and extended inpatient (EIP) rehabilitation for alcoholics hospitalized for detoxification and alcohol abuse. McCrady and her team calculated treatment costs and treatment outcomes separately to compare their cost-effectiveness. Treatment costs included room and board, day treatment program, work missed, child care, outpatient treatment, and cost of rehospitalization. PHT treatment costs averaged $4,983 per patient, almost $1,500 less than the per-patient cost of the EIP group ($6,432). However, the comparison of treatment cost alone only shows that PHT was cheaper per patient than EIP. In order to calculate cost-effectiveness, treatment outcomes were quantified as (1) the number of abstinent subjects and (2) the number of abstinent days during the year following treatment termination based on subjects' self-reports. Cost-effectiveness estimates were then expressed for both dimensions. Because both treatment groups did not differ significantly along several outcome measures, conducting a cost-effectiveness analysis proved to be an important step for overall program evaluation. First, to answer how much treatment outcome was generated for a certain amount of money, the researchers estimated the number of abstinent days per $100 treatment cost (see Equation 1). The CE ratio for PHT was 5.4 abstinent days per $100 treatment costs and the CE ratio for EIP 'rehabilitation was 4.2 abstinent days per $100 treatment costs. Second, to answer the question which treatment costs were the least for a specific treatment outcome, the costs per abstinent patient were calculated (see Equation 2). The resulting CE ratios were $18,935 per abstinent subject for PHT and $21,637 per abstinent subject for EIP. Thus, both CE ratios indicated that PHT treatment for alcoholics provides a cost-effective alternative to EIP rehabilitation, given the fact that therapeutic outcomes were equal.

Strength and Weakness. The strength of a CEA lies in combining cost data and outcome data *without changing data formats.* In other words, treatment outcomes are not monetized; instead, they are expressed in therapeutic units. This allows for a less complicated cost analysis, which mainly requires the tracking of treatment related costs. This strength, however, is also the CEA's weakness because it limits the scope of a cost analysis by allowing comparisons only between those alternatives that measure treatment outcomes along the same dimensions (e.g., abstinent days produced, number of abstinent subjects). CEAs cannot address the issue of whether or not a treatment program is producing social and financial benefits other than the therapeutic benefits for the client. Determining whether a treatment program is worthwhile requires a cost-benefit analysis.

Cost-Benefit Analysis

Definition and Purpose. Cost-benefit analysis (CBA) refers to the evaluation of alternatives according to a comparison of costs and benefits when *both* are measured in monetary terms (Prest & Turvey, 1965). For example, monetized benefits may consist of the patient's earnings from competitive employment and sheltered workshops, or of lowered treatment costs due to less expensive therapists or placement settings. The cost-benefit (CB) ratio may be expressed as:

$$(3) \qquad \text{CB ratio} = \frac{\text{Financial benefits of treatment outcome}}{\text{Cost of treatment resources}}$$

A cost-benefit analysis addresses the question of whether a behavioral health intervention is economically justified (i.e., do the program's overall financial benefits exceed the program's costs?). Typically, a CBA compares dollars spent on a specific treatment with actual dollars saved.

For example, Frank, Klein, and Jacobs (1982) conducted a cost-benefit analysis to determine if active treatment for the elderly can be both "therapeutically beneficial and economically wise" (p. 374). Treatment consisted of a behavioral therapeutic community that prepared geriatric patients of a state hospital for return to more independent living environments such as adult family homes, congregate care facilities (boarding homes), and skilled nursing homes. While at the state hospital, elderly patients diagnosed with schizophrenia, affective illness, and organic brain syndrome acquired independent living skills in a three-phase token economy before they transitioned to a halfway house. During their stay at the halfway house, residents did their own shopping, cooking, and cleaning. They developed community contacts and were encouraged to select their own post discharge placement setting. Patients who completed the behavioral therapeutic community were discharged into more independent settings. Daily treatment costs for these settings showed a strong reverse correlation with the level of independence; that is, the more independent the setting, the lower its cost. For example, placement costs for adult family homes were $7.53 a day; congregate care facilities, $12.89 a day; skilled nursing facilities, $23.45 a day; and the state hospital, $60 a day. The cost-benefit question to be answered was whether the overall financial benefits of the program exceeded the costs of the

