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A Context for Science with a Commitment to Behavior Change

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Most contributions are by invitation and all are then peer-reviewed and edited. The editors, however, welcome unsolicited manuscripts, in which case, we suggest potential authors send an abstract or short summary of contents and we will respond as to our interest ina full manuscript submission. In all cases, manuscripts should be submitted electronically saved in "rich text format" (.rtf) to BOTH Beth Rosenwasser at ibrosie@aol.com and Joe Cautilli at jcautill@astro.temple.edu. Please adhere to APA format and us "Times New Roman" font in 11 pt. Throughout. In references, however, please italicize the places where APA format would have you underline. Headings are encouraged and must follow APA format.

Our Mission

The Behavior Analyst Today is committed to increasing the communication between the sub disciplines within behavior analysis, such as behavioral assessment, work with various populations, basic and applied research. Through achieving this goal, we hope to see less fractionation and greater cohesion within the field. The Behavior Analyst Today strives to be a high quality journal, which also brings up to the minute information on current developments wihin the field to those who can benefit from those developments. Founded as a newletter for master level practitioners in Pennsylvania and those represented in the clinical behavior analysis SIG at ABA and those who comprised the BA SIG at the Association for the Advancement of Behavior Therapy, BAT has evolved to being a primary form of communication betweeen researchers and practitioners, as well as a primary form of communication for those outside behavior analysis. Thus the Behavior Analyst Today will continue to publish original research, reviews of sub disciplines, theoretical and conceptual work, applied research, program descriptions, research in organizations and the community, clinical work, and curriculum developments. In short, we strive to publish all which is behavior analytic. Our vision is to become the voice of the behavioral community.

BEHAVIOR SYSTEMS APPROACH: A BETTER EXPLANATION FOR SEXUAL CONDITIONING STUDIES

Chana K. Akins
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General process learning theory has accounted for many instances of both instrumental and Pavlovian conditioning. The theory suggests that general laws of learning should apply across species, regardless of what stimuli are used or what response is measured. The literature on sexual conditioning provides a wide array of findings that indicate the importance of stimulus features, and the importance of careful consideration of the topography of the conditioned response to be measured. The present review addresses these issues in a sexual conditioning paradigm in which temporal contiguity (CS-US interval) and stimulus features were manipulated. The methodology also involved measuring numerous response topographies to maximize the likelihood of detecting learning. The findings of these experiments are discussed with regard to general process learning theory and the behavior systems approach.

General process learning theory assumes that the principles of learning apply across behavior systems and to many different stimuli and responses. This approach to the study of learning has had a long and distinguished history in the field of learning dating back to Thorndike, Pavlov, Skinner, Hull, and others (e.g., Bower & Hilgard, 1981). In particular, Skinner who was a general process theorist developed the operant chamber, presumably to encourage the study of general laws of learning by allowing scientists to study arbitrary stimuli and responses (Skinner, 1938). Despite the challenges proposed by many findings (Breland & Breland, 1961; Garcia & Koelling, 1966; Bolles, 1970; Seligman, 1970; Shettleworth, 1972), the general process learning approach has maintained its acceptance in the field of learning.

When I first joined the laboratory of Dr. Michael Domjan, it was my impression that I would be adopting a general-process approach and that the research I would conduct would likely provide support for general laws of learning. Although I knew about findings such as the misbehavior of Pliny (Breland & Breland, 1961), selective associations in aversion learning (Garcia & Koelling, 1966) and others, I learned that these were exceptions to general rules of learning due to "biological constraints" on learning. That is, they were species-specific adaptations assumed to influence the manifestations of learning, not its mechanism. Thus, as a graduate student, I was excited that my research might demonstrate that general laws of learning also applied to a somewhat unconventional system, the sexual behavior system. Ironically, findings published from my dissertation (Akins, Domjan, & Gutierrez, 1994) would later provide strong evidence for alternative thinking about general process theory. This paper is a review of those findings, as well as more recent ones, and a discussion of how the findings have contributed to our understanding of theories that have been proposed to explain response systems.

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The CS-US Interval and Sexual Conditioning

Temporal contiguity, a recurrent theme in the field of learning, suggests that two events have to occur temporally close together to become associated. In Pavlovian conditioning, temporal contiguity may be altered by increasing the time between the onset of the conditioned stimulus (CS) and the onset of the unconditioned stimulus (US), the CS-US interval. Although there are a handful of experiments that have provided evidence for learning at relatively long CS-US intervals (e.g., Garcia, Ervin, & Koelling, 1966; Kamin, 1965; Millenson, Kehoe, & Gormezano, 1977; Holland, 1980), the

common finding has been that acquisition of responding is inversely related to the CS-US interval (e.g., Schneiderman & Gormezano, 1964). Long intervals result in poorer learning or the absence of learning.

Only one investigation on sexual conditioning and temporal contiguity had been reported at the time I began my dissertation research in 1991. Zamble, Mitchell, & Findlay (1986) studied the Pavlovian conditioning of sexual arousal in Long-Evans rats. In their experiment, rats were transported to a holding room and placed in a plastic tub (CS) for 2, 4, 8, 16, or 32 min. They were then carried to an adjacent room and placed into one side of an arena. A female rat (US) that occupied the other side of the arena was separated from the male by a wire divider. Thus, CS-US intervals (CS duration) were 2, 4, 8, 16, and 32 min. During a CS test, in the absence of the female, male rats demonstrated a long ejaculation latency when the CS-US interval was either 2 or 32 min, compared to ejaculation latency prior to conditioning. Effective conditioning appeared to occur at CS-US intervals of 4, 8, and 16 min long. Thus, this was the first demonstration of long delay learning in a sexual conditioning paradigm, and suggested that sexual learning could occur at relatively long CS-US intervals.

Response Considerations & the CS-US Interval

The original purpose of my first dissertation experiment (Akins, et al., 1994; Experiment 1) was to test the temporal contiguity limits of sexual conditioning in male Japanese quail by varying the CS-US interval. The goal was to replicate Zamble et al. (1986) in an avian species rather than in the rat, using a different sexual conditioning paradigm that consisted of different stimuli and response measures. As long as the stimuli were demonstrably salient and the response measures sufficiently sensitive, general process learning theory would have us believe that the learning outcome should not be altered.

During sexual conditioning in animals, an object (CS) is presented and followed by copulation with a receptive female (US). After several pairings of the object with copulation, the object comes to elicit a conditioned response. Although in human males, the US is a sexually-arousing stimulus rather than copulation with a receptive female, the development of conditioned sexual arousal has been fairly well established (e.g., Langevin & Martin, 1975; Plaud & Martini, 1999). The conditioned response that results from such conditioning in humans is typically penile tumescence. Previous experiments with male quail demonstrate that birds also develop conditioned sexual responses. For example, male quail increase the amount of time they spend near an arbitrary object that signals a copulatory event, a response referred to as "conditioned approach" behavior. Conditioned approach has been observed using various stimuli, including a red light, a yellow stuffed toy dog, a foam block with orange feathers, and a terrycloth object (Domjan, Lyons, North, & Bruell, 1986; Domjan, O'Vary, & Green, 1988; Holloway & Domjan, 1993; Koksal, Domjan, & Weisman, 1994, respectively). Given its reliable occurrence across experiments and with many different stimuli, we chose to investigate effects of the CS-US interval on sexual conditioning by measuring the conditioned approach response.

Procedures were carried out in large (91 x 122 cm) test chambers that consisted of two adjacent areas. Subjects could move freely between the two large areas through an opening (60 cm wide x 25 cm high). A door separated the male's large test chamber from a female's smaller cage. Raising the door exposed a gray foam block with bilaterally-attached orange feathers (CS). A wire screen stretched over the block minimized physical contact. A small area marked off adjacent to the door was referred to as Zone 0, the area between Zone 0 and the opening, Zone 1, and the other half of the large chamber, Zone 2. The block could be moved aside and the door opened, to allow males to copulate with a female quail that was housed behind the door. Time spent in each zone was measured, with special interest in time spent in Zone 0 as an indicator of approach behavior. CS-US intervals tested were 0, 0.5, 2.5, 5, 10, 15, and 20 min. Because the procedure was a delayed conditioning procedure in which the CS was presented up until the time that the US was

presented, CS duration and CS-US intervals were synonymous.

Groups that received 0.5, 5, and 10 min CS-US intervals had a greater increase in the percent time they spent near the CS as conditioning proceeded across trial blocks. In addition, when the criterion of conditioned responding included time spent in Zone 0 plus Zone 1, the entire half of the large chamber closest to the CS, significant acquisition was evident with CS-US intervals of 0.5, 2.5, 5, and 10 min. The results were taken as evidence that sexually conditioned approach behavior could occur with CS-US intervals as long as 10 min. Therefore, the experiment replicated Zamble et al., (1986) with the exception that they found evidence for sexual learning with a longer CS-US interval, 16 min. In our experiment, the failure to find evidence for conditioned approach behavior in groups that experienced a 15 and 20 min CS-US interval was attributed to a lack of associative learning and supported the common finding that conditioned responding is inversely related to the CS-US interval.

Interestingly, about midway through the experiment, I noticed that during trials that employed the 20 min CS-US interval, males appeared to be running back and forth between the opening of Zones 1 and 2. In a follow-up experiment (Akins, et al., 1994; Experiment 2), the frequency crossing between the two areas furthest from the CS, Zones 1 and 2, was measured and quantified for subjects receiving a 1 or a 20 min CS-US interval followed by copulation (Short-Paired and Long-Paired, respectively). Control groups that received an unpaired condition, the US 2 hours prior to the CS for 1 or 20 min (Short-Unpaired and Long-Unpaired, respectively) were also tested.

Results showed that subjects that received a 1 min CS-US interval paired with copulation (Short-Paired) developed conditioned approach behavior to the block, whereas other groups did not. More importantly, subjects that received a 20 min CS-US interval paired with copulation (Long-Paired) developed increased locomotor behavior between Zones 1 and 2, whereas none of the other groups developed any systematic increases in locomotor activity across trials.

These results emphasize the importance of utilizing a variety of response topographies to measure conditioning. Had traditional measures of sexual conditioning solely been used, the results would have indicated a failure to acquire sexual learning at longer CS-US intervals. Our extensive observations indicated that increases in the CS-US interval changed the behavioral manifestations of learning rather than the common finding that conditioned responding declines as the CS-US interval increases above some optimal point (e.g., Schneiderman & Gormezano, 1964; Zamble et al., 1986).

Stimulus Considerations & the CS-US Interval

Previous experiments suggested that varying the temporal contiguity of a CS and US may alter the topography of the sexually conditioned response (Akins et al., 1994). There was also reason to believe that the nature of the conditioned stimulus might also alter the sexual response topography. First, Farris (1967) found that male quail that are given pairings of an auditory cue with copulation developed conditioned courtship responses in the presence of the auditory cue, including toe walking, vocalization, and feather ruffling. Later, also in male quail, Domjan et al. (1986) observed conditioned approach behavior toward a red light that had been repeatedly paired with copulation. That the response outcomes of the two experiments differed despite use of the same species and the same behavior system suggested that the nature of the stimulus may be an important determinant in the conditioned response topography.

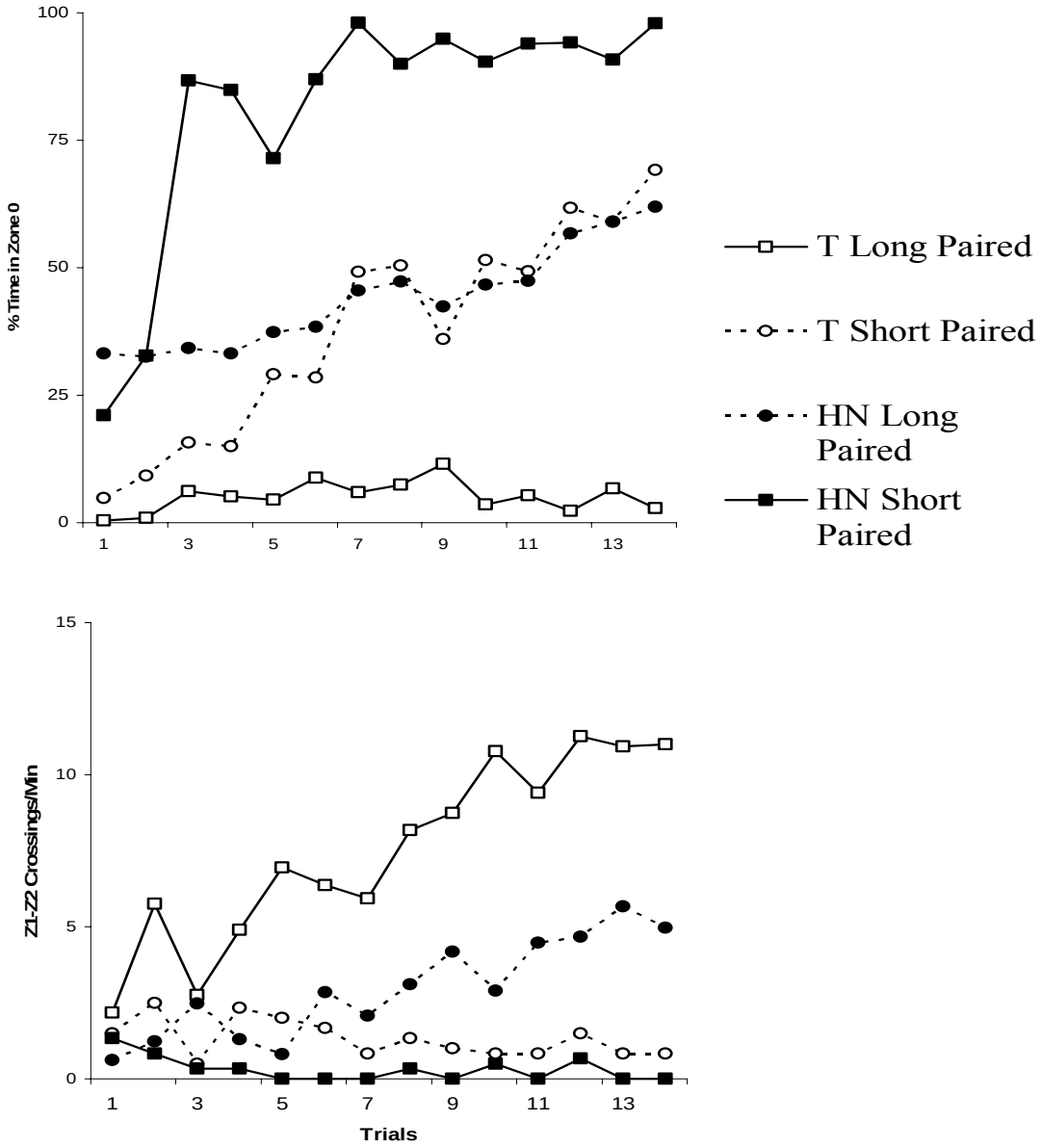
Second, differences in response topographies emerged from other sexual conditioning experiments, especially when the conditioned stimuli used were more complex than those that utilized discrete local conditioned stimuli. For example, Akins (1998) observed increased conditioned locomotor activity in male quail during exposure to a distinctly-colored chamber that had been paired with copulation with a female quail. Similarly, Mendelson & Pfaus (1989) observed high rates of level changing in a bi-level chamber that rats had exposure to for 5 min prior to the introduction of a sexually receptive female rat. Therefore, these findings suggested that increases in locomotor activity during sexual conditioning might be controlled by contextual cues.

