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The Integration of Basic Research, Treatment Research, and Clinical Practice in Pediatric Psychology

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There are many ways research advances the science of pediatric psychology, as well as clinical psychology in general. Research contributes to the knowledge and thought base on which the future of the field is built. Roberts and McNeal (1995) distinguish among four types of empirical research in pediatric psychology: explicative, assessment, prevention, and treatment research. Each approach contributes uniquely to the study of the clinical phenomenon that are the subject matter of pediatric psychology. However, in recent years the balance among these four types of contributions has become skewed. In particular, there is an overemphasis on explicative research, which examines the associations among variables. In addition, there appears to be a chasm between explicative and treatment research, with explicative research seldom informing the development of treatment programs. However, the chasm has not always been there (see Roberts & McNeal, 1995), and was not characteristic of the early days of the field. Clinical research at that time primarily had an applied goal: to produce clinically significant treatment gains for the patients, as opposed to the current theoretical or model building goal of much of explicative research today. While important, explicative research and the associated theory development were not the primary focus of the majority of research.

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The goal of this chapter is to suggest possible ways to reintegrate explicative and treatment research.

This chapter will briefly elaborate on the changing trends in the proportions of explicative and treatment research over the last several decades, probable reasons for these changes, and some of the disadvantages of that trend. Clinical practice will be presented as an arena in which explicative and treatment activities are integrated, with each informing the other. Borrowing from the paradigm of clinical practice, a research program that integrates explicative and treatment research in the area of pediatric pain will then be presented as a model for this approach. Some salient features of the model will be highlighted, along with some additional considerations.

EXPLICATIVE AND TREATMENT RESEARCH: THEY USED TO BE FRIENDS BUT THEY HAVE DRIFTED APART AND DO NOT TALK MUCH ANYMORE

Explicative research aims to discover associations among variables that may be related to the onset, severity, and course of the clinical phenomenon of interest. In addition, explicative research seeks to identify those variables that predict the likelihood of developing a disorder; factors associated with better and worse adjustment to, or forms of, a disorder; and factors that relate to the duration of suffering associated with a disorder. The findings from explicative research may be used to develop theoretical models of how various factors associated with a disorder are related, refine our understanding of the clinical phenomenon of interest and its similarities to and differences from other disorders, and design treatment programs for the alleviation of suffering. Excellent and well-known examples of theoretical models in pediatric psychology based on explicative research include the risk and resistance model of adaptation to chronic illness and handicapping conditions in children (e.g., Wallander, Varni, Babani, Banis, & Wilcox, 1989) and the transactional stress and coping model for children (Thompson, Gustafson, Hamlett, & Spock, 1992). Explicative research can provide the data for the inductive process of conceptualizing or theorizing about the phenomenon of interest, with the validity of the theory or conceptualization being verifiable through research designed using deductive processes. In applied areas, the testing of the theory is, in applied areas, accomplished by conducting experimental investigations based upon empirically derived clinical treatment procedures.

In recent years, researchers often have stopped at the level of explicative research and the associated theoretical model development and refinement, failing to translate their findings into the design of treatment programs. In a survey of articles appearing in the *Journal of Pediatric Psychology*, Roberts (1992) (also see Elkins & Roberts, 1988) found that those studies that were explicative in nature accounted for approximately 75% of the research published during the period from 1988 to 1992. Assessment research, which was related primarily to diagnosis, testing, surveys, and instrument development and validation, accounted for 12.9%. Prevention was the primary theme in 3.8% of the articles. Only 9.1% of the published research in the journal during that period was intervention or treatment research. Although a large amount of attention is being devoted to explicative research, it seems that the resulting plethora of explicative data now rarely informs

the development of clinical treatment programs, as it originally did. We believe that these trends are reflective of the field of clinical psychology as a whole and of the social sciences in general.

There are a number of possible reasons for the tendency of researchers to conduct explicative rather than treatment research. Often with explicative research large databases are gathered and the researcher's attention is focused more on the relationships among variables than on how those variables might be changed in eventual clinical treatment research. From such large databases, numerous publications are often generated, aided by peer reviewers' and journal editors' apparent affinity for theoretical and other forms of explicative research. This high productivity is reinforced through pay raises and the approval of colleagues and granting agency officials. In addition, there is the practical issue of the ease of running additional analyses on an existing large database versus collecting and processing new data, as would be required with treatment research. Working with a large database can be relatively safe in that the probability that some research findings will be published does not depend on the uncertain outcome of a treatment intervention. The advent of sophisticated statistical techniques, such as LISREL and other variations of causal modeling procedures, and even the increased use of multiple regression techniques further promote explicative research. These types of statistical procedures are enticing tools that can provide considerable insights into the associations among variables. However, we suspect that once a person is familiar with the benefits of using a tool, for example, the hammer of causal modeling, many objects, including one's general approach to research, can come to resemble nails.

The biases of many researchers toward conducting explicative research also is supported by anecdotal comments. For example, at a recent presentation a well-known researcher in pediatric and child clinical psychology was questioned about how he had used his extensive explicative research publications and the associated theory development to inform the design of clinical treatments. He replied that he had not, and that he "really did not find treatment research to be very interesting." Indeed, much of explicative research is more cerebral than the pragmatism that characterizes treatment research. However, we believe the mind-set that this researcher's statement reflects does not serve very well the needs of the children and families with whom we work, or the field as a whole. In terms of scientific issues, experimental treatment research provides a very strong test of the validity of the correlational findings derived from explicative research. More importantly, a primary goal in pediatric psychology, as an applied area of clinical psychology, is the prevention or reduction of suffering and the enhancement of well-being. What is the point if the findings from explicative research are not eventually translated into treatment interventions?