program. For a cost-benefit analysis, as is the case with a cost-effectiveness analysis, treatment costs have to be calculated. In this case, the costs of the behavioral therapeutic community consisted mainly of staff salaries and backup reinforcers. Financial savings were calculated by comparing placement costs of program participants with placement costs for patients who did not participate in the program. Dividing savings by treatment costs resulted in a CB ratio of 20.32: 1. In other words, the overall savings due to shorter hospitalization and reduced post discharge placement costs were $20.32 for each dollar of treatment cost. The authors concluded that a lack of effective programming with the elderly will result in increased financial cost to society because even a merely custodial hospital setting can be very costly. In addition, patients who otherwise may not have received additional treatment, received notable therapeutic benefits.

Strength and Weakness. Cost-benefit analyses determine which treatment alternatives save the most money in the long term and, therefore, allow health service providers to select treatment programs based on their financial merits. Their weakness lies in the fact that placing a monetary value on some treatment benefits such as improved mental health or social relationships is not an easy task and may require long-term follow-ups of patients served with different treatment programs or techniques (Weisbrod, 1981). However, the inclusion of both monetized and nonmonetized costs and benefits is encouraged (e.g., Rundell, Jones, & Gregory, 1981; Weisbrod, 1981). The following section describes examples of both cost-effectiveness and cost-benefit analyses that illustrate the wide range of their application, including treatment providers, treatment components, and performance management strategies.

Illustrations of Cost-Analysis Applications

Treatment Providers. One critical factor in improving the cost-effectiveness of behavioral health treatments is the selection of treatment providers. Doctoral-level psychologists are getting "pushed upstairs" and will be increasingly responsible for program development, evaluation, and management rather than treatment delivery alone (Hayes, 1995, p. 64). Therefore, psychologists with master's degrees and paraprofessional staff will play an increasing role in direct treatment delivery. For example, Baradell (1994) suggested that clinical nurse specialists are cost-effective treatment providers particularly for persons with mild emotional disturbances. The following three studies describe how cost-analyses were used to evaluate the financial aspects of treatment delivery by paraprofessional therapists.

A case study by Saur and Ford (1995) illustrates how outpatient therapy provided by a clinical nurse specialist can be a cost-effective and therapeutically viable alternative to hospitalization. The subject was a 57-year-old woman with a 23-year history of bipolar disorder with psychotic features. During the past 20 years she had been hospitalized 13 times, with increasingly shorter intervals between hospitalizations. Based on the long-term ineffectiveness of hospitalization for this particular patient, the psychiatrist referred the patient to a clinical nurse specialist (CNS). The CNS provided weekly outpatient psychotherapy while the psychiatrist

monitored pharmacotherapy every three weeks. Both treatment providers consulted frequently to "share assessments, to promptly identify potential problems or concerns, to communicate independent interventions that might impact the other's therapy, and to decide on treatment modifications" (p. 334). Thus, by obviating the need for hospitalization over a three-year period, the collaborative treatment model reduced the average annual treatment cost for that patient from $40,000 per year (pre-collaboration hospital cost) to $3,564 per year.