Further evidence that contextual cues may come to elicit different sexual response topographies than discrete local cues is based on experiments that varied the CS-US interval but also measured responding at times other than conditioning. Zamble et al. (1986) tested for ejaculation latency in rats that were carried from a home room to a holding room in their home cage and then placed in a plastic tub. Placement into the tub for 10 min served as the putative CS. After conditioning, subjects were tested in the presence of the CS and also in the absence of the CS. Similar learning was evident during both tests. The authors later determined that cues other than the putative CS became associated with the US (Zamble et al., 1986, Experiment 4). Similarly, Akins et al. (1994) measured sexually conditioned responding 30 sec prior to each presentation of the CS in her experiments. She found that male quail that received a short CS-US interval approached the CS more in its presence than during the 30 sec before it was presented. In contrast, however, male quail that received a long CS-US interval demonstrated similar amounts of locomotor activity just before the presentation of the CS and during the CS presentation. Therefore, although the approach response seemed to be tightly controlled by the local CS, locomotor activity appeared to be controlled by contextual stimuli other than the local CS.

In general, conditioning of copulatory responses, in the form of direct sexual contact with the CS appears to be rare. In rats, ejaculation does not appear to support a conditioned response (Zamble, Hadad, & Mitchell, 1985; Zamble, Hadad, Mitchell, & Cutmore, 1985). However, this may be due to the use of complex contextual stimuli as the CS in these experiments. In Japanese quail, conditioning of copulatory responses has also been a rarity. The occurrence of it appears to depend on the nature of the conditioned stimulus. Cusato & Domjan (1998) conducted an experiment in which they compared sexually conditioned responses toward either a terrycloth stimulus that contained a small portion of a taxidermically-prepared female head, or a terrycloth stimulus without the female head. Though the presence of the head cues did not influence conditioned approach behavior (both groups responded more than unpaired controls), only subjects that received the head cues grabbed, mounted, and made more cloacal thrusts (copulatory responses) toward the model than their unpaired control groups. The presence of the head cues did not elicit conditioned responding in any of the unpaired groups. Collectively these findings suggest that the nature of the stimulus might influence the topography of the conditioned response that is acquired during sexual conditioning.

In a recent experiment (Akins, 2000), we were interested in whether a conditioned stimulus that elicits copulatory responses at a short CS-US interval, as found by Cusato & Domjan (1998), would also come to elicit copulatory responses with a long CS-US interval. Subjects were tested in a large experimental chamber (183 cm X 61 cm) that provided ample opportunity for locomotor behavior. As in previous experiments, the test chamber was marked off into three zones. Zone 0 was the CS area; Zone 1 made up the rest of that half of the chamber; and Zone 2 consisted of the half of the chamber furthest from the CS. Independent groups received the conditioned stimulus either for a short (1 min) or a long (20 min) CS-US interval before access to a female. Control groups received the short or long CS unpaired with access to a female. For some groups, the CS consisted of 2 sponge-filled ovoids (one vertical and one horizontal), both covered with terrycloth. For others, the CS was similar except that the vertical ovoid was replaced by a taxidermically-prepared head and neck of a female quail. Responses measured were time spent in each zone, crossings between zones 1 and 2, and frequency of copulatory behaviors toward the models (grabs, mounts, cloacal thrusts).

Figure 1. The percentage of time that subjects spent in Zone 0, the small area that contained the CS (top); the frequency of line crosses between Zones 1 and 2, the two zones furthest away from the CS. Adapted from Akins (2000).



Results showed that none of the unpaired control groups demonstrated much responding, regardless of what response was measured (and therefore these data were not included in the present figures). The highest rate of acquisition of conditioned approach behavior occurred in subjects that received the head and neck model for a short CS-US interval (HN-Short Paired). Those subjects that received the head and neck model for a long CS-US interval (HN-Long Paired) or the Terrycloth model for a short CS-US (T-Short Paired) interval showed a moderate increase in conditioned approach behavior to the CS. In contrast, the greatest rate of acquisition of locomotor activity occurred in subjects that received the terrycloth CS for a long duration before access to a female (T-Long Paired). None of the other groups showed substantial increases in locomotor activity further away from the CS, although HN-Long Paired showed a moderate increase.

The results of the copulatory response measures indicated that male quail that received the head and neck CS for 1 min paired with

copulation, not only approached the CS but also showed significant increases of grabbing, mounting, and cloacal thrusts during conditioning. The other groups made virtually no copulatory responses toward the model. Further analysis of the data indicated that the group that received the head and neck CS for a 20 min CS-US interval showed similar amounts of copulatory responding during the first 1 min of the 20 min CS-US interval.

As in previous research (Akins et al., 1994), a difference in CS-US interval of 1 to 20 min resulted in a change in the topography of the sexually conditioned response. Subjects that received the terrycloth CS for 1 min demonstrated conditioned approach to the CS, whereas subjects that received the terrycloth CS for 20 min showed increased locomotor activity further away from the CS. When the nature of the conditioned stimulus is taken into consideration, subjects that received the head and neck CS for 1 min showed more conditioned approach than any other group and they were the only group that demonstrated conditioned copulatory responses. When duration of exposure to the head and neck CS was 20 min, subjects showed moderate levels of both conditioned approach and locomotor activity. Anecdotally, it looked to us like these subjects were running back and forth from the far end of the chamber (Zone 2) into the zone that contained the CS. Interestingly, similar levels of conditioned approach were evident in the HN-Long Paired group as in the T-Short Paired group. Furthermore, the former group also developed similar amounts of conditioned copulatory responses toward the head and neck CS as group HN-Short Paired when the first minute of their 20 min period was compared. Thus, the head and neck CS primarily elicited conditioned approach behavior and conditioned copulatory responses and was not very sensitive to CS-US interval effects.

These findings clearly illustrate the influence of the nature of the conditioned stimulus and of which behavior is measured on the topography of sexually conditioned response. General process learning theory might suggest that some responses are simply less sensitive than others. However, this cannot account for the findings discussed above since increasing the CS duration not only decreased one response (e.g., conditioned approach) but also increased a different response (e.g., locomotor activity). Both responses appeared to be sensitive responses, however, certain conditions may have dictated which response was elicited. General process learning theory might also argue that one of the stimuli used in the experiments discussed above was more salient than the other and that resulted in differences in the strength of conditioning between the two stimuli. It is conceivable that a CS with features that are similar to those of a real female bird might be more salient than a CS without those natural features. However, these features were not salient enough to condition responding in our unpaired control groups. In addition, salience cannot explain why the head and neck CS more readily elicited approach behavior and less readily elicited increases in locomotor activity.

Behavior Systems Approach as an Alternative

The behavior systems approach has been developed in an attempt to combine concerns about control of functional behavior with concerns of the role of learning on eliciting new responses and stimulus control (Timberlake & Lucas, 1989; Timberlake, 2001; Fanselow, 1994; Hogan, 1994; Shettleworth, 1994). Behavior systems are assumed to consist of a series of modules organized in a temporal spatial sequence, with general search behavior at one end of the continuum and focal search behavior and consummatory behaviors at the other end. During classical conditioning, a CS becomes integrated into the system that is activated by the US. The conditioned response that becomes elicited by the CS depends on which module was activated at the time of the CS presentation, and this depends on when the CS is presented relative to the US. In the previously discussed experiments (Akins et al., 1994; Akins, 2000), when the CS was integrated early into the sexual behavior system (as with a short CS-US interval), focal search behavior was evident as conditioned approach. In contrast, when the CS was integrated later into the sexual behavior system (as with a long CS-US interval), general

search behavior was evident as a high rate of locomotor activity.

In addition to temporal issues, the behavior systems approach proposes that the physical characteristics of the predictive stimuli are important for activating particular response modes (Timberlake & Lucas, 1989; Timberlake, 2001). In the experiments above, male quail made more conditioned copulatory responses when the CS contained features that were more similar to the US (female quail) than when it did not. Presumably, the presence of the head and neck, which are species-specific cues, activated the consummatory mode. In the absence of these cues, the terrycloth CS may have been more susceptible to the temporal contiguity of the CS and US. Therefore, the use of more arbitrary cues may have reduced the contribution of CS physical characteristics to activate a mode, and made it more susceptible to the temporal arrangement.

The behavior system approach provides a comprehensive framework for organizing the diverse sexual conditioning effects. In a formulation of a behavior system for sexual conditioning in Japanese quail, Domjan (1994) described how learning about various types of stimuli come to control different aspects of the sexual response. As previously discussed, successful conditioning of copulatory responses appears to occur only in the presence of some of plumage and other features of a female quail (Domjan, et al., 1986; Domjan et al., 1988; Akins, 2000). Local cues (discrete arbitrary cues) that have been paired with copulation elicit focal search or conditioned approach behavior (Domjan, et al., 1986). However, if local cues are first presented with species-specific cues that are gradually removed, they can come to elicit conditioned copulatory responses (Domjan, Huber-McDonald, & Holloway, 1992). Furthermore, if local cues are conditioned with a long CS-US interval, the time between the CS and copulation with a female (US), local cues elicit general search behavior that is characterized as increased locomotor activity across a wide area of a chamber (Akins, et al., 1994; see also Akins, 2000). Contextual cues serve in a modulatory role to facilitate copulatory responding elicited by the shape and plumage of a female's head and neck (Domjan, Greene, & North, 1989), and to facilitate approach behavior elicited by conditioned local cues (Domjan, Akins, & Vandergriff, 1992). More recent experiments have also demonstrated that contextual cues alone may elicit general search behavior, as measured by increased locomotor activity, and focal search behavior in the form of a place preference (Akins, 1998).

General Process Theory versus Behavior Systems Approach

General process theory implies that "a stimulus is a stimulus is a stimulus" and that "a response is a response is a response." Therefore, neither the nature of the stimulus nor the topography of the to-be-conditioned response need be considered. Studies of sexual conditioning have demonstrated that the topography of the response can be dictated by both stimulus features and by temporal contiguity. The findings also emphasize the importance of measuring qualitative changes in the behavioral manifestations of learning rather than traditional use of quantitative measures to determine whether learning has occurred.

Although the general learning process approach still accounts for a majority of learning outcomes, it does not appear to account for many of the findings of sexual conditioning experiments. Some might argue that the sexual conditioning paradigm or the sexual behavior system represents an exception; that similar to research on misbehavior and selective associations, the findings of sexual conditioning studies are due to biological constraints on learning. On the contrary, however, biological constraints or limitations on the effectiveness of conditioning do not explain the qualitative differences that are evident in sexual conditioning studies. The behavior systems approach offers an alternative to general laws of learning and provides a different view of biological constraints. The approach takes into account the functional features of a behavior system such as different rates of learning in different species and/or different ways of responding in certain situations. According to this approach, constraints are due to

environmental situations that are not well-suited for the animal's natural behavior system.

Collectively, the behavior systems approach appears to account for a majority of the findings in sexual conditioning experiments. Although there have been findings in other behavior systems supported by this approach (e.g., Fanselow & Lester, 1988; Holland, 1980; Timberlake, Wahl, & King, 1982), more experiments need to be conducted to continue to investigate the ubiquity and limits of this approach.

References

Akins, C. K. (1998). Context excitation and modulation of conditioned sexual behavior, *Animal Learning & Behavior, 26*(4), 416-426.

Akins, C. K. (2000). Effects of species-specific cues and the CS-US interval on the topography of the sexually conditioned response. *Learning & Motivation, 31*, 211-235.

Akins, C. K., Domjan, M., & Gutierrez, G. (1994). Topography of sexually conditioned behavior in male Japanese quail (*Coturnix japonica*) depends on the CS-US interval. *Journal of Experimental Psychology: Animal Behavior Processes, 20*, 199-209.

Bolles, R. C. (1970). Species-specific defense reactions and avoidance learning. *Psychological Review, 71*, 32-48.