Training in the perspective that explicative research is superior to applied, pragmatic, treatment-oriented research begins early in the social scientist's career. In many graduate programs, a lack of theory building or theory testing for a thesis or dissertation often brings negative evaluations by some of the voting faculty members on committees. The threat of failure is enough to assure that most clinical students will attempt to design their study around theory development or testing. Relating research to theory is not negative, but it can be overdone. Committees also frequently call for students to add additional measures. Even though this may

enhance the value of the study, it can promote the tendency to "throw in" yet another measure. Multiple measures are a key feature of large databases used in explicative research. An additional reason for the preponderance of explicative research in graduate programs is the need for the student to finish the research in a short period of time. Large databases, which may already have been collected, perhaps under the direction of the student's major professor, promote the student's design of time-efficient studies using those data. In that situation, analyses need only be conducted from the existing data, as opposed to the student having to run subjects and secure a possible research site. Each step in research takes time for someone who is seeking their degree in a timely manner. A popular maxim is that one of the best predictors of future behavior is past behavior. This is also true for the conduct of primarily explicative research by pediatric psychology and other graduate students, who later become the next generation of researchers in the field (see Blount, Frank, & Smith, 1993, and the entire Special Issue of the *Clinical Psychologist* on training researchers in clinical psychology).

An additional factor which contributes to the lack of treatment research is that many graduate students have not been trained in conducting research in applied pediatric and child clinical settings, where treatment-related issues are very hard to deny. Indeed, if they have clinical experience in hospital and other applied settings, they often encounter psychologists who face extraordinary and ever-increasing demands for clinical services in order to justify their salaries. This nationwide trend threatens to push psychologists into either a clinical or research track. Psychologists in the clinical track have little time for research. In contrast, psychologists in a research track may have little involvement in clinical service provision. This clinician-researcher schism creates a dynamic whereby the quantity and quality of treatment research suffers. In this professional environment the heuristic and compelling aspects of clinical treatment needs have little impact on those who conduct research. In addition, this situation further limits students' access to professional role models who are conducting research evaluating clinical treatments.

Another reason for the bias of researchers toward conducting explicative research could be the relative unattractiveness of some forms of treatment research. In addition to the risk that an intervention does not produce the desired clinically or statistically significant results, in our experience greater effort is usually required for fewer research publications when conducting treatment studies as compared to conducting explicative research. The payoff to the researchers' vita simply is not as likely or as frequent as it is with treatment research. Also, it may be difficult to gain adequate control over the independent variable in much of treatment research. Explicative research requires only measurement of existing conditions, not changing those conditions in ways that match the intended treatment manipulations.

One danger in not integrating explicative and treatment research is that the investigations in each area can quickly become stale. For instance, in clinical treatment research and service provision, a prime source of inspiration for developing treatment programs comes from using treatments that have proved successful in other areas. In initial research in a new area, this approach is certainly acceptable. However, this strategy may quickly grow old as study after study shows that treatment X works with yet another problem. This phenomenon is not peculiar just

to treatment research, as there are many examples of a theoretical model and the associated explicative research paradigm being applied to one clinical syndrome or disorder after another. This rehashing is much more likely to occur as the field becomes more mature. There are simply fewer new approaches to be applied in that field. Also, as research about a clinical phenomenon accumulates and the field matures, the initial big treatment gains or leaps in understanding are typically supplemented by contributions that provide incremental treatment effectiveness, greater efficiency of treatment application, comparisons of different treatments, combinations of treatments, or clarification of our understanding of the area. A big leap forward phase in the progression of a field, followed by incremental or refining smaller steps, is characteristic of both treatment and explicative research. Documentation that this is occurring in clinical psychology is indicated by recent efforts to categorize some psychological treatments as having demonstrated effectiveness for particular disorders (Chambless et al., 1996). This categorization of treatments would not have been possible 20 years ago.

Finding a wellspring of creative, effective, efficient approaches or combinations of approaches to the design of treatments then becomes the challenge. Researchers should be open to inspiration from within and from outside of their areas of expertise and their disciplines. One of the most obvious sources of treatment options—the findings from explicative research—is too seldom used. In part we believe this is due to the nature of the explicative research that has been conducted, with a primary focus on distal variables that are not easily manipulated. No doubt there are also many clinically useful findings from explicative research that are not being extended to design treatments. Historically, explicative research was integral to the process of understanding clinical phenomena. Intervening without having a satisfactory understanding of the phenomenon of interest is likely to lead to ineffective, inefficient, or counterproductive treatment outcomes. It will be to the benefit of all involved to get these two old friends talking again.

CLINICAL PRACTICE AS A MODEL OF HOW CLINICAL RESEARCH COULD BE CONDUCTED: BACK TO THE FUTURE?

In clinical practice, understanding the factors that are related to and seem to control the occurrence of a behavior or disorder and the provision of treatment for that disorder are intimately related. For any patient with any problem, providing treatment without a proper understanding of the factors that control the problem is misguided at best and potentially harmful and unethical. The assessment phase of clinical work takes the form of a behavioral assessment funnel (e.g., Cone & Hawkins, 1977; Cronbach, 1970). It is so named because the assessment is initially broad, and with low resolution or focus on specific areas. A number of aspects of a person's life may be assessed prior to effectively defining the problem. Once the problem areas are ascertained, the emphasis narrows and becomes more focused on specific areas. This narrow phase of the funnel, with its high resolution on the target behaviors and the factors that control them, continues throughout treatment. The therapist remains flexible in that the funnel is broadened as necessary when moving to new treatment targets, refining the intervention, assessing for collateral therapeutic changes or side effects, or when the treatment fails (see Table 1).