Yates (1978) used a cost-effectiveness analysis to compare costs incurred by patients in two obesity treatments (designated in the original study as Program "X" and Program "Y"). Program X was designed to minimize drop-out rate and consisted of small-group behavioral treatments by professional therapists. Program Y consisted of "electric treatment" (p. 259) delivered by formerly obese nonprofessionals to groups of up to 40 patients. Treatment outcomes were measured as the proportional reduction in weight that was produced by the time a subject terminated treatment. In this study, cost-effectiveness was computed from the patients' perspective, based on the fee paid for participation. Results indicated that both programs were equally effective in producing weight loss; however, patients paid $295 to participate in Program X while participation cost for Program Y averaged only $35. Cost-effectiveness ratios were calculated for each patient by dividing the patient's financial costs by the proportional reduction in weight. The resulting CE ratios were $44.60 per one percent reduction in overweight for Program X and $3.00 per one percent reduction in overweight for Program Y. These results indicated that the cost-effectiveness of obesity treatments might be improved by a careful choice of delivery systems.

Ginsberg and Marks (1977) reported how behavioral nurse therapists were trained to manage clinical problems that are likely to respond to brief behavioral psychotherapy. To save money, some communities may choose to withhold treatment for chronic phobic and obsessive-compulsive patients. A cost-benefit analysis showed that the community's investment in training and wages for nurse therapists paid for itself and actually saved money because patients used less health care resources after treatment, and they and their relatives took less time off work. However, the CB ratios indicated that benefits exceeded costs only when treatment benefits continued beyond two years. For example, the CB ratios for different benefit categories were below 1.0 (i.e., no money was saved) for a two-year post-treatment duration of therapeutic benefits, but exceeded 1.0 (i.e., money was saved) when treatment benefits lasted three years.' This cost-benefit analysis did not compare two treatment programs; rather, it suggested that for particular patient groups no treatment may be more expensive than treatment.

Therapist-related cost savings, as described above, will be a driving factor for shifting treatment delivery from doctoral-level therapists to therapists with less extensive training (Christensen & Jacobson, 1994). Based on recent research findings, Christensen and Jacobson (1994) argued that this shift will not adversely affect the quality of treatment for certain behavioral health problems because treatments administered by paraprofessionals, by patients themselves, or by mutual-support groups can be as effective as treatment provided by highly-trained professionals. The major advantage of reducing treatment cost and increasing the

number of less-expensive service providers will be that treatment will become accessible for many people who can benefit from behavioral health services but who would otherwise not be able to obtain these services (Christensen & Jacobson, 1994). However, before conducting comparative studies or before delivering treatment with paraprofessional therapists, it is important to consider how these services will fit within the framework of various insurance programs. Medicare, for example, prescribes detailed guidelines for administration and payment of psychological treatment in hospital and outpatient settings that preclude service delivery by nonprofessional therapists (Medicare, 1996).

Treatment Components. The comparison of treatment components is a second area for which cost analyses are a helpful evaluation tool. O'Farrell et al. (1996) used a cost-benefit analysis to compare therapeutic and financial aspects of behavioral marital therapy (BMT) with and without relapse prevention (RP) sessions. Alcoholics and their spouses who participated in weekly BMT sessions were randomly assigned to receive or not receive 15 additional sessions in RP. Treatment costs for both BMT and BMT plus RP were based on treatment sessions received by each subject and multiplied by the cost per treatment session. Financial benefits included reductions in alcohol-related health cost over baseline such as inpatient hospitalization for alcohol detoxification or rehabilitation, and stays in halfway houses. Reductions in legal costs were also included to assess treatment benefits; they consisted of costs for days spent in jail for alcohol-related reasons. BMT alone was more cost-effective in generating abstinence from drinking and in producing subjects who remained completely abstinent during the one-year follow-up while BMT plus RP was more effective in generating abstinent days during follow-up. The overall CB ratios were 5.97:1 for BMT alone and 1.89:1 for BMT plus RP. In financial terms, BMT saved $5.97 in alcohol-related health and legal cost for each dollar spent on treatment while BMT plus RP saved only $1.89 per dollar of treatment cost.

Performance Management. Behavioral health organizations may respond to decreasing budgets not only by reducing treatment costs but also by improving organizational performance. The following two studies show how cost-analyses were used to determine if performance management techniques added value by reducing operating cost and improving service delivery.