Bower, G. H., & Hilgard, E. R. (1981). *Theories of Learning*. (5th edition). Englewood Cliffs, Prentice-Hall.

Breland, K., & Breland, M. (1961). The misbehavior of organisms. *American Psychologist, 16*, 681-684.

Cusato, B. M., & Domjan, M. (1998). Special efficacy of sexual conditioned stimuli that include species typical cues: Tests with a conditioned stimuli preexposure design. *Learning & Motivation, 29*, 152-167.

Domjan, M. (1994). Formulation of a behavior system for sexual conditioning. *Psychonomic Bulletin & Review, 1*, 421-428.

Domjan, M., Akins, C. K., & Vandergriff, D. H. (1992). Increased responding to female stimuli as a result of sexual experience: Tests of mechanisms of learning. *Quarterly Journal of Psychology, 45*, 139-157.

Domjan, M., Greene, P., & North, N. C. (1989). Contextual conditioning and the control of copulatory behavior by species-specific sign stimuli in male Japanese quail. *Journal of Experimental Psychology: Animal Behavioral Processes, 15*, 147-153.

Domjan, M., Huber-McDonald, M., & Holloway, K.S. (1992). Conditioning copulatory behavior to an artificial object: Efficacy of stimulus fading. *Animal Learning & Behavior, 20*, 350-362.

Domjan, M., Lyons, R., North, N. C., Bruell, J. (1986). Sexual Pavlovian conditioned approach behavior in male Japanese quail (*Coturnix coturnix japonica*). *Journal of Comparative Psychology, 100*, 413-421.

Domjan, M., O'Vary, D., & Greene, P. (1988). Conditioning of appetitive and consummatory behavior in male Japanese quail. *Journal of Experimental Analysis of Behavior, 50*, 505-519.

Fanselow, M. S. (1994). Neural organization of the defensive behavior system responsible for fear. *Psychonomic Bulletin & Review, 1*, 429-438.

Fanselow, M. S., & Lester, L. S. (1988). A functional behavioristic approach to aversively motivated behavior: Predatory imminence as a determinant of the topography of defensive behavior. In R. C. Bolles & M. D. Beecher (Eds.), *Evolution and learning* (pp. 185-212). Hillsdale, NJ: Erlbaum.

Farris, H. E. (1967). Classical conditioning of courting behavior in the Japanese quail, Coturnix coturnix japonica. *Journal of Experimental Analysis of Behavior, 10*, 213-217.

Garcia, J., Ervin, F. R., & Koelling, R. A. (1966). Learning with prolonged delay of reinforcement. *Psychonomic Science, 4*, 123-124.

Garcia, J., & Koelling, R. A. (1966). Relation of cue to consequence in avoidance learning. *Psychonomic Science, 4*, 123-124.

Hogan, J. A. (1994). Structure & development of behavior systems. *Psychonomic Bulletin & Review, 1*, 439-450.

Holland, P. C. (1980). CS-US interval as a determinant of the form of Pavlovian appetitive conditioned responses. *Journal of Experimental Psychology: Animal Behavior Processes, 6*, 155-174.

Holloway, K. S., & Domjan, M. (1993). Sexual approach conditioning: Unconditioned stimulus factors. *Journal of Experimental Psychology: Animal Behavior Processes, 19*, 38-46.

Kamin, L. J. (1965). Temporal and intensity characteristics of the conditioned stimulus. In M. R, Jones (Ed.), *Miami Symposium on the Prediction of Behavior: Aversive Stimulation* (pp. 9-31). Miami, FL: University of Miami Press.

Koksal, F., Domjan, M., & Weisman, G. (1994). Blocking of the sexual conditioning of differentially effective conditioned stimulus objects. *Animal Learning & Behavior, 22*, 103-111.

Langevin, R., & Martin, M. (1975). Can erotic response be classically conditioned? *Behavior Therapy, 6*, 350-355.

Mendelson, S. D., & Pfaus, J. G. (1989). Level searching: A new assay of sexual motivation in the male rat. *Physiology & Behavior, 45*, 337-341.

Millenson, J. R., Kehoe, E. J., & Gormezano, I. (1977). Classical conditioning of the rabbit's nictitating membrane response under fixed and mixed CS-US intervals. *Learning & Motivation, 8*, 351-366.

Plaud, J. J., & Martini, J. R. (1999). The respondent conditioning of male sexual arousal. *Behavior Modification, 23*(2), 254-269.

Schneiderman, N., & Gormezano, I. (1964). Conditioning of the nictitating membrane of the rabbit as a function of the CS-US interval. *Journal of Comparative and Physiological Psychology, 57*, 188-195.

Seligman, R. E. P. (1970). On the generality of the laws of learning. *Psychological Review, 77*, 406-418.

Shettleworth, S. J. (1972). Constraints on learning. In D. S. Lehrman, R. A. Hinde, & E. Shaw (Eds.), *Advances in the study of behavior* (Vol. 4, pp. 1-68). New York: Academic Press.

Shettleworth, S. J. (1994). What are behavior systems and what use are they? *Psychonomic Bulletin & Review, 1*, 451-456.

Skinner, B. F. (1938). *The behavior of organisms.* New York: Appleton-Century-Crofts.

Timberlake, W. (2001). Motivational modes in behavior systems. In R. R. Mowrer and S. B. Klein (Eds.). *Handbook of contemporary learning theories.* (pp. 155-209). Mahwah, NJ: Erlbaum.

Timberlake, W., & Lucas, G. A. (1989). Behavior systems and learning: From misbehavior to general principles. In S. B. Klein & R. R. Mowrer (Eds.), *Contemporary learning theories: Instrumental conditioning theory and the impact of biological constraints on learning* (pp. 237-275). Hillsdale, NJ: Erlbaum.

Timberlake, W., Wahl, G., & King, D. (1982). Stimulus and response contingencies in the misbehavior of rats. *Journal of Experimental Psychology: Animal Behavior Processes, 8*, 62-85.

Zamble, E., Hadad, G. M., Mitchell, J. B. (1985). Pavlovian conditioning of sexual arousal: Unsuccessful attempts with an ejaculatory US. *Bulletin of the Psychonomic Society, 23*(2), 149-152.

Zamble, E., Hadad, G. M., Mitchell, J. B., & Cutmore, T. R., H. (1985). Pavlovian conditioning of sexual arousal: First- and second-order effects. *Journal of Experimental Psychology: Animal Behavioral Processes, 11*(4), 598-610.

Zamble, E., Mitchell, J. B., & Findlay, H. (1986). Pavlovian conditioning of sexual arousal: Parametric and background manipulations. *Journal of Experimental Psychology: Animal Behavioral Processes, 12*(4), 403-411.

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INCONSPICUOUS SOURCES OF BEHAVIORAL CONTROL: THE CASE OF GENDERED PRACTICES

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Until recently, behavior analysts have remained conspicuously silent on the topic of gender . Understood as a case of socially constructed knowledge maintained by social contingencies in verbal communities, gender related processes are a pervasive aspect of our cultural fabric. Yet, the control exerted by gendered practices is subtle and typically defies detection. A deeper understanding of the control exerted by gendered cultural practices would enrich the field of behavior analysis. At the same time, a behavior analytic approach brought to bear on the analysis of gender related social processes would represent a fresh and unique perspective particularly as it might apply to the analysis of social contingencies and reinforcement patterns within verbal communities.

Gender is a topic about which behavior analysts have historically remained conspicuously silent. Recent treatments of the topic by behavior analysts (Biglan, 1995 Guerin, 1984, Ruiz, 1995, 1998, Vogeltanz, Sigmon and Vickers, 1998) are promising evidence that our field is beginning to join an important conversation that has been taking place for quite some time. A behavior analytic perspective applied to the study of gender as a case of socially constructed knowledge shaped and maintained by social contingencies and reinforcement patterns within the verbal community may contribute unique insights to the current literature. At the same time, exploring the rich an complex issues involved in the study of gender related process could potentially enrich our discipline's understanding of sources of control that impact the behavior of those we work with as well as our own.

There is an extensive literature that raises important and challenging questions about sex and gender that could be of interest to many behavior analysts. In this paper I offer a behavior analytic conceptualization of gender, and discuss several findings of interest including: the discriminative control of gendered practices and the interaction of sex, gendered practices and interpretive repertoires. I conclude with a discussion of some of implications of this work for behavior analysts.

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When We Speak of Gender

Sociologists Candace West and Don Zimmerman (1987) coined the phrase 'doing gender'. Many feminist psychologists favor this phrase over plain 'gender' and use it

> to "designate how sex is a salient social and cognitive category through which information is filtered, selectively processed, and differentially acted upon to produce self-fulfilling prophecies about men and women" (Crawford, 1995 p. 2). The cognitive slant notwithstanding, feminist psychologists want to emphasize that gender is not a personal attribute, but rather that gender organizes people into groups categorically, and characterizes social relations. Behavior analysts would agree that gender should not be construed as a characteristic of the individual. We might also find the phrase 'doing gender' to be more useful, though for different reasons. From a behavioral perspective 'doing gender' or gendering may be a reasonable way of speaking about a class of cultural practices that have come to be associated with sex as a biological category. How the two come to be conflated is worth elaborating if only briefly.

The foundation of the conceptual framework at work in our culture includes a series of important dualisms. The person-environment split is a dualism that is foundational to our culture's belief in individualism and the self as locus or agent of action. A second dualism at work in our culture is based on sexual designations as separate and distinct biological categories. Thus individuals are characterized as women or men by virtue of their sex. The biological designations have given rise to the development and elaboration of complex cultural practices associated with sexual status. It is this collective of cultural practices, including and perhaps most importantly verbal practices, that we tact when we speak of 'doing gender' or gendering. Thus gendering involves yet a third foundational dualism constituted of the feminine and the masculine.

Gendering and Cultural Practices

Historically cultural practices associated with the feminine and the masculine have developed within different and separate contextual spheres. Traditionally, the masculine has been associated with the public sphere of work while the feminine has been associated with the private sphere of the home and family. While many changes have been promoted in response to the contemporary women's movement, enduring dichotomies and associated inequities persist. Perhaps most conspicuous at the social-structural level are gendering practices that reflect the public/private sphere split in the area of work. The wage differential by sex has remained fairly constant for more than half a century cutting across all socioeconomic levels and sectors (Rix, 1991). Thus the degree of education does not level the field. This imbalance of resources is directly related to the imbalance of power between men and women in our culture.

Sex as a Discriminative Stimulus for Gendered Practices

Gendered practices in our culture mean that women and men participate under vastly different cultural contingencies. The work by Sadker and Sadker (1994) identified disturbing social realities in American classrooms. Direct observations of classroom practices spanning over 25 years revealed that a child's sex exerts powerful discriminative control over teacher behavior. Specifically, male children receive an overwhelming proportion of the resources managed by teachers and are clearly selected in the classroom. A related and consistent finding is that teachers are typically unaware that the child's sex is exerting discriminate control over their classroom practices. That is, the vast majority are not able to tact the very differential contingencies they administer. While it may not surprise behavior analysts that such stimulus control relations remain undetected (un-tacted) by teachers, these findings should give us pause as they highlight the subtleties and veracity of the control over behavior exerted by gendered practices. These educational practices have come to be known as the Hidden Curriculum.

There have also been interesting findings on the combined control exerted by gender and race. Amongst girls, for example, Jacqueline Irvine (1986) found that black females are least likely to get specific critical-constructive feedback. The students most likely to receive teacher time and attention are white males, followed by minority males, white females are next, and finally minority females. In addition, and in concert with the Sadker's (1994) findings, Irvine (1986) reported content analyses of the interactions between teachers and students further showing that girls are twice as likely as boys to be praised for appearance of their work and following the rules. On the other hand, when boys are praised, it is more likely to be for the quality of their ideas and their work.

These trends in teacher-student interactions in the early grades have been related to data depicting gender gaps in how students speak of themselves and their abilities, and to actual test scores. Students' depictions of themselves are well documented in a national survey conducted by the American Association of University Women (1990) that included three thousand children in grades 4 through 10 from 12 different locations nationwide. The survey showed, for example, an increasing and highly disturbing gender gap to the question "I'm happy with the way I am". While in elementary school a 7% difference-favoring males was recorded, the percent of high school girls answering yes to

this question trailed males by 16% points. Similar trends and gender gaps were revealed in the extent to which students expressed interest in math and science and career expectations. As far as actual test scores Sadker and Sadker (1994) point out that females are the only group in America to begin school testing ahead and leave having fallen behind. The gender gap in SAT scores, for example, shows a 50 to 60 point lead-favoring boys. It is not surprising, therefore that as women move from high school to college they tend to adopt less challenging career options (Holland & Eisenhart, 1990). The gender bias that underlies the Hidden Curriculum operates to creates micro-inequities which, when looked at individually might appear insignificant. On the other hand, as a functional class of cultural practices they have a powerful and cumulative impact.