Table 1. Assessment in the Service of Treatment in Clinical Work

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- I. Assessment. This phase is equivalent to assessment or explicative types of research. Assessment takes the form of a behavioral assessment funnel (Cone & Hawkins, 1977; Cronbach, 1970), moving from broadband, low resolution (I.A) to narrowband, high resolution (I.B) as the definition of the problem and probable means of intervention emerge.
- A. Mouth of the behavioral assessment funnel:
1. Information gathered across numerous areas of functioning.
 2. Standardized assessment instruments are often employed.
 3. Numerous people in the patient's life may be contacted.
 4. Patterns and parameters of general behavioral, emotional, intellectual, spiritual, and physiological strengths and weaknesses, as well as resources in the environment, are assessed.
 5. Some initial problem definition and conceptualization emerges.
- B. Stem of the behavioral assessment funnel. Once the problem behavior(s) is initially defined, a functional analysis is conducted to determine the antecedents and consequences of that behavior.
1. Included in the consideration of antecedents and consequences are environmental and situational factors, as well as the patient's own emotions, cognitions, physiological states, and overt behaviors that precede, occur during, or follow the problem behavior.
 2. A working theory or conceptualization is formed of the factors that influence the problem behavior.
 3. A formal baseline may be taken of some aspect of the problem behavior and its relevant antecedents and consequences.
 4. Baseline assessments often use very individualized and specific measures.
 5. Baseline assessments may result in a refinement of the conceptualization and subsequent treatment plan.
 6. Assessment using this methodology continues throughout treatment.
- II. Treatment. The treatment is empirically derived based on the assessment and subsequent conceptualization.
- A. Planning of treatment
1. Probable interventions are considered, including rearranging antecedents, rearranging consequences, training alternative behaviors, or some combination of these three approaches.
 2. Changes in the environment and/or some aspect of the patient are considered as focal points of the intervention.
- B. Provision of treatment. Continue the narrowband assessments, while maintaining a periodic view of the relevant broadband factors.
1. The primary method of evaluation is by using the measure employed during baseline.
 2. The clinician also periodically assesses beyond the dependent variable for collateral beneficial or detrimental changes. Adjustments in treatment strategy are made accordingly.
- C. Evaluation of treatment
1. Changes in the dependent variable are assessed throughout treatment. These changes provide the basis for continuing to provide treatment as originally planned, revising the specifics of the treatment plan, returning to the broadband or functional analysis stages to reassess and reconceptualize the factors which control the problem behavior and subsequently redesigning the treatment, or selecting new targets for intervention.
 2. Standardized measures also may be employed for assessing treatment effectiveness, but these are typically more related to general functioning than is true of the more specific, more process-related variables that are assessed in the baseline and treatment phases.
 3. The original conceptualization, equivalent to the theoretical model stage in explicative research, is either supported, amended, or discarded based on treatment responsiveness.
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In the behavior analytic paradigm, the determination of factors that influence the target behavior is referred to as conducting a functional analysis. For the behavior of interest, the antecedents and consequences are ascertained based on interview, observation, and other methods, in order to determine the factors that seem to relate to increased or decreased likelihood of the behavior. Antecedents and consequences, along with the behavior(s) of interest, could be either the patient's own overt behavior, physiological functioning, cognitions, emotional states, or external stimuli. Antecedents are events that precede the behavior and increase the likelihood of the behavior occurring. Consequences are those events that follow the behavior and serve either to increase or decrease the likelihood of the behavior occurring. These functional antecedents and consequences tend to occur in close temporal proximity to the target behavior, but temporally distal antecedents and consequences may be the controlling factors or at least exert some control. However, distal factors are usually much harder to manipulate and their impact on behavior tends to be less direct than the temporally proximal factors.

After initial data gathering, the clinician analyzes this information and forms a conceptualization of the factors that control the behavior of interest. This phase is equivalent to conducting the correlational analyses and associated conceptual or theory development phase that characterizes explicative research. For the clinician to consistently stop at the level of explanation, understanding, and the associated conceptualization or theory development would be unthinkable and unacceptable. In like manner, clinical researchers also should move beyond this point.

Following the functional analysis, the selection of the best route of intervention is made. The intervention could include rearranging antecedents, teaching new behaviors, rearranging consequences, or some combination of the above. Treatment is then initiated, with careful observation of the behaviors of interest and other concomitant behavioral changes, whether beneficial or detrimental. Efforts are made to assure that the independent variable is manipulated in the desired manner so as to better differentiate between true treatment failures and simple patient noncompliance. The prescription for what the therapist should do in the case of the treatment not being implemented properly, or a true treatment failure, would of course differ in these two situations. The goal is to produce clinically significant changes in behavior. Statistical significance is of little value for the individual patient. Ongoing monitoring is essential, with each occasion of assessment being an opportunity to confirm, deny, or amend the original theory or conceptualization of controlling antecedents and consequences and how to modify them. This provides a means of experimentally validating the conceptualization or theory of how factors influence the patient's behavior. If the results are turning out as desired, the theory tends to be confirmed. If not, it is either revised or discarded altogether.

In clinical practice, at least as modeled after applied behavior analytic thought, assessment and treatment are closely connected at all points. Assessment informs treatment and treatment responsiveness or outcome informs additional assessment and possible theory or conceptual revisions. In terms of scientific methodology, this latter phase is analogous to experimentally testing and validating the results of explicative research. The revised theory is then tested and the process begins again. The applied behavior analytic therapist-researcher talks about "coming under the control of his or her data," meaning that he or she is responsive to the patient-

subject, and adjusts theory and approach accordingly. There is a high degree of focus and resolution on the behavior of the individual patient during the assessment (explicative) and treatment stages. At each stage, the data gathering, conceptualization, and treatment are pragmatic in that they are in the service of producing clinically significant changes in behavior. Some information that is gathered may not prove useful for facilitating behavior change, but that is inevitable. However, merely changing the theory or refining the explanation of how the variables interrelate is not the goal, nor should it be. The approach described, along with much elaboration, is the hallmark of applied behavior analysis and is widely applicable to both clinical treatment and clinical treatment research. For a further explanation of some of the basic tenets of this approach, the reader is referred to the classic paper by Baer, Wolf, and Risley (1968). It is our experience that the basic tenets of applied behavior analysis are not very much practiced by clinicians today, even in behavioral circles, and much less so outside of behavioral circles. However, we believe that some of the basic principles of applied behavior analysis could be employed, perhaps regardless of the theoretical paradigm of the researcher, and that this employment would go far to encourage the development of empirically derived treatment programs.

ACUTE PROCEDURAL PAIN IN CHILDREN: A MODEL FOR THE INTEGRATION OF EXPLICATIVE AND TREATMENT RESEARCH

As an example of integrating explicative and treatment research, we will focus on our work with acute procedural pain in pediatric patients. The process and the thinking by the researcher that went on behind the pages of the published research are what we wish to share.