Yates, Yokley, and Thomas (1994) used a cost-benefit analysis to determine whether monetary incentive programs for child therapists can improve service delivery while reducing overall operating cost. A community mental health center for children contracted with state funding agencies for a specified number of therapy hours per month. When service delivery fell below the contracted hours, the health center had to outsource therapy services, thus incurring a financial loss due to paying both center staff and outside therapists. During six incentive interventions, bonuses were paid to individual therapists, to therapists and their support staff, or to entire departments. Results showed that clinical service hours increased above hours contracted, thereby allowing increased service delivery to more clients while reducing the need for contract therapists. The financial benefits of the incentive intervention were calculated by subtracting the costs for incentive programs and

outside therapists from the cost savings generated by reduced outside hires. Because incentive programs were in effect for varying duration, the cost-benefit analysis was based on monthly averages for costs and savings which allowed a direct comparison of the different incentive systems. The CBA indicated that four of the six incentive systems produced savings over baseline; the most beneficial system provided bonuses to individual therapists as well as center support staff.

Smoot and Gonzales (1995) used a cost-effectiveness analysis to determine whether a staff training program improved staff skills and reduced operating costs. State hospital employees (e.g., social workers, clerks, nurses, therapists, and physicians) received interpersonal communications training to improve their patient-management skills and relieve staff stress. Operational costs for the experimental unit decreased by $63,592 (52.9%) due to decreases in staff costs related to transfer, resignation, and sick leave. In addition, patients' rights complaints, restraints, and patients' assaults on staff decreased over baseline.

Cost-benefit analyses are not only an important tool for practitioners and researchers in the behavioral health area. Cost-analyses have been reported for a number of other behavior-analytic interventions, such as procedures designed to encourage parents to seek dental care (Reiss, Piotrowski, & Bailey, 1976) or immunization (Yokley, & Glenwick, 1984) for their children; police helicopter patrols (Schnelle et aI., 1978); an incentive program to increase safety belt use (Rudd & Geller, 1985); and enforcement schedules to reduce cigarette sales to minors (Jason, Billows, Schnopp-Wyatt, & King, 1996). In addition to providing project-specific data, cost analyses can function as advertisement for effective interventions. For example, Alavosius (1997) used cost analyses as effective marketing tools for behavioral safety programs because they identified financial savings as a secondary outcome of safety interventions.

These examples of applications of cost-effectiveness and cost-benefit analyses illustrate that monetary benefits can be achieved without compromising treatment integrity. However, the cost of a treatment program should not be the only variable determining its worth. O'Farrell and his colleagues (1996; see above) suggested that despite its lower cost-benefit ratio, BMT plus RP may be indicated for patients with more severe alcohol problems who incur higher pretreatment health and legal costs. Treatments that are selected according to both therapeutic and financial effectiveness increase the probability that society benefits in more than one way from behavioral health services.

Implications for Behavior Analysts

Only recently, Glenn (1993) suggested that "the need for *effective* solutions will likely result eventually in consideration of behavior-analytic technologies that have proven effective" (p. 140, emphasis Glenn). Today one may have to add that particularly those behavior-analytic technologies will be considered that have proven *cost-effective.* Besides allowing the financial evaluation of treatment programs, CBA and CEA could be an important tool for securing federal, state, and private research grants. The ability to conduct cost analyses, therefore, is a skill that will become increasingly important for researchers, educators, and practitioners alike, and, over

time, may become an integral component of the behavior-analytic repertoire suggested by Ellis and Glenn (1995). However, the contingencies affecting individual behavior analysts' repertoires may not-yet-be strong enough to generate the acquisition of cost-analysis skills. It is therefore incumbent upon the behavior analysis community to establish contingencies that produce those behavioral repertoires. This may occur, for example, in graduate training programs and by means of continuing education. In addition to training, incentives must be provided so that cost-analyses are actually conducted and reported.