In the Eye of the Beholder: Gendered Interpretive Repertoires

Another interesting aspect of the subtle control exerted by gendered practices relates to their influence on interpretive repertoires (Ruiz, 1998). A well-documented finding is the tendency of observers to interpret the same behavior differently depending on the sex of the actor engaging in the behavior, particularly when the behavior in question is verbal behavior. Assertive behavior is an excellent illustration because it became the focal point of a research trend that began in the 1970's and grew to monumental proportions in the 1980's with over 1600 works published in one decade (Ruben, 1985). Assertive behavior has been defined as asking for what one wants and refusing what one doesn't want (Booraem & Flowers, 1978) and has bees explicitly contrasted to passive (Lange & Jacubowski, 1976) and to aggressive (Rakos, 1979) behavior. It is not uncommon for women's appropriate assertive behavior to be labeled as aggressive, angry or 'bitchy' (Fodor & Rothblum, 1984; Solomon & Rothblum, 1985). One consistent finding has been that assertive behavior tends to be evaluated differently depending on whether the individual engaging in the behavior is a man or a woman. In contrast to men, women speaking assertively tend to be judged as less likable (e.g. Cohen, Bunker, Burton, & McManus, 1978; Crawford, 1988; Kelly, Kern, Kirkley, Patterson, & Keane, 1980) and have less influence on listeners (Carli, 1990; Costrich, Feinstein, Kidder, Marecek, & Pascaleb, 1975; Sterling & Owen, 1982) particularly when the listener is male. Thus, the sex of the speaker may influence a listener's interpretation of the verbal behavior as well as its functional effectiveness.

Given that in our culture females and males are exposed to vastly, though subtly, different social contingencies, it is not surprising that under many circumstances men and women interpret the same events or circumstances differently. An interesting and legally challenging illustration is the case of sexual harassment. Since the 1970's organizations and institutions have been forced to incorporate into their policies and codes of conduct concerns relating to "sexual harassment". But while codified changes attest to the societal recognition that sexual harassment is a significant social problem, studies have shown that the conditions tacted by the term "sexual harassment" differ widely across the sexes. For example, women consistently identify more experiences as sexual harassment than do men, and the factor that most consistently predicts differences in what acts will be labeled as "sexual harassment", is the sex or the observer/interpreter (cf. Riger, 1991). An extensive discourse analysis by Kitzinger and Thomas (1995) found that most men reported underlying sexual interest on the part of the harasser as a necessary condition for tacting sexual harassment. Many women, by contrast, were explicit in stating that the events they were describing as sexual harassment were not sexual per se, but rather were events that functioned in terms of power. Since the term is subject to different interpretations it is not surprising that researchers and policy makers have found it difficult to clearly define the topic and create standards of practice to address it.

Conclusion

Control from social contingencies is subtle and inconspicuous. Gendered cultural practices maintained by social contingencies illustrate a pervasive source of subtle social control in our culture. Social contingencies, unlike contingencies set forth by the physical environment, can be illusive to an observer. I cannot walk through a wall, and an observer reporting on my efforts to do so can describe my

behavior and its consequences. The effects of social consequences, on the other hand, are not necessarily obvious to an observer. For example, a woman interviewing for a management position may speak assertively, but may fail to be hired because the interviewer finds her style offensively aggressive. While these consequences are as real and impacting to the woman as any control exerted by the physical environment, to an observer watching the interview on tape the social consequences of the woman's verbal behavior may go undetected. Unlike the control exerted by the physical environment, social consequences often go unrecognized by the observer because they involve a history of social interaction, they are intermittent and they are generalized (see Biglan, 1995).

When we look towards the relations between classes of sex-based differential selection practices we can identify metacontingencies. These, like the patterns suggested in the research on the Hidden Curriculum represent outcomes of interlocking actions that may go beyond direct and immediately detectable effects on the individual. One such outcome is the invisible barriers that keep many women from reaching top positions in business popularly labeled the *glass ceiling:* The woman can see her goal, but she bumps into a barrier that is both invisible and impenetrable (Lorber, 1993). Therefore when we speak of gendered cultural practices, we are speaking of forms of social control related to power and dominance relations that bear directly on the level of access that an individual or group of individuals may have to sources of reinforcement or resource allocation.

One challenge for behavior analysts is to understand how these types of cultural metacontingencies participate in our context of discovery and our ability to be effective (Ruiz, 1995). Cultural assumptions are ubiquitous, and as Bolling (in press) points out they operate in any intervention with an interpersonal component. Behavioral interventions are no exception. It is true that behavior analysts strive to stay at the level of observation and description in their interventions following Skinner (1950) who objected to "…any explanation of an observed fact which appeals to events taking place somewhere else, at some other level of observation, described in different terms, and measured, if at all, in different dimensions." (p.193). Our self stated efforts at objectivity notwithstanding, our observations, descriptions and functional analyses are not immune to our culture-bound assumptions, including those about sex and gendered practices. This fact has prompted Iwamasa (1997) to note that without such awareness, "a functional analysis of behavior may be more a function of *who* is doing the analysis…than *what* is being analyzed" (p.348).

Returning briefly to the assertiveness training research will help to illustrate the potential problems. Assertiveness was conceptualized as a set of skills that could be trained and behaviorally oriented therapists endorsed assertiveness training to replace maladaptive forms of communicating (Lange & Jakubowski, 1976; Erwin, 1978). Years later we realized that installing an assertiveness training program for women in the workplace, for example, without analyzing the social contingencies involving status and power would be irresponsible. Yet this is an example of the potential dangers that we face when we essentialize the notion of skill or behavior.

Behavior analytic work cannot be held separate from the cultural contingencies and metacontingencies that select and maintain our community's verbal practices. If, as Skinner (1950, 1957) advocated, we should endeavor to come under precise control of our subject matter, then deliberate interrogations about inconspicuous sources of behavioral control embedded in cultural metacontingencies could only contribute to our effective action by helping us to uncover sources of unexplained variance that challenge the effectiveness of our practices.

References

American Association of University Women. (1990). *Shortchanging girls, shortchanging America.* Washington, DC.

Biglan, A. (1995). Changing cultural practices: A contextualistic framework for intervention research. Reno, NV: Context Press.

Bolling, M. (In press). Research and representation: A conundrum for behavior analysis. *Behavior and Social Issues.*

Booraem, C.D. and Flowers, J.V. (1978). A procedural model for training of assertive behavior. In J.M. Whitely and J.V.

Flowers (Eds.), *Approaches to assertion training,* pp.15-46. Monterey, CA: Brooks/Cole.

Carli, L.L., (1990). Gender, language, and influence. *Journal of Personality and Social Psychology, 59*, 941-951.

Cohen, S.L., Bunker, K.A., Burton, A.L., and McManus, P.D. (1978). Reactions of male subordinates to the sex-role congruity of immediate supervision. *Sex Roles, 4,* 297-311.

Costrich, N., Feinstein, J., Kidder, L., Maracek, J., and Pascale, L. (1975). When stereotypes hurt: Three studies of penalties for sex-role reversals. *Journal of Experimental social Psychology, 11*, 520-530.

Crawford, M. (1988). Gender, age, and the social evaluation of assertion. *Behavior Modification, 12*, 549-564.

Crawford, M. (1995). *Talking difference: On gender and language*. London: Sage.

Fodor, I. and Rothblum, E.D. (1984). Strategies for dealing with sex-role stereotypes. In C. Brody (Ed.), *Women therapists working with women* , pp. 86-95. New York: Springer.

Guerin, B. (1992). Behavior analysis and the social construction of knowledge. *American Psychologist, 47,* 1423-1432.

Guerin, B. (1994). *Analyzing social behavior: Behavior analysis and the social sciences.* Reno, NV: Context Press.

Holland, D.C. and Eisenhart, M.A. (1990). Educated in romance: *Women, achievement, and college culture.* Chicago, IL: University of Chicago Press.

Irvine, J.J. (1986). Teacher-student interactions: Effects of student race, sex, and grade level. *Journal of Educational Psychology, 78*, 14-21.

Iwamasa, G.Y. (1997). Behavior therapy and a culturally diverse society: Forging an alliance. *Behavior Therapy, 28*, 347-358.

Kelly, J.A., Kern, J.M., Kirkley, B.G., Patterson, J.N., and Keane, T.M. (1980). Reactions to assertive versus unassertive behavior: Differential effects for males and females and implications for assertiveness training. *Behavior Therapy, 11*, 670-682.

Kitzinger, C. and Thomas, A. (1995). Sexual harassment: A discursive approach. In S. Wilinson & C. Kitzinger (Eds.), *Feminism and Discourse: Psychological Perspectives,* pp. 32-48, London: Sage.

Lange, A.J. and Jakubowski, P. (1976). *Responsible assertive behavior: Cognitive-behavioral procedures for trainers.* Champaign, IL: Research Press.

Lorber, J. (1993). *Paradoxes of Gender*. New Haven: Yale University Press.

Rakos, R.F. (1979). Content consideration in the distinction between assertive and aggressive behavior. *Psychological Reports, 44*, 767-773.

Riger, S. (1991), Gender dilemmas in sexual harassment policies and procedures. *American Psychologist, 46,* 497-505.

Ruben, D. (1985). Progress *in assertiveness, 1973-1983: An analytical bibliography.* Metuchen, NJ: Scarecrow Press.

Ruiz, M.R. (1995). B.F. Skinner's radical behaviorism: Historical misconstructions and grounds for feminist reconstructions. *Psychology of Women Quarterly, 19,* 161-179.

Ruiz, M.R. (1998). Personal agency in feminist theory: Evicting the illusive dweller. *The Behavior Analyst, 21*, 179-192.

Rix, S. (1991). *The American woman 1990-1991: A status report.* New York: Norton.

Sadker, M.and Sadker, D. (1994). Failing at fairness: How America's schools cheat girls. New York: Scribners.

Skinner, B.F. (1950). Are theories of learning necessary? *Psychological Review, 57*, 193-216.

Skinner, B.F. (1957). *Verbal Behavior*, New York: Appleton Century-Crofts.

Solomon, L.J. and Rothblum, E.D. (1985). Social skills problems experienced by women. In L. L'Abate and M.A. Milan (Eds.), *Handbook of social skills training and research,* pp.303-325. New York: Wiley.

Sterling, B.S, and Owen, J.W. (1982). Perception of demanding versus reasoning male and female police officers. *Personality and Social Psychology Bulletin, 8*, 336-340.

Vogeltanz, N.D., Sigmon, S.T., and Vickers, K.S. (1998). Feminism and behavior analysis: A framework for Women's Health Research and Practice. In J.J. Plaud & G.H. Eifert (Eds.), >*From behavior theory to behavior therapy* (pp. 269-293). Boston: Allyn & Bacon.

West, C. and Zimmerman, D.H. (1987). Doing gender. *Gender and Society, 1,* 125-151.

FROM TRADITIONAL BEHAVIORAL COUPLE THERAPY TO INTEGRATIVE BEHAVIORAL COUPLE THERAPY: NEW RESEARCH DIRECTIONS

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Integrative behavioral couple therapy (IBCT; Jacobson & Christensen, 1996) grew out of traditional behavioral couple therapy (TBCT; Jacobson & Margolin, 1979), but has expanded on this approach to emphasize the important role of acceptance in relationships. Addressing many of the limitations highlighted in research on TBCT, integrative behavioral couple therapy focuses on different controlling variables in the development of couple dysfunction and is part of an ongoing movement in behavior therapy toward the use of acceptance strategies. Early in its development, IBCT has not yet been researched thoroughly enough to be classified as efficacious; however, this approach has the potential to significantly enhance TBCT and is being evaluated in ongoing clinical trials. Future research should capitalize on the unique emphasis in IBCT on acceptance. Specific recommendations for future research include (a) establishing IBCT as an empirically supported treatment, (b) investigating the efficacy of IBCT to varied populations, (c) more closely defining and examining the mechanisms of action in IBCT.

Traditional behavioral couple therapy (TBCT; Jacobson & Margolin, 1979) has had the distinction of being the most widely studied and empirically supported intervention available for the treatment of relationship distress for more than two decades. TBCT was developed to target the dysfunctional patterns, communication difficulties, and poor problem-solving behaviors often associated with relationship discord. Based on social learning theory and findings from research with distressed couples, TBCT consists largely of strategies to promote skill acquisition and behavioral change among partners. Empirical support for the efficacy of TBCT is considerable; however, several studies have highlighted key limitations of this approach. In an effort to address the shortcomings of TBCT, Jacobson and Christensen (1996) developed Integrative Behavioral Couple Therapy (IBCT). IBCT is grounded in contextually based behavioral theory and interweaves the well-established components of TBCT that promote accommodation and change between partners with newer acceptance-based strategies. Consequently, many of the treatment recommendations in IBCT share similarities with those proposed in several of the burgeoning treatment approaches based in contextual-behavioral theory that emphasize acceptance-based strategies, such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2000), Functional Analytic Psychotherapy (FAP; Kohlenberg & Tsai, 1991), and Dialectical Behavior Therapy (DBT; Linehan, 1993).

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Traditional Behavioral Couple Therapy (TBCT)

Jacobson and Margolin (1979) developed TBCT (formerly known as behavioral marital therapy; BMT) largely based on social learning and behavioral exchange theories of marital discord. Research from social learning theory suggested that couples who exchange negative or aversive behaviors with high frequency and who lack communication and problem resolution skills were likely to experience poor relationship adjustment (Gottman, 1980). These findings fit well within the context of social exchange theory, which posits that relationship satisfaction is associated with the ratio of costs and benefits received in the current relationship, relative to perceived alternatives to the current relationship. A higher ratio of positive to negative behavior denotes a higher frequency of reinforcing behaviors, fewer punishers, and more satisfaction. From this framework, TBCT treatment primarily involves: (a) *behavioral exchange*, strategies aimed at increasing the exchange of positive behaviors between partners, (b) *communication training*, to enhance skills in communicating desires, needs, feelings and thoughts, and (c) *problem resolution training,* to improve the couples' facility and efficiency in working together to

resolve problems inside and outside of the marriage.