Explicative Research: Begin with the End in Sight

While following the families on a consultation–liaison service, I (RLB) was blessed to observe some important information about pediatric oncology patients, their parents, and the staff during the children's lumbar punctures (LP) and bone marrow aspirations (BMA). During these observations, it soon became apparent that some children displayed less distress and more coping behaviors than others. More importantly, in terms of therapeutic implications, the parents and medical staff interacted with the children in different ways. Some of these ways seemed to encourage coping, while other ways seemed to encourage distress.

My initial interest in children with cancer undergoing BMAs and LPs was clinical, with numerous preliminary observations being made. We asked frequent questions of the staff and examined the literature. Vicki Wolfe, who had studied marital interactions, suggested using a technique called *sequential analysis* as a means of mapping the flow of the interactions that occurred in the treatment room. This method allows for the determination of temporal antecedents and consequences of particular child and adult behaviors. The discovery of temporal antecedents and consequences could pave the way for the determination of important functional relationships. Being on a very low budget at the time, we set about audiotaping the children and others present prior to, during, and after the medical

treatments. We later devised an assessment instrument for coding the interactions (Blount et al., 1997). None of the children and parents had been trained in the use of coping strategies.

This explicative research was designed to learn more about what happens in the medical treatment room. The research was patterned after the functional analysis that is used in clinical service provision, in which one of the authors (RLB) was trained. However, it differed from clinical practice in that this functional analysis investigated the antecedents and consequences of child coping and distress behavior, as well as the other child–adult and adult–adult interactions, of the *group* of children, parents, and staff. Hence, we were interested in learning about generalizable findings. Three investigations were conducted using the same data.

In our initial research in this area (Blount et al., 1989), using a sequential analysis framework and the 35 code Child–Adult Medical Procedure Interaction Scale (CAMPIS), we determined those adult behaviors that typically preceded or followed children's distress and coping behaviors. We found that the child coping behaviors of nonprocedural talk and humor by the child (forms of distraction) were typically preceded and followed by nonprocedural talk and humor directed to the child by the medical staff and/or parents. Also, the child coping behavior of use of deep breathing seldom occurred unless it was preceded by adults repeatedly prompting the children to breathe. This suggested that frequent adult prompts were necessary in order to promote the occurrence of the desired coping behaviors.

In contrast, child distress behaviors were typically preceded and/or followed by adult's reassuring comments, empathic comments, apologies, criticism, and giving the child control over the beginning of some aspect of the medical procedure. We termed these behaviors *distress promoting*. By far, reassurance by parents and staff was the most commonly occurring of the behaviors to precede and follow child distress. While this finding did not indicate a causal relationship, it did suggest that reassurance, empathic comments, apologies, criticism, and giving control to the child were much more related to the occurrence of distress behavior than to coping behavior. The findings of this study had direct implications for the design of therapeutic programs. For example, in order to promote child coping, it would be necessary to train the children to use the coping behaviors indicated by the explicative findings, and train the adults to repeatedly prompt their occurrence using the appropriate cues. Child distress was also associated with specific adult antecedents. However, because increases in child coping and adults' coaching of their children to cope were incompatible with child distress and adult distress-promoting behaviors, respectively, we elected not to target these undesired behaviors directly in the first series of treatment studies.

Our subsequent analyses of the data (Blount, Sturges, & Powers, 1990) indicated that there were phase variations in the coping behaviors that children used and similarly in the adults' prompts that facilitated those coping behaviors. During the anticipatory phase prior to the beginning of the painful aspects of the medical treatment, the most common coping behavior was nonprocedural talk and occasional humor by the child. Later, during the painful medical treatment, those coping behaviors seldom occurred and the child instead shifted to the use of deep breathing. These types of child coping behaviors were closely associated with the adult's use of nonprocedural talk and humor to the child and with coaching them to breathe, which occurred in the same phase-specific manner. We did not find a

general child or adult coping-promoting disposition. That is, use of nonprocedural talk by or to the child in the anticipatory phases was not correlated with breathing or coaching the child to breathe, respectively, in the painful phases. Child distress and the associated adult behaviors were highly correlated from the anticipatory to the painful phase, suggesting that once a child started on a chain of distress behaviors, it was difficult to break. These data refined the treatment implications of the previous study, suggesting that the particular phases had particular coping demands, and that parents and staff needed to vary their prompts to the children across phases in order to promote the desired coping behavior. In order to reproduce the coping pattern found in these untrained subjects, the findings indicated that children should be taught to use one type of coping behavior prior to the medical procedure and another during the painful aspects. Adult's prompts would have to vary similarly.

In the final analyses of the initial data (Blount, Landolf-Fritsche, Powers, & Sturges, 1991b), we rank-ordered the children on the basis of their use of coping behaviors. We found that parental prompts varied as we expected, with the high-coping children being more likely to have parents and staff prompt them to cope, while doing fewer of those behaviors previously found to be associated with distress. Also, the high-coping children were found to be more responsive to the prompts by parents and staff to engage in coping behaviors. However, for both the high- and low-coping children, the same adult-child behavioral relationships were found. Both high- and low-coping children were more likely to cope when coping-promoting prompts were present and to show distress when reassurance, empathy, apologies, criticism, and giving control to the child occurred. This suggested generalizability of the findings from the previous analyses to children with different levels of coping. In addition, there were no differences found in children's reactions to various prompts from a parent versus a staff member. Again this suggests generalizability of the interactional pattern of behavior between the child and either the parent or the medical staff member.

Another finding of considerable importance was the behavioral associations among the adults' behaviors in the previous studies, particularly the first study (Blount et al., 1989). In that investigation, the most common behavior to precede and follow most of the adult behavioral categories was another adult behavioral category of the same type. What this suggested was that adults in the treatment room take many of their cues from each other as to how to behave toward each other as well as toward the child. In terms of therapeutic implications, it suggests that it may not be necessary to change the behavior of all the people in the treatment room directly. Sufficient changes in the behavior of one of the participants in the medical treatment room may be adequate to change the behavior of all other participants.