Graduate Training. Doctoral-level psychologists, who will be increasingly responsible for treatment management rather than treatment delivery (e.g., Hayes, 1995), will see a growing need for financial skills, including the ability to read, interpret, and conduct cost-effectiveness and cost-benefit analyses. This requires training of Ph.D. behavior analysts in cost analysis methods through graduate courses provided by behavior analysis/psychology departments or other departments (e.g., business). The behavior analysis program at the University of Nevada, Reno, is one example of how financial analyses of behavioral treatments can be incorporated into graduate training (Hayes et aI., 1995).

Continuing Education. Continuing education workshops and seminars are easily accessible means of education. They can be used to address the application of cost analyses for a wide array of behavior change interventions of interest to practitioners and researchers. In addition, the current cost-effectiveness and cost-benefit literature may allow behavior analysts to familiarize themselves with relevant cost analysis methods.

Research and Dissemination. The behavior analysis community may also arrange contingencies that increase the probability that behavior analytic researchers not only acquire cost-analysis skills but also conduct these analyses and disseminate their findings. Dissemination is essential because research findings can only then "contribute to the evolution of behavior analysis as a cultural system if they are reported or otherwise enter into the interlocking contingencies that maintain the behavior of other behavior analysts" (Glenn, 1993, p. 135). These behavioral contingencies may be set up by journal editors and funding agencies that require the inclusion of cost-effectiveness and cost-benefit analyses (Yates, 1994). In addition, behavior analysts might actively inform funding agencies such as HMOs, Medicare, and other insurance organizations of the cost-effective nature of behavior-analytic treatment outcomes.

Summary

The purpose of this paper was to acquaint behavior analysts with the increasingly important tool of cost analysis for the evaluation of behavioral health treatment programs. The most common cost analyses are cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA). CEAs express the ratio of treatment outcome to the cost of resources consumed to produce that outcome. Treatment outcomes are

not monetized; that is, they are not expressed in monetary values but in therapeutic units. Cost-effectiveness analyses are appropriate for comparing treatment alternatives that provide the most treatment effectiveness per level of cost or that require the least overall cost per unit of outcome. Cost-benefit analyses (CBA) measure both treatment cost and treatment outcome in monetary terms. A CBA is particularly useful because the value of a program can be evaluated in pure economic terms-that is, dollars spent are compared with dollars saved. Although monetizing treatment outcomes can be difficult, it is necessary to determine if a treatment program is economically justified. Cost-benefit ratios can either compare different treatment programs or evaluate single programs for their financial benefits.

The research reviewed above illustrated that a reduction in treatment costs must not lead to inferior treatment outcomes; quite to the contrary, it has shown clinically significant increases in the quality of behavioral health services. Most likely, a larger segment of the population can gain access to services just *because* behavioral health researchers are developing cost-effective alternatives to traditional treatments. The behavior-analytic community can establish contingencies to train behavioral health providers in cost analysis methods by means of graduate training or continuing education. Editors and funding agencies may encourage dissemination of cost-based research findings by requiring that cost analyses are included in behavioral health treatment studies.

Conclusion

The improvement of patients is the ultimate goal of behavioral health treatment, but it is important to recognize that "real resources" are required to achieve this goal (Weisbrod, 1981). Russell and Buckwalter (1991) phrased the paramount contingency for the increasing emphasis of cost analyses with succinct clarity:

> In the current political climate, it is imperative that mental health programs be evaluated in terms of costs and financial benefits, *in order to convince legislators and other policy makers of their desirability.* (p. 81, emphasis added)

Despite their importance, cost analysis studies have historically been outnumbered by studies that focus on treatment outcome only. If behavior analysts acquire and apply the skills needed for developing and delivering treatments that are not only effective clinically but also effective financially, they will increase the probability that their interventions will become an essential component of the behavioral health delivery system.

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