The Status of TBCT Research

The overall efficacy of TBCT and its components have been evaluated in numerous controlled treatment outcome studies over the years. Findings from these studies have been combined in several review articles (e.g., Alexander, Holtzworth-Monroe, & Jameson, 1994; Baucom & Epstien, 1990; Baucom & Hoffman; Bray & Jouriles, 1995) and meta-analytic studies (e.g., Dunn & Schwebel, 1995; Hahlweg & Markman, 1988). Generally, this literature supports the efficacy of TBCT for the treatment of couple distress and has not isolated any particular treatment component as the active ingredient of the treatment package. Using current guidelines to define empirically supported treatment approaches outlined by Chambless and Hollon (1998), TBCT has been established as both an *efficacious and specific* treatment for marital distress (Baucom, Shoham, Mueser, Daiuto, & Stickle, 1998). Thus, TBCT has been demonstrated to produce greater treatment effects than non-treatment control conditions in at least two studies by independent research teams and to demonstrate greater efficacy than conditions that control for non-specific processes associated with treatment, such as attention or expectations of change. Generally, couples in TBCT have fared substantially better than couples assigned to control groups, with a mean effect size of 0.95 observed across studies (Hahlweg & Markman, 1988; Shadish, et al. 1993). Results are even more encouraging when cross- cultural findings are included. The positive effects of TBCT have been observed with couples in both Europe and the United States, supporting the generalizability of this treatment approach (Hahlweg & Markman. 1988).

Despite considerable support for TBCT in the literature, researchers have begun to focus their attention on the substantial numbers of couples who do *not* experience *clinically meaningful* changes by the completion of therapy (Jacobson & Addis, 1993). Jacobson, Follette, and Ravensdorf (1984) define a clinically significant treatment as one in which (a) there is a statistically significant change from pre to post-treatment assessment, and (b) couples are no longer categorized as "distressed" by the end of treatment. Estimates indicate that although TBCT is efficacious, only about half of all couples who participate in therapy are successfully treated using these criteria, and nearly one third of these couples experience a pattern of relationship deterioration over time (Hahlweg, Revenstorf, & Schindler, 1982; Jacobson, Schmaling, & Holtzworth-Munroe, 1987; Snyder, Wills, & Grady-Fletcher, 1991).

Several explanations have been offered for the limited long-term efficacy and clinical significance of TBCT, including failure to modify treatment to meet the individual needs of each presenting couple, limiting the treatment focus to current relationship functioning without regard to the historical context in which problems have developed, and overemphasizing behavior change strategies (Jacobson & Addis, 1993). Jacobson and Christensen (1996) have addressed these concerns in the development of IBCT. These authors suggest that, for some couples, focusing first on acceptance of one another is essential in facilitating needed behavioral change. Thus, partners who enter therapy less willing to compromise, accommodate to change, or collaborate are less likely to benefit from change-oriented TBCT strategies. In fact, it has been suggested that change-focused TBCT may reinforce the faulty notion that partners must make considerable behavioral changes before the relationship can become satisfactory (Jacobson & Christensen, 1996).

These discouraging findings have formed the impetus for investigations of the factors associated with less favorable outcomes in TBCT. This treatment approach tends to be less effective with couples who are more severely distressed (Baucom & Hoffman, 1986), as well as when one partner is suffering from psychological difficulties such as depression (Jacobson, Fruzzetti, Dobson, Whisman, & Hops, 1993). There is also evidence that older age, emotional disengagement, non-egalitarian gender roles, and having divergent views about important aspects of marital relationships are poor prognostic signs for treatment (Baucom & Hoffman, 1986; Hahlweg, Schindler, Revenstorf, & Brengelmann, 1984; Jacobson, Follette, Pagel, 1986).

Integrative Behavorial Couple Therapy (IBCT)

TBCT was designed specifically to address the limited clinical significance and long-term efficacy of TBCT's largely change-oriented approach. The theory behind IBCT diverges from TBCT in that it represents a change in emphasis toward an increasingly radical behavioral or contextual perspective (Hayes, Hayes, & Reese, 1988; Jacobson, 1997). This change in theoretical perspective is associated with a stronger emphasis on understanding the phenomenon of private behavior in the context of couple therapy (e.g., thoughts, feelings, and desires). However, these behaviors are not granted causal status as they are in traditional cognitive treatment approaches. Instead, feelings and thoughts are viewed merely as another form of behavior that is under the same environmental influences as any publicly observable behavior.

Contextual behaviorism has an operant focus that classifies behavior according to its purpose or function, rather than emphasizing the topographical features of the behavior. For example, consider a couple with an angry wife who reports that her partner routinely jokes when she brings up the idea of starting a family, stays out until midnight with the guys every chance he gets, and regularly fails to remember dates that are important to her (e.g., anniversary, birthday, Valentine's Day). A *topographical* approach to treatment might target each of these behaviors as discrete relationship problems. Treatment strategies might include helping partners to clarify and communicate their needs, to identify ways of solving each problem through compromise, and to practice behavioral changes in each area. While these strategies may also be useful in IBCT, a contextual conceptualization would place more importance on understanding the common functions that these problem behaviors serve in order to identify the controlling variables in the relationship. For instance, this set of behaviors might function to limit emotional closeness and commitment in the marriage and to set up conditions where the wife feels unloved and undervalued. In turn, this may lead to sadness, anger, and coercive attempts to force her husband to change his behavior, thus increasing the likelihood that her husband's attempts to withdraw and avoid will escalate. The strategy in IBCT is to target the controlling variables in the relationship rather than to focus on solving the derivative problems that often bring couples into treatment. In contrast, TBCT would focus on the derivative problems through teaching a general set of communication and problem-solving skills that are expected to enhance functioning across couples. By emphasizing controlling variables unique to each couple, the IBCT approach de-emphasizes universally problematic patterns of reciprocity (i.e., the exchange of negative behaviors). Correspondingly, interventions in IBCT are guided by an idiographic conceptualization that emphasizes the particular needs of each couple rather than global skill deficits presumed to exist across distressed couples.

>From a contextual perspective, an effective intervention is one that produces behavior change that generalizes to the couple's natural setting. The TBCT approach attempts to produce generalization by teaching specific skills, encouraging homework practice, and fading therapist prompts and reinforcement over time. Jacobson (1997) noted that these skill-based strategies may fail to produce generalization because they promote rule-governed rather than the more flexible, natural contingency-shaped behavior. *Contingency-shaped* behavior is defined as that which is under the direct control of reinforcement contingencies in the couple's relationship. For example, a man who avoids making requests of his wife in front of others after experiencing repeated punishment (e.g., being ridiculed, scolded, or ignored) is displaying contingency-shaped behavior. In contrast, *rule-governed* behavior is that which occurs in response to verbal rules that specify relations between behavior and environment (Hayes, 1986; Skinner, 1969; Zettle & Hayes, 1982). For example, this same husband may eventually avoid going to social gatherings with his wife in response to the rule "If I socialize with my wife, she will humiliate me". Jacobson has suggested that, since the therapist is the primary reinforcing agent for new behavioral rules, skill-based interventions may not generalize to daily interactions that occur in the absence of the therapist. Furthermore, strategies to help couples generalize rule-based skills have met with

somewhat limited success (Jacobson, Schmaling, & Holtzworth-Monroe, 1987), and it has been noted that rule-following may decrease individuals' sensitivity to direct contingencies (Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1982). In sum, the IBCT approach shares contextual roots with TBCT but represents a more idiographic approach emphasizing functional rather than topographical features of couple interactions.

The Practice of IBCT

Within an IBCT perspective, the focus on changing partner behavior is a central controlling variable that leads to many of the problems associated with couple discord, such as coercion and negative behavioral reciprocity (Jacobson & Christensen, 1996). The struggle around behavior change is identified as the key problem, and it is proposed that behavior change techniques may be insufficient and ineffective without a corresponding foundation of mutual acceptance. In this way, IBCT is part of a broader movement in behavior therapy to integrate acceptance and mindfulness-based strategies into existing change orienting approaches to enhance treatment outcomes and prevent relapse (e.g., Hayes et al., 1999; Linehan, 1993; Segal, Williams, & Teasdale, 2002).

While the empirically supported change strategies of TBCT continue to be used in IBCT (i.e., behavior exchange, communication/problem-solving training), the primary emphasis of this approach is to help partners to accept (and even embrace) aspects of each other and their relationships that have come to be defined as intolerable. Acceptance in this context includes letting go of the struggle to change each other, but it is not resignation or learning to live with clearly unacceptable behavior (e.g., abuse). Jacobson and Christensen (1996) define *acceptance* as the act of relinquishing the struggle to change partner behavior and using differences as opportunities to create enhanced intimacy. Thus, for partners in relationships with seemingly intractable problems, IBCT facilitates progress by providing alternative ways of establishing closeness. Enhanced acceptance is expected to facilitate contact with a larger variety of the stimulus functions of a partner's behavior, thereby changing responses to such behavior from extremely negative (e.g., disgust, contempt) to neutral or even positive (e.g., tolerance, appreciation) in valence.

Several key acceptance strategies are described in the IBCT treatment manual (Jacobson & Christensen, 1996) and are distinct from interventions used in TBCT. These strategies include empathetic joining, unified detachment, and tolerance building. *Empathetic joining* involves magnifying the expression of feelings and thoughts that are likely to elicit empathy, as opposed to those that may elicit defensiveness, non-acceptance, or invalidating responses. For instance, the couple might be encouraged to express the "softer" side of their emotional experience, such as sadness instead of anger or frustration. *Unified detachment* involves strategies to create a context in which couples are able to communicate about their problems in a detached, intellectual, and non-accusatory manner. One intervention within the framework of unified detachment involves describing relationship problems in a clear, non-accusatory manner that frames the problem as an "it" that both partners are working to resolve. *Tolerance building* involves changing the function of negative partner behavior by allowing partners to experience such behavior with less distress and conflict. For example, a partner may be urged to intentionally engage in an undesirable behavior in order to observe the impact that this behavior has on their partner (in a context that is not emotionally intense) and as a means of changing the stimulus properties of the behavior for the partner. Finally, an additional tolerance building exercise involves self-care strategies, designed to encourage partners to avoid seeking fulfillment of all of their emotional needs from the relationship.

Important Directions for Future Research on IBCT

Establishing Efficacy. Although it is a relatively new intervention, IBCT builds on the vast empirical base of TBCT and has promising data to support its efficacy for couple distress. The first published data on the efficacy of IBCT (Jacobson, Christensen, Prince, Cordova, & Eldridge, 2000) suggest that the addition of acceptance strategies may enhance the efficacy of traditional behavior change interventions. Jacobson et al. (2000) randomly assigned 21

couples between the ages of 21 and 60 to receive TBCT or IBCT for a maximum of 26 sessions. TBCT was conducted as outlined in Jacobson and Margolin (1979), and IBCT was conducted using both acceptance and change strategies. Therapist compliance to the treatment protocols was found to be strong, and acceptance interventions were significantly more common in IBCT than in TBCT sessions. Results show that couples receiving IBCT experienced greater increases in marital satisfaction than couples in the TBCT condition, and effect sizes were moderate to large (.62 for husbands and .78 for wives). These results are especially promising considering that two active treatments were compared, and that the sample size was small. Based on the standards outlined by Jacobson & Truax (1991), 80% of IBCT couples experienced clinically significant improvements compared to 64% of the TBCT couples. Moreover, the gains in the IBCT condition were maintained at both 6-month and 1-year follow-up, whereas couples in the TBCT condition showed some relapse between post-test and 1-year follow-up.

Since completion of this pilot research, Christensen and colleagues obtained NIMH funding to conduct a large-scale clinical trial to further investigate the efficacy of IBCT (Christensen, personal communication). In this study, 134 couples with stable and serious marital distress were randomized to either IBCT or TBCT conditions. These investigators used stringent criteria to assess for consistent marital discord at three time intervals prior to treatment. Couples were stratified into moderately distressed and severely distressed groups based on marital satisfaction scores. Couples met with experienced therapists from the community who were trained in both approaches and administered both treatments, minimizing potential allegiance effects. Adherence data showed that the therapists administered the two different treatments according to protocol. These researchers examined the trajectory of marital satisfaction over four time points during therapy (pre, 13 weeks, 26 weeks, final session) and have examined marital satisfaction over 4 follow-up time points (6, 12, 18, and 24 months). Results indicated that the process of change differed during treatment between groups. The trajectory of change in marital satisfaction scores in the TBCT condition showed an initial improvement greater than IBCT, but then slowed and eventually began a downward trend. In contrast, couples in IBCT showed a gradual but steady increase throughout treatment. Overall, IBCT couples were more likely than TBCT couples to experience clinically significant improvements during treatment and to maintain treatment gains at two-year follow-up (Christensen, personal communication).

The promising findings from these early studies support the potential efficacy of IBCT and encourage evaluation of this approach. However, there are still too few studies available to classify IBCT as an efficacious and specific treatment for couple discord. To establish IBCT as an efficacious treatment, guidelines suggest that at least two independent groups of researchers must demonstrate that treatment effects are superior to a no treatment condition. IBCT research to date has been conducted exclusively by the group of researchers who developed the treatment. To move the research on IBCT forward, future studies will need to focus on the replication of existing findings in independent laboratories. To further establish IBCT as a specific treatment, it must also outperform alternative treatment approaches or conditions that control for non-specific features of therapy, such as attention and the expectation of change (Chambless & Hollon, 1998). Although IBCT has outperformed TBCT in one published study showing better treatment effects and clinically significant outcomes, these results were based on a fairly small sample size and did not include a control group condition. It would be helpful to compare IBCT to a no treatment control condition (i.e., waitlist control), as this is one criterion for treatment efficacy. However, it should be noted that IBCT has compared favorably to an established treatment (TBCT) that has outperformed no treatment conditions in numerous studies. In sum, IBCT is perhaps best classified as a *possibly efficacious* treatment at this time (Chambless & Hollon, 1998).