Based on our explicative research and the work of others we developed a working model or conceptualization of how various factors impact coping and distress behavior in children undergoing painful medical procedures (Fig. 1). There are primarily two categories of independent variables: those that are temporally and functionally proximal and those that are temporally and functionally distal to the behaviors of interest. The behaviors of interest are the coping and distress behaviors of the child that occur before, during, and after the medical procedure. The proximal behaviors, which are more situational or statelike, are the parental and staff in-session behaviors that occur in the treatment room and exert a powerful

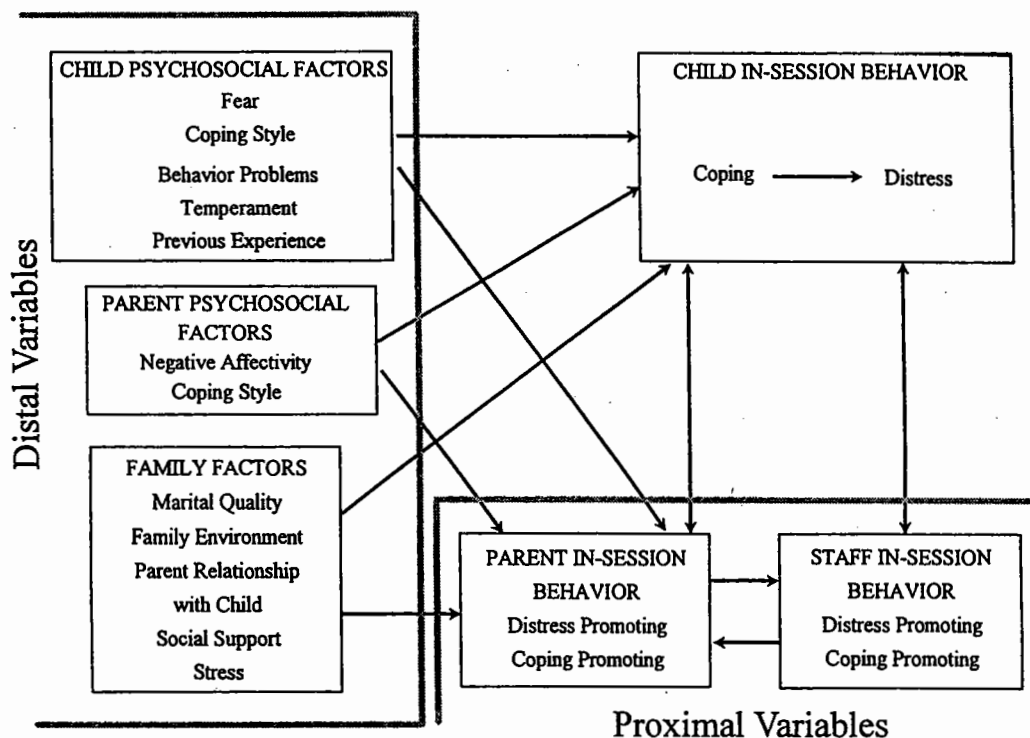


Figure 1. The Proximal-Distal Model of Children's Coping and Distress During Painful Medical Procedures. This model was changed slightly from the one presented by Varni, Blount, Waldron, and Smith (1995).

influence on the child's reactions. For example, in a recent study of preschool children receiving immunizations who were not trained in coping behaviors, parent and staff in-session behavior accounted for 38% of the variance in child coping and 55% of the variance in child distress (Frank, Blount, Smith, Manimala & Martin, 1995). As described above, these proximal behaviors should vary in a phase-specific manner with the unique coping demands of the different parts of the medical procedure. The proximal variables also tend to be the more easily changed of the two categories of variables, at least for the behaviors of child coping and distress. These proximal variables occur in the narrow-focus, high-resolution part of the behavioral assessment funnel described earlier.

In contrast to the proximal variables, distal variables occupy the broad-band, low-resolution part of the behavioral assessment funnel. Some distal variables, such as the child's age, fear, and level of distress during past medical treatments, are significantly correlated with the child's distress (e.g., Blount, Davis, Powers, & Roberts, 1991a; Dahlquist et al., 1986; Frank et al., 1995; Jay, Ozolins, Elliott, & Caldwell, 1983; Pate, Smith, Blount, & Cohen, 1996). However, these variables may be difficult or impossible to change or, in the case of fear, may be changed in the process of teaching coping behaviors. The usefulness of these distal variables seems to be as a screening mechanism for identifying those characteristics of patients who may be in need of training or for serving as a marker for the presence of potentially modifiable, functional, proximal variables. Many of the other more distal variables seem to have little direct impact on child behavior during acute

painful medical procedures. As opposed to the situational proximal variables, distal variables tend to be more trait-like.

The Goal: Empirically Derived Treatment Research

A unique advantage of conducting empirically derived treatment research is that it provides a powerful test of the validity of the findings from the explicative research. As such, it either validates, disproves, or, almost always, refines the original conceptualizations that were associated with the explicative research. Our own treatment research certainly forced some refinement and adaptation of our original conceptualizations. Explicative research that examines the associations among variables that are not easily manipulated, typically the more temporally and functionally distal variables, lacks this degree of acidity in any test of the theory or conceptualization.

The initial three treatment studies conducted by our group incorporated a matching-to-sample approach. The desired sample was the high-coping children, as well as the coping/coping-promoting, phase-specific interaction patterns found in our explicative research. Our goal was to promote the same sort of adult-child interactions in the subjects in the treatment studies which characterized the high-coping children during the various medical phases in our explicative research. In the first treatment study conducted (Blount, Powers, Cotter, Swan, & Free, 1994), we attempted to teach children and parents to discuss nonprocedural topics and to deep breathe in a manner consistent with the behavior of the children in our explicative research. Both settings were pediatric oncology treatment centers, although at different hospitals, and the children in the explicative research were a few years older. We were unable to successfully teach the children and parents to use the same nonprocedural talk or breathing behaviors at a comparable level that the children in the explicative research had used. In retrospect, in the setting in which the explicative research was conducted, it is likely that one laboratory technician and one nurse present during the procedures were the driving forces behind the parents' and other medical staffs' use of so many prompts for the children to cope. We have never observed so much "naturally occurring" deep breathing or distraction by children undergoing any painful medical treatments in any other setting.

As a fallback technique, we kept the same concepts and used props to facilitate distraction and breathing by the children. In our experience, this type of flexibility is necessary when moving from explicative to treatment research. The props that facilitated adults' coaching of the children were various toys that could be used before the medical procedures began. Incorporating toys helped eliminate the silence that would otherwise often ensue during the many minutes prior to the medical treatment. The prop that facilitated breathing in these young children was a party blower. Selecting this item for breathing promotion was based in large part on a conversation with Bill Redd, who was then associated with Memorial Sloan-Kettering, along with his collaborators, Sharon Manne and Paul Jacobsen. The party blower also had a fairly heavy distraction component. Use of the party blower was easily verifiable, thus assuring that the desired coping response was occurring and allowing for a better determination of the supposed inverse relationship between coping and various forms of child distress and pain. Training or booster

training sessions, which incorporated role play, rehearsal, and feedback, were conducted prior to each LP except the last one. In a multiple baseline across subjects design, the treatment worked very well for two of the subjects who adapted to using the coping behaviors regularly. One of these two children and their parents immediately adapted to the use of the desired coping behavior. The other, a younger child, took several sessions before her level of blower usage was adequate. Therefore, the necessity of training until skill acquisition was apparent, as was also indicated for the next subject. The third parent-child dyad used distraction and book reading throughout the first treatment session, with little to no reliance on a blower during the LP. Distress was extremely low compared to baseline. However, in subsequent sessions, the child's distress was at or above baseline levels. Heightened family disruption between the first and subsequent treatment sessions was the suspected culprit for this setback in coping and coping-promoting ability.

We successfully replicated this basic training procedure in another study using pediatric oncology patients undergoing intramuscular (IM) and intravenous (IV) injections, again using a multiple baseline design (Powers, Blount, Bachanas, Cotter, & Swan, 1993). Based on parent and child preference, the use of parent-prompted counting was substituted for use of the party blower for some of the children in the study. Therapeutic effects were obtained and maintenance was found for these subjects.

In the final study in this series of treatment investigations (Blount et al., 1992), we took what we had learned from experimentally controlled single-subject designs with pediatric oncology patients who underwent repeated painful procedures and applied the basic training program to 4- to 6-year-old preschool children undergoing immunizations at a county health department. Due to the high volume of patients seen at the health department and the nonrecurring nature of this injection compared to recurring LPs, the training period was shortened to 7-10 minutes. We eliminated the requirement to demonstrate the desired skills to proficiency prior to ending a training session, as was used in the first two studies. The investigators presented the training program using role play and encouraged the parent and child to practice while receiving feedback. This represented a move toward broader application of the training techniques used in the previous investigations. Training resulted in therapeutic gains and less distress on some but not all dependent variables. In addition, we found that the untrained nurses also took their cues from the trained parents and coached the trained children to cope. This latter result also supported the findings from our explicative research and confirmed that not all people in the treatment room need to be trained in order to assist in coping-promoting efforts.

In one of the most easily used techniques we know for fostering children's coping (Cohen, Blount, & Panopoulos, 1997), we incorporated the concept of adult-prompted distraction of the children's attention from the fearful or painful aspects of the injection to highly appealing cartoons that were watched before, during, and after the injections. Three groups were used, including an attention control, nurse-directed distraction, and nurse-directed distraction plus training children and parents condition. This study was designed to determine whether costly and time-consuming training of each parent and child dyad was necessary, given the compelling distraction of appealing cartoons and nurse prompting to attend. Participants were 4- to 6-year-old children receiving immunizations at a health department.

Upon the child's entrance into the immunization room, nurses offered treatment subjects a choice of viewing *Aladdin*, *Beauty and the Beast*, *Barney*, or *The Lion King*. For the subjects in the treatment conditions, immunizations proceeded as normal except at procedural junctures, such as cleaning for the injection and just before needle insertion, at which time the nurse would direct the child's attention to the video. Nurses also directed the child's attention to the cartoon at signs of child distress. The results indicated that nurse-directed distraction with untrained children and parents was just as effective and less costly than nurse direction plus training the child and parents condition. Both interventions were superior to the no-treatment control condition on all observational, child self-report, parent report, and nurse report measures of pain, distress, and coping. Similar to the previous investigations, untrained parents also joined in and prompted the child to attend to the cartoons, apparently taking their cues from the nurses as to how to interact with their children. As in our previous research (Blount et al., 1992), parents in the intervention conditions were also less distressed than those in the control group. The nurse-directed condition was also judged by the nurses to be easy to use. Because of its cost-effectiveness and the nurses' indication of their intention to continue to use the intervention, this study could be viewed as a move toward treatment dissemination (Blount, 1987). However, to our knowledge, this cost-effective approach has not been widely instituted or adopted as standard health care in other settings. Therefore, in our research and the field as a whole, treatment dissemination is an issue in need of attention (Blount, 1987).

We have conducted one investigation in our laboratory in order to evaluate the presumed negative, causal impact of reassurance on child distress (Manimala, Blount, & Cohen, in press). This study was conducted last because it related more to conceptual-theoretical issues than to practical clinical issues. In our explicative and conceptual work, we described reassurance as a "distress-promoting" behavior. We have never taught parents or staff to engage in less reassurance. Instead, we have always taught them to engage in more distracting and coaching, believing that reassurance would decrease as distracting and coaching increased. However, when referring to the effects of reassurance in our proximal-distal model of variables that influence child distress and coping, as well as in our grouping of the 35 CAMPIS codes into the six code CAMPIS-R (Blount et al., 1997), we use the term *distress promoting*, rather than *distress correlated*, thereby indicating causal associations. Three groups of preschool children undergoing immunizations at a health department served as subjects. There was a control, reassurance, and distraction-coping group. Due primarily to factors peculiar to that busy health department, it was more difficult to gain adequate control over the independent variables. However, all results that were significant were in the predicted direction, with the reassurance subjects showing more distress. Most striking, 40% of the children in the reassurance group required restraint, whereas only 15% of the children in the control and 10% of the children in the distraction group required restraint. This further supports the findings from a different aspect of our explicative research.