IBCT for difficult to treat couples.

One important issue in efficacy research on IBCT is whether or not this treatment is efficacious for those couples for whom it was originally designed, couples for whom TBCT did not produce significant or lasting improvements. These couples include severely

distressed, older, emotionally disengaged, and non-egalitarian couples, as well as couples in which one or both partners are depressed or have alternative mental health problems. Research is needed to examine whether the addition of acceptance strategies enhances outcomes for couples who do not typically benefit from TBCT or who have traditionally been excluded in treatment outcome studies (i.e., older couples, and couples presenting with domestic violence). Although preliminary studies do appear to support the notion that IBCT may help a larger number of couples than TBCT, it is still unclear whether IBCT is efficacious for those specific types of couples who have not benefited from TBCT. As a first step in addressing this issue, there is a pilot study underway in our laboratory to investigate the feasibility, acceptability, and efficacy of treating depressed older adults and their spouses with IBCT. It is hoped that this study will pave the way for future studies that focus on couples that are traditionally very difficult to treat.

Understanding mechanisms of change.

In contrast to treatment outcome studies that examine whether treatments are efficacious, research on mechanisms of change aims to evaluate whether the process of change is consistent with the theory that underlies the treatment (Jacobson & Addis, 1993). A central premise of IBCT is that acceptance-oriented strategies produce therapeutic change above and beyond the change-based interventions that characterize TBCT. Thus, it is critical to measure the construct of acceptance and to examine whether changes in acceptance occur and are associated with treatment outcome. Findings from comparative studies of IBCT and TBCT provide initial support for this premise. For instance, couples in IBCT conditions received a higher frequency of acceptance-based strategies and, in turn, showed more favorable and longer-lasting treatment responses than couples in TBCT (Christensen, personal communication; Jacobson, et. al, 2000).

Future studies should carefully operationalize the construct of acceptance and elucidate those behavioral indicators that most clearly capture this construct. This will allow researchers to study whether IBCT's interventions are specifically associated with improvements in acceptance, whether these improvements produce meaningful therapeutic changes, and whether the process of therapeutic change in IBCT is distinguishable from that of alternative approaches. As an example of this type of research, Baucom and Epstein (1990) developed cognitive behavioral couple therapy (CBCT) to enhance TBCT by including cognitive strategies to specifically target dysfunctional thought patterns associated with couple discord. It was hypothesized that CBCT would produce a more notable change in attributions and perceptions of partner behavior than TBCT. A meta-analytic study of treatment outcome research indicated that only CBMT (not TBCT) produced significant changes in spouses' post-therapy relationship related cognitions (Dunn & Schwebel, 1995). Similarly, a treatment outcome study found some associations between the type of treatment intervention and the domain of change (Baucom, Sayers, & Sher, 1990). IBCT's acceptance-based interventions are based on a radical behavioral, rather than a cognitive conceptualization of couple discord. Accordingly, IBCT targets broader contextual controlling variables in contrast to CBCT's approach of modifying cognitive factors that give rise to derivative problems (i.e., coercion; Chapman & Dehle, 2002). Although these approaches are clearly distinguishable at the level of theory and practice, research is needed to determine whether they actively target and modify different relationship processes. Such research may involve comparisons of the types of therapeutic changes found with IBCT, CBCT, and TBCT. Whereas TBCT might be expected to result primarily in more skillful communication and problem resolution, IBCT may produce changes primarily in how partners emotionally respond to each other during interactions. For example, if the mechanism of action in IBCT is enhanced acceptance, emotional responses to previously undesirable behavior should be attenuated and behavioral interventions should reflect greater understanding and empathy.

Additional studies are needed to examine whether any specific acceptance intervention (i.e, empathetic joining, unified detachment, and tolerance building) stands out as being necessary or particularly efficacious. There may be certain types of acceptance

interventions that are more globally useful across couples. It is possible that certain strategies are particularly well suited for couples with specific problems or characteristics. As this research progresses, it is likely that the core acceptance strategies currently proposed will be augmented with additional approaches to enhancing acceptance. Furthermore, it is necessary to clarify whether acceptance interventions *alone* constitute the active ingredient for therapeutic success in IBCT. Alternatively, it may be the unique combination, interaction, or order of acceptance *and* change strategies that constitute the driving force behind the beneficial effects of IBCT. Thus, investigations that explore the efficacy of each treatment component and the order of interventions would be a helpful addition to the literature.

The theoretical and pragmatic issues associated with understanding the mechanisms of change in IBCT are challenging. As part of a broader movement toward incorporating the construct of acceptance into treatment, IBCT researchers would benefit considerably from the work that has been done by other researchers in this area. For example, acceptance is a central feature of Acceptance and Commitment Therapy, a radical behaviorally oriented approach designed by Hayes and colleagues (Hayes et al., 1999). Within ACT, it is asserted that *experiential avoidance* is a key controlling variable in the development of psychopathology. Experiential avoidance is defined as behavior that has as its function the avoidance or escape from internal experiences (such as thoughts or emotional responses) or from those situations that elicit them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). From an ACT framework, society reinforces the notion that distress is abnormal and should be eliminated, thus encouraging people to engage in a variety of behaviors (e.g., substance abuse, agoraphobic avoidance, and suicide) that function to terminate or avoid distress. The bi-directional nature of language, whereby an individual can experience distressing events simply by hearing or thinking words associated with such events, makes it very difficult to successfully avoid internal experiences. For example, an agoraphobic individual does not need to be in the mall to feel anxious; he or she can simply think, “mall, large crowds of people” and feel anxious. Further, the verbal rule, “If I stay away from the mall, I will not feel anxious”, contains the very stimuli (“mall”) that are anxiety provoking and to be avoided. ACT interventions are designed specifically to encourage individuals to expand their behavioral repertoires by changing the function of their behavior from experiential avoidance to meaningful, valued action.

The overall goal in IBCT is very similar to that of ACT: to increase valued behavior (i.e., intimacy enhancing and collaborative behavior) and to reduce maladaptive struggles to change partner behavior. Within an ACT framework, it is possible that attempts to change the behavior of a partner may function to avoid uncomfortable emotional reactions to such behavior. If IBCT acceptance strategies facilitate acceptance of such undesired reactions, coercive attempts to produce change would likely be reduced. That is to say, when partners accept their own experience (thoughts, feelings), they are more likely to be able to engage in behaviors that are consistent with their desire to improve their relationships. Therefore, a fundamental mechanism of change in IBCT may involve increasing partners’ acceptance of their own internal or “private” behavior as experienced in the context of the relationship.

In other work on acceptance, Linehan (1993) has developed an approach to therapy, Dialectical Behavior Therapy (DBT), which includes several interventions to enhance acceptance of emotional discomfort. These interventions include mindfulness and distress tolerance skills that emphasize acceptance of the present moment, rather than focusing on past or future events. From a DBT framework, acceptance provides the opportunity to experience non-reinforced exposure to distressing events. Exposure is hypothesized to facilitate the habituation of aversive emotional responses to these events over time. IBCT tolerance building strategies similarly encourage non-reinforced exposure. For instance, the strategy of “faking bad behavior” provides partners with an opportunity to experience undesired behavior without the intense conflict that may typically follow such behavior. When the behavior occurs without ensuing conflict, the recipient essentially experiences a trial of non-

reinforced exposure, which may lead to habituation of his or her emotional responses to the behavior (Christensen & Jacobson, 1995; Koerner et. al., 1994).

The notion of non-reinforced exposure suggests several important future directions for research on the mechanisms of change in IBCT. One way of investigating this potential mechanism of change is to use psychophysiological measurement to determine whether or not partners actually experience decreasing or habituation of emotional responses in response to previously undesired or unaccepted partner behavior. Research in this domain may also examine changes in facial expressions of emotion or changes in self-reported non-acceptance. To support the theoretical underpinnings of IBCT, it must be demonstrated that these changes (a) occur in response to acceptance interventions, and (b) are associated with improved relationship functioning.

Acceptance building through mindfulness training has received increasing attention in behaviorally and cognitive-behaviorally oriented interventions, such as DBT and Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002). Essentially, mindfulness involves non-judgmental awareness of the present moment. The IBCT intervention that perhaps most closely approximates a mindfulness intervention is the acceptance strategy of unified detachment (i.e., treating the problem as an "it"). This intervention involves encouraging partners to discuss the problem as it is, without judgment, thereby reducing their emotional reactions to the problem and facilitating effective problem resolution. Although this is the most obvious place for mindfulness in IBCT, we would argue that interventions such as empathetic joining also encourage non-judgmental awareness of the present. Specifically, when one partner expresses "softer" emotions, the other partner is better able to attend to their emotional expression in an open, non-judgmental fashion. If partners are able to attend mindfully to their interactions, including observing internal reactions and judgments, they may be better able to respond objectively to the interactional process.

In summary, IBCT is a promising new treatment designed to address many of the shortcomings of traditional behavioral couple therapy (TBCT). IBCT's focus on acceptance interventions opens the door for several interesting lines of research and theory that would not otherwise have been considered within the framework of TBCT. As the research and theory on IBCT becomes increasingly sophisticated, refinement of the measurement of acceptance and use of sophisticated methodologies (i.e., physiological measurements of emotion, direct observation of couple processes, "on-line" recording of the experience of acceptance during interactions) to assess the impact of acceptance on therapeutic change will become necessary. In order to further this process, behaviorally oriented couples researchers from diverse labs must utilize their strengths in theory and design to evaluate and expand this unique approach to ameliorating relationship discord.

References

Alexander, J. F., Holtzworth-Munroe, A. & Jameson, P. (1994). The process and outcome of marital and family therapy: Research review and evaluation. In A. E. Bergin & S. L. Garfield (Eds.), *Handbook of psychotherapy and behavior change (*pp. 595—630). New York: Wiley.

Baucom, D. H., & Epstein, N. (1990). *Cognitive-behavioral marital therapy*. New York: Brunner/Mazel.

Baucom, D. H. & Hoffman, J. A. (1986). The effectiveness of marital therapy: Current status and application to the clinical setting. In N. S. Jacobson & A. Gurman (Eds.), *Clinical handbook of marital therapy* (pp. 597—620). New York: Guilford Press.

Baucom, D. H., Sayers, S. L. & Sher, T. G. (1990). Supplementing behavioral marital therapy with cognitive restructuring and emotional expressiveness training: An outcome investigation. *Journal of Consulting and Clinical Psychology, 58*, 636-645.

Baucom, D. H., Shoham, V., Mueser, K. T., Daiuto, A. D., & Stickle, T. R. (1998). Empirically supported couple and family interventions for marital distress and adult mental health problems. *Journal of Consulting and Clinical Psychology, 66*, 53-58.

Bray, J. H. & Jouriles, E. N. (1995). Treatment of marital conflict and prevention of divorce. *Journal of Marital and Family Therapy, 21*, 461-473.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*, 7-18.

Chapman, A. L., & Dehle, C. (2002). Bridging theory and practice: A comparative analysis of Integrative Behavioral Couple Therapy and Cognitive Behavioral Marital Therapy. *Cognitive and Behavioral Practice, 9*, 150-163.

Christensen, A., Jacobson, N. S., & Babcock, J. C. (1995). Integrative behavioral couple therapy. In N. S. Jacobson & A.

S. Gurman (Eds.), *Clinical handbook of couple therapy* (pp. 31-64). New York: Guilford Press.

Dunn, R. L., & Schwebel, A. I. (1995). Meta-analytic review of marital therapy outcome research. *Journal of Family Psychology, 9,* 58-68.

Gottman, J. M. (1980). Consistency of nonverbal affect and affect reciprocity in marital interaction. *Journal of Consulting and Clinical Psychology, 48,* 711-717.

Halford, W. K., Sanders, M. R., & Behrens, B. C. (1993). A comparison of the generalization of behavioral marital therapy and enhanced behavioral marital therapy. *Journal of Consulting and Clinical Psychology, 61*, 51-60.

Hahlweg, K., & Markman, H. J. (1988). Effectiveness of behavioral marital therapy: Empirical status of behavioral techniques in preventing and alleviating martial distress. *Journal of Consulting and Clinical Psychology, 56,* 440-447.

Hahlweg, K., Revenstorf, D. & Schindler, L. (1982). Treatment of marital distress: Comparing formats and modalities. *Advances in Behavior Research and Therapy, 4*, 57-74.

Hayes, S.C. (1986). The case of the silent dog—verbal reports and the analysis of rules: A review of Ericsson and Simon's Protocol Analysis: Verbal Reports as Data. *Journal of the Experimental Analysis of Behavior, 45*, 351-363.

Hayes, S. C., Brownstein, A. J., Zettle, R. D., Rosenfarb, I., & Korn, Z. (1986). Rule-governed behavior and sensitivity to changing consequences of responding. *Journal of the Experimental Analysis of Behavior, 45*, 237-256.

Hayes, S. C., Hayes, L. J., & Reese, H. W. (1988). Finding the philosophical core: A review of S. C. Pepper's *World hypotheses. Journal of the Experimental Analysis of Behavior, 50,* 97-111.

Hayes, S. C.; Wilson, K. G.; Gifford, E. V.; Follette, V. M., & Strosahl, K. D. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting & Clinical Psychology, 64,* 1152-1168.

Hayes, S. C., Strosahl, K. D., & Wilson, K. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change.* New York: Guilford

Holtzworth-Monroe, A., Jacobson, N. S., DeKlyen, M., & Whisman, M. A., (1989). Relationship between behavioral martial therapy outcome and process variables. *Journal of Consulting and Clinical psychology, 57,* 658-662.

Jacobson, N. S. (1997). Can contextualism help? *Behavior Therapy, 28,* 435-443.