An additional point worth noting is that our medical colleagues have been much more interested in treatment research, which has the potential to assist their patients, than they have been in explicative research, which is primarily related to theory building or testing. Individual patients in explicative research often do not benefit much from their participation in those investigations. However, even with

beneficial treatment research, procedures that require significant changes in the way medical regimens are provided or in the medical professionals' interactions with patients may meet with some resistance by the frontline medical personnel. Acceptance of clinical lore, the effort required to adopt new routines, and the demands of clinical service needs, among other factors, all may conspire to prevent change in medical protocol.

HOW TO MAKE THE INTEGRATION WORK: SALIENT FEATURES AND ADDITIONAL THOUGHTS

We have described one example of the successful integration of explicative and treatment research. What are some of the foundations for this successful integration that may be emulated by others? For one, explicative research can be conducted in such a way that it is more likely to produce results that have potential to inform the design of treatment programs. But this requires the explicative researcher to choose his or her variables well for that purpose. From our presentation on conducting a functional analysis in clinical service provision and our review of the explicative research conducted in our laboratory, it is clear that those independent variables that are temporally and functionally proximal to the behaviors of interest are the ones that have the greatest likelihood of exerting an influence on the dependent variable. Discovering the specific details about those functional associations, as was described in the review of our explicative research, should therefore be the goal! As noted throughout this chapter, proximal variables also tend to be the ones that are likely to be most easily manipulated in a training program. However, the degree to which this recommendation can be applied probably varies with the discreteness of the dependent variable, or perhaps more correctly the discreteness with which it is operationally defined. In our area of research, coping and distress are specific behaviors which occur during a painful medical procedure. This medical procedure has an anticipatory, encounter, and recovery phase which starts and ends in a short period of time before and after the predictable event of the injection(s). Other examples of discrete behaviors include an instance of an argument or aggression on the playground, having a stomachache as a way of staying home from school, giving a speech in class, and putting your tray away after lunch. Other situations are not so discrete, such as "adjustment" to chronic illness, "adjustment" to hospitalization, or "adjustment" to parental discord. The stressors and the distress or coping responses in these cases tend to be more prolonged or chronic and multicomponent.

Going back to our model of clinical work, when the clinician encounters a multicomponent task or long-term situation, which is causing the patient difficulty, one possible way to address the problem is to conduct a task analysis and break the complex situation down into more discrete component parts. For example, there are different events within the relatively long-term, complex stressor of hospitalization. Those events may include checking in, putting on hospital clothes, answering strange questions, anesthesia induction, injections, and people coming in and out of your room to wake you so you can take a pain pill. Each of these situations could be rated for unpleasantness or distress. Examples of successful "adaptation" to each of the more discrete situations could be ascertained and the factors that

promoted that adaptation could be determined. In clinical work, this would again be equivalent to conducting a functional analysis for each of the individual situations. It is possible that some overall coping or coping-promoting pattern could be found in this explicative investigation of adjustment to hospitalization. If so, there may be a need to train only one or a few coping or coping promoting behaviors. After the explicative research, creative treatment solutions could be designed and instituted. Overall adjustment should still be assessed, but that is likely to be a product of successfully handling the numerous smaller situations. In fact, the proposed hypothetical approach is similar to the treatment approach used by Visintanier and Wolfer (1975) in their early studies employing stress-point nursing to help children and their families adjust to different aspects of hospitalization.

A variation of the approach that guided stress-point nursing studies was used by Alexandra Quittner and her colleagues (e.g., DiGirolamo, Quittner, Ackerman, & Stevens, 1997; Quittner et al., 1996). As a means of selecting targets for intervention from among the difficulties faced by children and adolescents with cystic fibrosis (CF), these researchers assessed aspects of both the frequency and the difficulty of various problems individuals with CF may encounter. Adolescents with CF then indicated the coping responses they would make to audiotaped vignettes portraying the most frequent and difficult situations. The competence of these coping responses across different situations was then rated by teens, parents, and health care experts. The product of this assessment research is a method that has promise for designing treatment interventions for individual children based on profiles of their coping competency in various domains. Treatment research using this personalized assessment approach is currently being conducted. In addition, using this same methodology, different versions of the coping competency profiles are also being developed for schoolage children and for parents.

Another technique, of which some researchers may not be aware, for using their explicative data to inform the development of treatment is by the use of the matching-to-sample approach. This approach has been used in social skills training, among other areas, and involves teaching those who need treatment to do much the same thing as those who are dealing successfully with a situation. Matching-to-sample does not presume that the researcher necessarily knows what the best treatment is, but lets the data be a primary guide for the design of the treatment. Of course, with this approach the more the people and situation to be trained resemble those who served as the sample, the more likely the treatment will be useful. Issues of generalizability to subjects of different ages, socioeconomic status, ethnicity, and other potentially important dimensions are therefore important to consider.

Because of such within-group differences, we consider it of paramount importance to get to know your subject population. Too often, researchers do not have a good idea of the behavior-patient(s)-situation-environment they are studying before beginning the research. This is the type of format that is most likely to lead to explicative research where the main goal is to relate variables to variables. When it comes to treatment, trying to implement a program without a good understanding of the problem would probably be ineffective or even counterproductive. However, we have heard laypeople and imminent psychologists suggest this "blind" approach. Getting to know the subject population for pediatric psychologists means talking to the patients, parents, medical staff and other professionals involved; learning something about the disease or psychological condition; learning some-

thing about the medical event(s) or stressor(s); coming to know the **setting and the routine** in that setting; and conducting numerous observations.

We believe direct observation is an extremely important method for **understanding** the population being studied. For example, in our work with **acute distress**, we have had well-meaning medical personnel enthusiastically **tell us that** children experienced high levels of distress with procedure X, and that **there were** many patients seen in a particular clinic. Observation and an examination of the patient contact records may or may not confirm the honest but possibly **incorrect** impressions (see also Wolfe, Blount, Saylor, Dufour, & Saylor, 1987). Going back to the example of clinical work, conducting a good functional analysis of the **presenting** problem and the antecedents and consequences that influence it, as well as the **setting** factors, is essential for good clinical treatment. Being involved in clinical work in the area of research interests is one way to accomplish this. We also like observing and interacting with the subjects because they do so many things to teach us and can provide a source of creative ideas of what to do and what not to do.

This same philosophy of getting to know your subject matter and coming under the control of your data also has guided our transitions from explicative to treatment research. Our first two treatment studies following the explicative research employed multiple baseline experimental designs. These low numbers of subjects (*N*), high-resolution (focus), multiple measurement designs are in contrast to the high number of subjects, low resolution, and often only one measurement occasion that characterizes group designs. The high degree of resolution on both the application of the independent variable (treatment) and the evaluation of the effects of that treatment, allow the researcher to be more sure of how his or her treatment will work or will need to be modified or perfected when moving from explicative to treatment research. Single-subject designs are powerful experimental designs for evaluating the effects of treatment, not just pilot work for group research, although they can function that way too (see Collins, Baer, & Blount, 1985; Gelfand & Hartmann, 1984). Unfortunately, certain single-subject designs are not applicable in all situations. For example, if the behavior happens only once, repeated measurement occasions are not an option. However, clinical service provision or single-subject research to test the application and effects of treatment prior to larger-scale group research seems prudent in the majority of cases.

Another theme that has characterized our research in acute pain is to start with a fine-tooth comb. In our work with acute distress, we started with a more involved, costly, and high-resolution approach, and later moved to less sustained involvement with our subjects, less cost, and lower resolution (see Blount, 1987, for an elaboration on these themes). For example, our CAMPIS coding system is a 35-code system, with 16 codes for child distress, coping, and additional child behaviors. The remaining 19 codes were of adult behaviors directed toward the child or other adults. The speaker was coded for every vocalization. If a child, mother, father, nurse, physician, and another adult were present in the treatment room, that was a total of 111 possible speaker-content combinations. Those speaker-content combinations could occur over nine different phases in our initial research (e.g., Blount et al., 1990). That involved much work, time and effort, but it allowed for recombinations of those content codes or speakers in a variety of ways. If you are conducting a true functional analysis in clinical work or are using an inductive approach in explicative research, you are looking for what the data tell you rather than presum-

ing the data are ready to recite a particular chapter and verse because that is what the preexisting theory or even clinical lore dictates. The researcher can always collapse code categories but can never expand them without recoding of the data.

From our 35-code CAMPIS, we later combined the codes into the six-code CAMPIS-R, which includes children's coping, distress and neutral behaviors and adults' coping promoting, distress promoting, and neutral behaviors (Blount et al., 1997). This recombination was based on conceptual factors, other's research (e.g., Bush, Melamed, Sheras, & Greenbaum, 1986; Jay et al., 1983; Katz, Kellerman, & Siegel, 1980; LaBaron & Zeltzer, 1984), and primarily our own earlier explicative research (Blount et al., 1989). The validity of these CAMPIS-R groupings was supported by a concurrent validity study (Blount et al., 1997), as well as by being experimentally validated by our treatment research. We are now converting the CAMPIS-R into a more easily used rating scale, which still maintains the conceptual advantages of the CAMPIS-R over previous scales in this area. At the time of the writing of this chapter, the validity of this rating scale seems to be good.

The CAMPIS, which takes time and effort to use, was being developed and used in our laboratory at a time when a number of leaders in the field were calling for easily used scales that required less time and effort. We have argued elsewhere (Blount, 1987) that researchers can move prematurely to low-cost assessments or treatments at the sacrifice of effectiveness. Again, we believe that it is better to start with higher resolution and if necessary higher cost, in assessment or treatment, in order to gain a thorough understanding of the subject matter and in the case of treatment to help assure effectiveness. When an assessment instrument or a treatment protocol accomplishes what it is designed to accomplish at as low a cost as possible, only then is it efficient for day-to-day use. Assessment instruments or treatments are not efficient if they are not effective, regardless of the low cost. Another point related to efficiency that is beyond the scope of this chapter is the dissemination of existing cost-effective therapeutic programs. Dissemination is an issue that receives almost no attention in the literature, but one that researchers in any applied health profession should consider (Blount, 1987).

This chapter has been about the process of moving from explicative to treatment research. However, this presupposes that the researcher has determined in his or her mind that conducting treatment research is a worthy activity and that preventing or reducing human suffering is the ultimate goal of psychological investigations. Obviously not all of any active researcher's work is going to be in the service of alleviating suffering, and that is okay. However, clinical psychologists should be thrilled to conduct research that potentially benefits patients and informs those who provide frontline service in schools, clinics, and health care settings.

Finally, what we have proposed is only one way that researchers can move from explicative to treatment research. There are probably a number of variations on the theme we described (e.g., Quittner et al., 1996), as well as novel approaches. This chapter was based on many subjective impressions, personal perspectives and experiences, and personal biases. Others may not even consider the approximate 7.5:1 ratio of explicative to treatment research in the *Journal of Pediatric Psychology* (Roberts, 1992), and probably the field of clinical psychology and the social sciences as a whole, to be a problem. However, we and at least some others believe that the explicative-to-treatment research ratio can and should be reduced through

various means, including following the guidelines proposed in this chapter. Whether these approaches will be adopted will depend on not just the individual researcher's decision, but also on the research environment in graduate programs, journal editors' and reviewers' decisions as to what gets published, granting agencies deliberations about what gets funded, the degree of entrenchment of social scientists' belief that theoretical research is the acme of research investigations, and administrators' commitment to the conduct of treatment research as having a unique value. One chapter clearly will not suffice to accomplish all of that, but it is a start, and one that needs to be made.

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