Jacobson, N.S., & Addis, M. E. (1993). Research on couples and couple therapy: What do we know? Where are we going? *Journal of Consulting and Clinical Psychology, 61,* 85-93.

Jacobson, N. S., & Christensen, A. (1996). *Integrative Couple Therapy.* New York: W.W. Norton.

Jacobson, N. S., Christensen, A., Prince, S. E., Cordova, J., & Eldridge, K. (2000). Integrative behavioral couple therapy: An acceptance-based, promising new treatment for couple discord. *Journal of Consulting and Clinical Psychology*, 68, 351-355.

Jacobson, N. S., Follette, W. C. & Pagel, M. (1986). Predicting who will benefit from behavioral marital therapy. *Journal of Consulting and Clinical Psychology, 54*, 518-522.

Jacobson, N. S., Fruzzetti, A. E., Dobson, K., Whisman, M. & Hops, H. (1993). Couple therapy as a treatment for depression II: The effects of relationship quality and therapy on depressive relapse. *Journal of Consulting and Clinical Psychology, 61*, 516-519.

Jacobson, N. S., & Margolin, G. (1979). *Marital therapy: Strategies based on social learning and behavior exchange principles.* New York: Brunner/Mazel.

Jacobson, N. S., Schmaling, K. B., & Holtzworth-Monroe, A. (1987). Component analysis of behavioral marital therapy. Two-year follow-up and prediction of relapse. *Journal of Marital and Family Therapy, 13,* 187-195.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting & Clinical Psychology, 59*, 12-19.

Kohlenberg, R. J., & Tsai, M. (1991). *Functional analytic psychotherapy.* New York: Plenum.

Koerner, K., Jacobson, N.S., & Christiansen, A. (1994). Emotional acceptance in integrative behavioral couple therapy. In S.C. Hayes, N.S. Jacobson, V.M. Follette, & M.J. Dougher (Eds.), *Acceptance and change: Content and context in psychotherapy* (pp. 109-118). Reno, N.V.: Context Press.

Linehan, M. M. (1993). *Cognitive behavioral treatment of borderline personality disorder.* New York: Guilford.

Segal, Z. V., Williams, J. M. G. & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* (New York: Guilford Press)

Shadish, W. R., Montomery, L. M., Wilson, P., Wilson, M. R., Bright, I. & Okwumabua, T. (1993). Effects of family and marital psychotherapies: A meta-analysis. *Journal of Consulting and Clinical Psychology, 61*, 992-1002.

Skinner, B. F. (1969). *Contingencies of reinforcement: A theoretical analysis.* New York: Appleton-Century-Crofts.

Snyder, D. K., Mangrum, L. F., & Wills, R. M. (1993). Predicting couples' response to marital therapy: A comparison of short- and long-term predictors. *Journal of Consulting and Clinical psychology, 61,* 61-69.

Snyder, D. K., Wills, R. M. & Grady-Fletcher, A. (1991). Long-term effectiveness of behavioral versus insight-oriented marital therapy: A 4-year follow-up study. *Journal of Consulting and Clinical Psychology, 59*, 138-141.

Zettle, R. D., & Hayes, S. C. (1982). Rule-governed behavior: A potential theoretical framework for cognitive-behavioral therapy. In P. C. Kendall (Ed.), *Advances in cognitive-behavioral research and therapy* (pp. 73-118). New York: Academic Press.

THE "EARLY RISERS" FLEX PROGRAM: A FAMILY-CENTERED PREVENTIVE INTERVENTION FOR CHILDREN AT-RISK FOR VIOLENCE AND ANTISOCIAL BEHAVIOR

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We provide a public health prevention context for reviewing the Early Risers "Skills for Success" Program. The program is presented as the prototype of a theory-driven, developmental approach to the prevention of antisocial behavior in elementary school-aged children who display early aggressive behavior complicated by skill deficits in academic and social functioning. Early Risers is compared to other targeted prevention programs, and the benefits of its flexible family support component (FLEX) are discussed in relation to its standardized education and skills training component, CORE. Following an outline of the FLEX implementation procedures, the program's empirical bases are reviewed. We conclude by candidly discussing some pragmatic research challenges associated with tailoring interventions to family's assessed needs.

The public health approach to prevention seeks to decrease base rates of violence in the general population. When applied to youth in the general population, this is a universal intervention approach. Applied to youth at higher degrees of risk, this is considered a selective or indicated intervention approach (Munoz, Mrazek, & Haggerty, 1996). Interventions used to achieve universal prevention goals typically focus on enhancing protective factors in the general population in order to buffer low-risk youth from deviant influences that might encourage antisocial behavior. Examples of interventions designed to achieve universal prevention include media-based public health messages, school-wide discipline policies, and classroom curricula that teach conflict resolution, anger management, assertiveness, and self-management skills.

However, the universal approach is less appropriate for high-risk youth who display a life-course persistent pattern of aggressive behavior associated with academic problems, socioemotional skill deficits, damaged peer relationships, and harsh and ineffective parenting practices (Moffitt, 1993). These high-risk youth require targeted (i.e., selective or indicated) preventive interventions. These interventions include early initiation to prevent crystallization of troublesome behaviors and a comprehensive focus that targets risk and protective factors across multiple systems of influence. These interventions also require an extended duration in which to provide protection through multiple stages of risk.

A number of targeted preventive-interventions are currently in various stages of empirical validation, including Early Risers (August, Realmuto, Hektner, & Bloomquist, 2001), Early Alliance (Dumas, Prinz, Smith, & Laughlin, 1999), Fast Track (Conduct Problems Prevention Group, 1999; 2002), Linking the Interests of Families and Teachers (LIFT: Reid, Eddy, Fetrow, & Stoolmiller, 1999), the Baltimore Developmental Epidemiologists Project (Kellam, Rebok, Ialongo, & Mayer, 1994), Seattle Social Development Project (Hawkins, Catalano, Kosterman, Abbott, & Hill 1999), and the Montreal Longitudinal-Experimental Program (Tremblay, Pagani-Kurtz, Masse, Vitaro, & Pihl, 1995). Although these programs share a common perspective on the developmental pathways that high-risk children traverse, they differ in the emphasis given to various program components designed to meet public health goals.

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The Early Risers "Skills for Success Prevention Program

The Early Risers "Skills for Success" Program is a prototype of a theory-driven, developmental approach to the prevention of violence and antisocial behavior. This program is designed for elementary school-aged children whose risk is indicated by a constellation of aggressive, oppositional and disruptive behavior. Implementation requires two years of intensive intervention with an optional year of booster intervention. The program can be implemented in a variety of community venues, including, schools, community and faith centers. The intervention design includes a coordinated set of child- (CORE) and parent/family-focused (FLEX) intervention components that map onto the early-starter model of antisocial behavior (Moffit, 1993; Patterson, DeBaryshe, & Ramsey, 1989). These components are crafted with needs assessment technologies that allow tailoring of the intervention content and intensity to match the unique characteristics of individual families. CORE consists of a set of evidence-based developmental skills curricula fused with a technology of behavioral support procedures that seek to ameliorate *child-level* risk by promoting competence in social skills, academic achievement and school bonding, as well as behavioral self-regulation. The CORE package includes (a) a 6-week Summer School experience, (b) a "Check & Connect" School Engagement Program, and (c) a Family Program that consists of parenting education and skills delivered concurrently with child social skills training groups. Detailed descriptions of these child-focused components can be founded elsewhere (see August, Realmuto, Winters, & Hektner, 2001).

Targeting Family Stress in Prevention

The Early Risers Program departs from other targeted prevention programs in its approach to family sources of risk to the child. As one of the important systems that envelop the at-risk child early in life, the family system requires special attention in a comprehensive prevention approach. This is particularly true in economically disadvantaged communities where the quality of family life is threatened by poverty, substandard living conditions, single parent households, neighborhood drug trafficking and violence, and social isolation. In a context of chronic stress, caregivers can become easily frustrated and demoralized (Conger, Patterson, & Ge, 1995; Conger et al., 2002, leading to a variety of unhealthy behaviors and practices such as drug use and abuse (Jacobs et al., 2001), depression (Petterson & Albers, 2001), marital strife (Duncan, 1994), and health impairments (Repetti, Taylor, & Seeman, 2002). These family stressors adversely impact parents' coping abilities, resource management, and parenting skills (McLoyd, 1998). Without the important stabilizing forces parents provide, a child's socialization is imperiled. The result is a challenge to the child's sense of security and capacity for emotion regulation, decreasing the likelihood that the child will successfully internalize prosocial standards of behavior, progress toward autonomy and individuation, and achieve developmentally-appropriate milestones (Davies & Cummings, 1994).

Precisely because family stress constricts family coping, adaptation, and resource management (Garrison & Hira, 1992) extrafamilial support is needed to leverage families' strengths as they seek to cope and adapt. Thus, preventive interventions need to rise to the challenge of devising effective family support strategies that operate to empower caregivers to address family members' needs across the multiple contexts that influence their lives. To this end, we developed our FLEX component to function as an extrafamilial brace.

The FLEX Family Support Component: Conceptual Foundations

The principles and strategies of FLEX were derived from a family-centered systems approach (Illback, 1994). Five basic tenets of the family-centered orientation are embodied in the FLEX component. These include (a) interventions are tailored to the specific needs and preferences of family members, (b) needs are addressed by building family strengths and competence, rather than focusing exclusively on repairing deficits, (c) parents function as active participants in promoting their own health, (d) the locus and management of services are grounded in a strong culturally-competent community-base; and (e) services are oriented toward the full participation and empowerment of family members such that they attribute change in part to their own efforts.

To respond to these tenets FLEX evolved over time to become a risk-adjusted family support, consultation, and empowerment intervention that is individually tailored to address unique sources of parent, child, and family needs. FLEX is delivered via home visitation. It includes a deliberate process of family and child needs assessment and assets appraisal, initiates further asset building through strategic goal setting, and accesses formal and informal community resources and services through a negotiated contract with the participants. The incipient goal of FLEX is to reduce *parent/family-level* risk by remedying the conditions that produce or perpetuate stress in the lives of families and adversely affect the parents' capacity to nurture and support their child's healthy development.

The FLEX Family Support Program: Implementation Procedures

FLEX is implemented in four iterative phases: (a) assets appraisal and needs assessment, (b) goal setting and strategic planning, (c) provision of brief interventions, allocation of resources, and brokering of specialized services, and (d) monitoring of progress toward identification and goal attainment, reevaluation of needs and goals and appraisal of the intervention, resources, and services utilization.

Phase 1: During the first year of intervention, the Early Risers' primary service provider (i.e., family advocate) schedules home visits with individual families. Initially the intent is to orient the family to the Early Risers Program, but ultimately the goal is to form a trusting alliance that will provide a foundation for a productive working relationship. At a time deemed appropriate, the family advocate administers a semi-structured interview that collects information about the child, parent, and family assets and risks. A major function of the interview is to assist parents in identifying strengths and needs that will subsequently be used to help motivate the family to pursue positive change. The interview includes two sections, the CH-ART (Child Assets and Risks Tool) and the P-ART (Parent Assets and Risks Tool). Each section consists of screening questions within a number of functional domains. Information taken from the interview is reviewed by the family advocate and FLEX supervisor. Related domains are clustered within three target areas: (a) basic living needs, (b) personal health and family functioning, and (c) quality of parenting practices. The CH-ART and P-ART are re-administered on an annual basis. Based on the assessed level of functioning in each target area, families are placed into four categories of need. "No need" families express few if any domestic or practical living needs, have no serious health or family problems, are knowledgeable about basic principles of child development, and are using effective parenting practices. Such families receive annual monitoring but no formal service. "Low need" families report no significant problems with basic living needs and have no health or family problems, but do express difficulties managing their child's behavior. Family advocates are required to contact these families at quarterly intervals during the year. Families identified to be in the "moderate need" category are contacted by their family advocate on a monthly basis. The family advocate and parents engage in collaborative problem-solving that facilitates the identification of solutions and assists the family in accessing informal systems of community support, while encouraging the family to set goals that center on assuring that their domestic needs are met and that crises are avoided. "High need" families are those who are experiencing acute difficulties in one or more health or family-related domains, such as imminent eviction from homes, impending unemployment, recent separation/divorce, depression, and substance abuse. The family advocate provides these families with contact on an as-needed basis and directly connects families to county or community resources that stabilize health and family problems or terminates crises. The successful family advocate is facile in interacting with community-wide collaborative systems of care and has developed a relationship with the family that allows openness to receiving care. The successful family advocate is also perceptive about fluctuations in stress and adaptation. They have an ability to identify crises early in order to prevent the demoralization that accompanies chronic dysfunction. Excellent communication skills are needed to convey to the family, supervisor, and appropriate community agency the urgency of the situation that is creating or continuing the crisis.

Phase II: Once a family's level of need has been determined, the family advocate

encourages family members to set goals and develop action plans for goal attainment. Goal-setting is a collaborative-consultative process in which the family advocate works with families to select goals that are compatible with their profile of need. Every effort is made to listen to family circumstances and to draw out a goal relevant to a parent's perceived needs and wishes. Parents are viewed as important partners who take responsibility for deciding what is most important and in their families' best interests. The family advocate discusses the goal so that the boundaries of parent and family advocate are established. Timelines and endpoints are also discussed and negotiated. The foundation of an iterative process is emphasized, including goal setting, reviewing efforts toward goal attainment, evaluating strategies utilized, and appraising outcomes.

Phase III: During this phase of the FLEX intervention the family advocate seeks to facilitate the action plan established by the family. Action plans will vary considerably depending on a family's assessed level of need and its corresponding goals. For example, a "low need" family may set a goal that focuses on improving a child's behavior at home, noting difficulties such as child noncompliance or oppositional and defiant behaviors. The family advocate may recommend a brief intervention that addresses effective behavior management procedures. Additionally, the intervention may include reading materials or interactive sessions that address validated strategies for managing child behavior. When more serious behavioral difficulties are identified, the family advocate will work with the family to receive specialized service from an appropriate health care professional in the community. A "high need" family may be financially strapped by unemployment of the primary caretaker. In addition to providing emotional support, the family advocate may assist the family in efforts to find gainful employment by collaborating in resume writing, searching employment opportunities in the newspaper, or contacting a community employment service.

Phase IV: A variety of methods are used to actualize goal attainment. The goals are matched to a plan that is reviewed regularly. Plans developed to achieve goals may involve active participation by the family advocate, such as accompanying a parent to a governmental or social service agency or less active efforts such as discussing the pros and cons of a current job. These actions grow out of specific knowledge of the family and community systems by the family advocate that assists in collaborating on strategies for resource management and acquisition. Responsibilities for executing the plan are defined for parents and family advocates and are another part of the FLEX system. Clearly drawing boundaries around roles and responsibilities is necessary so that accountability is clear and misgivings are avoided. Monitoring of progress is therefore ongoing, interactive and dynamic. Goals can be reviewed and realigned to more pressing needs as families come to better understand through this interactive process what is most important to their welfare. The family advocate monitors and reevaluates the adequacy of resources both family-based as well as formal and informal community resources. All relevant and appropriate resources are considered in the pursuit of goal attainment. Through this system, families may begin to learn the process of goal achievement through the steps of stating a goal, developing a plan, marshaling resources, applying effort and considering the outcome.

Finally, there is a systematic collection of data related to services utilization and the advocate's time investments in the family. These data are helpful in determining where program resources are being expended. Further analyses of these data can help identify the characteristics of families whose use of FLEX time has proven effective in improving parent functioning and child outcomes.

The Early Risers "Skills for Success Program": Empirical Bases

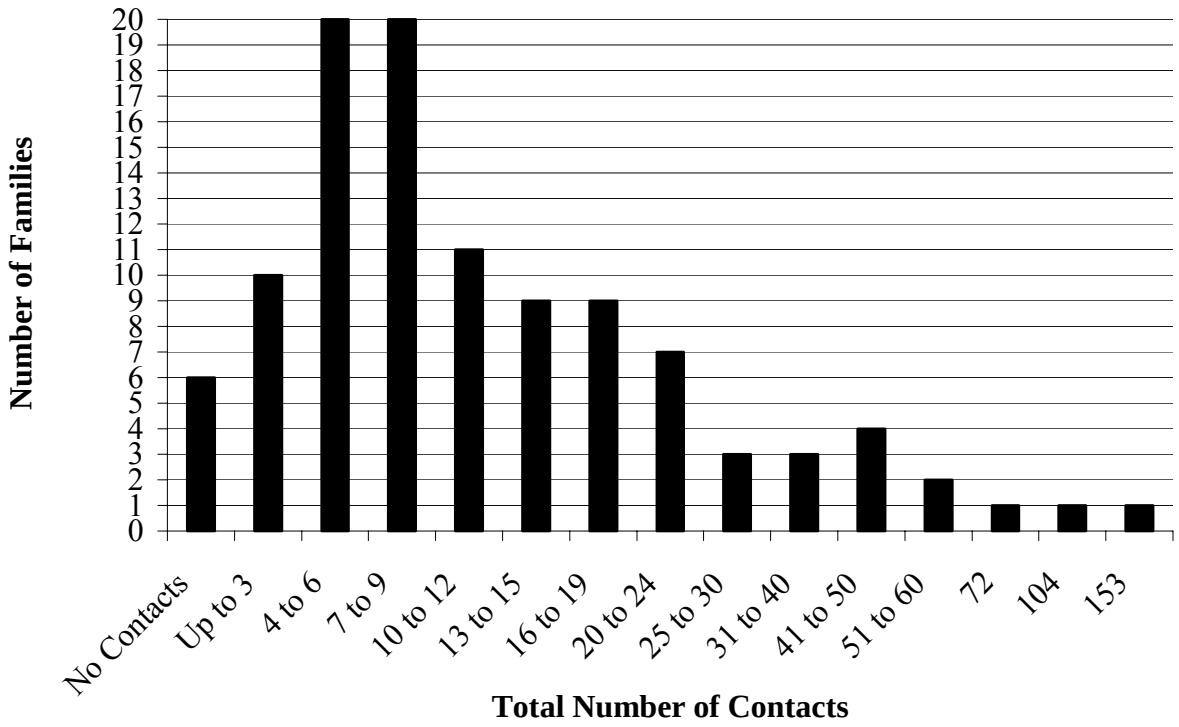
The efficacy of the Early Risers "Skills for Success" Program, including CORE and FLEX components, was demonstrated with a well-characterized sample of aggressive children in a prospective longitudinal study using a randomized control-group design. The study was conducted in semi-rural communities with primarily Caucasian children. Following two years of intervention, high risk program children, as compared to controls, made significant gains in academic achievement and classroom behaviors (August, Realmuto, Hektner, et al., 2001). Only the most severe aggressive children showed reductions in aggressive, impulsive, and hyperactive behaviors. Parents of program children, who

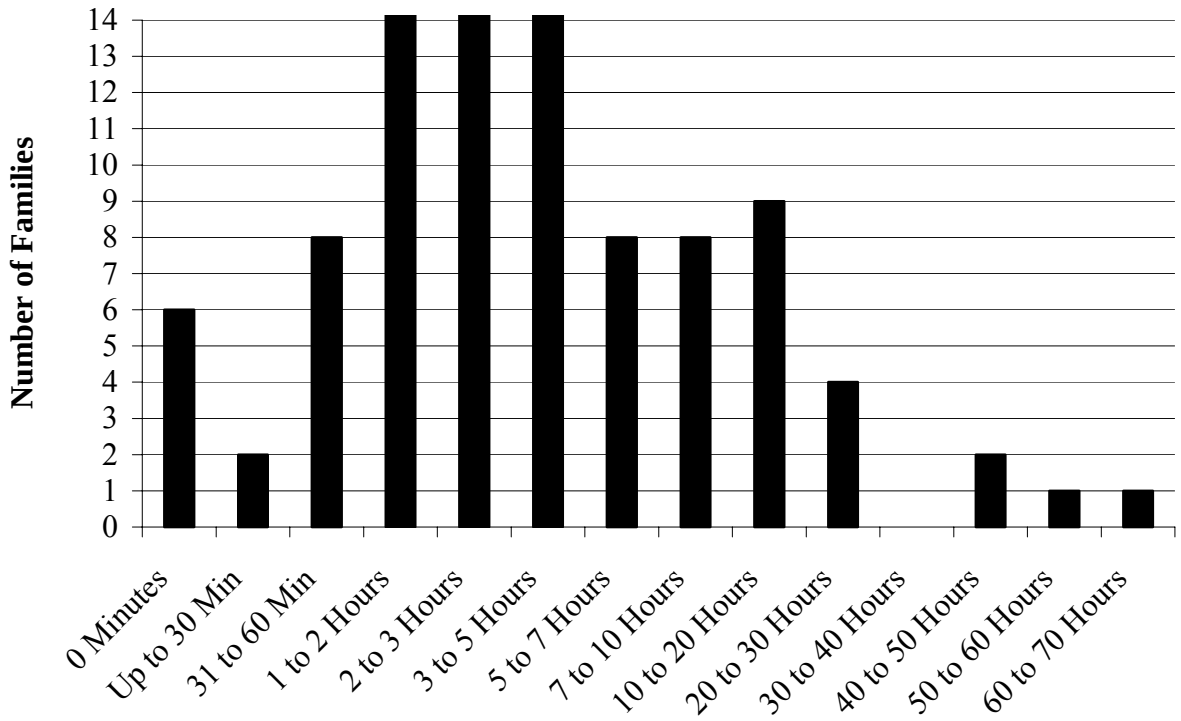
attained recommended levels of participation, reported improved discipline practices and reduced stress. These effects were maintained following a third year of intervention and complemented by gains in social skills and social adaptability (August, Hektner, Egan, Realmuto, & Bloomquist, in press).

Similar program effects were subsequently replicated in a small-scale effectiveness trial when implemented by urban neighborhood family resource centers with a sample of aggressive African-American children (August, Lee, Bloomquist, Realmuto, & Hektner, 2002). Program children, as compared to randomized controls, made significant gains in social competence and school adjustment. Only the most severely aggressive children displayed reductions in externalizing behavior problems. In general, these studies demonstrated the impact of the full strength Early Risers intervention model on children's competence variables.

In subsequent studies we have begun to explore various process parameters (e.g., rates of participation across components) that explain how each of the individual Early Risers intervention components worked for subgroups of participants. It is highly probable that families recruited for participation in a multicomponent preventive intervention (and not necessarily help-seeking), and offered a menu of intervention components, self-select which components to participate in. Moreover, it may be that participation in certain components is crucial for a program's success while participation in other components yields no significant gains for certain types of families. In a recent reanalysis of three-year program effects we explored several questions aimed at understanding the relationship of family needs, FLEX utilization, and program outcomes. Presented below in Figures 1 and 2 are data that illustrate the number of FLEX contacts between families and their family advocates and the amount of FLEX time received by families over a 30 month period. A contact could be either a telephone call, a scheduled meeting at the program office, or a personal home visit. Time was measured as the total number hours accumulated across all contacts. As expected, our needs-adjusted FLEX protocol produced considerable variability across families both in the number of contacts made by family advocates and the amount of FLEX time received by families.

Figure 1. Frequencies of total number of FLEX





contacts.
Figure 2. Frequencies of total amount of FLEX time received.

It was anticipated that that higher need families (levels 3 and 4), with significant health and quality of life difficulties (e.g., depression, substance abuse, marital discord, unemployment, social insularity) would be contacted more frequently by their family advocates and thus receive a larger portion of FLEX time and effort, since the need for these families has been identified as being greater than low need families (levels 1 and 2). As a validation test of this expectation, we independently distinguished our families in terms of ratings of parent global assessment of functioning (GAF). The GAF scale ranks an individual (low to high) from 1 to 100 based on degree of psychopathology, quality of adaptive functioning, and stability of resources. Scores of 71 or higher are considered consistent with effective and fruitful lives and the groups were divided at this cut point. Contrary to expectation, we found that high and low functioning families received equal amounts of FLEX time. Interestingly, high and low functioning families used their time in different ways. As expected, in lower functioning families, the family advocate devoted considerable time and effort addressing basic living needs and parental health problems through a series of crisis interventions. In contrast, in higher functioning families the child's welfare was the focus of FLEX time. When the effects of other Early Risers intervention components were controlled, we found that children from high functioning homes made greater gains in social competence as participation time in FLEX increased. We further found that linked to the child's improvement was a decrease in the parent's stress. There was no relationship between rates of participation and social competence in children from low functioning homes.

To better understand the relationship between the child's social competence and level of parent functioning we evaluated possible mediators of this relationship. We speculated that a child's social competence might be influenced by some aspect of the parent-child relationship that resulted from the FLEX intervention. We tested parent nurturance as a possible mediator of this relationship. We found that for the high functioning group, parent nurturance as rated after two years of intervention was responsible for the relationship

between FLEX time spent on parent's social functioning in year 1 and child social competence assessed in year 3. For high functioning parents, increased FLEX time spent on their own social functioning in the first year accounted for increases in nurturance in the second year which led to increases in child social competence in the third year after controlling for baseline levels of child social competence. These relationships did not hold up for the low functioning group. We speculate that the enhancement of parent social functioning through FLEX resulted in a cascade of forces that fostered child social competence for the high functioning group. None of these forces came into play with the low functioning group. FLEX served as a mechanism by which family advocates could bring into focus the domain of social competence for the parent with consequent advantages for the child within the high functioning families.

The FLEX Family Support Component: Challenges and Quandaries

The FLEX system of tailored care to families of children at high risk is a complicated intervention component. To some extent, it has roots in the case management paradigm of clinic-based treatment rather than community-based preventive interventions. As such, defining which services are needed and how they would be negotiated defies application of predetermined prescription generalizable to all families. Rather it encompasses a client-centered approach with variable prescription based on the unique matrix of needs and strengths of each individual child and his/her family. The unique service delivery system of FLEX may overcome participation and engagement problems encountered in more standardized intervention components where a "one size fits all" approach is utilized. With FLEX, intervention services are individually tailored in response to an ongoing assessment of family strengths, needs, and the practical, motivational, and disability-based barriers to child participation. Ultimately, the FLEX component offers different services to different subgroups in prevention programs with different proximal but similar outcome goals.

References

August, G. J., Hektner, J. M., Egan, E. A., Realmuto, G. M., & Bloomquist, M. L. (in press). The Early Risers longitudinal prevention trial: Examination of three-year outcomes in aggressive children with intent-to-treat and as-intended analyses. *Psychology of Addictive Behaviors*.

August, G. J., Lee, S. S., Realmuto, G. M., Bloomquist, M. L. & Hektner, J. M. (2002) *Dissemination of an evidence-based prevention innovation for aggressive children living in culturally diverse, urban neighborhoods: The Early Risers effectiveness study*. Manuscript submitted for publication.

August, G. J., Realmuto, G. M., Hektner, J. M., & Bloomquist, M. L. (2001). An integrated components preventive intervention for aggressive elementary school children: The Early Risers program. *Journal of Consulting and Clinical Psychology, 69*, 614-626.

August, G. J., Realmuto, G. M., Winters, K. C. & Hektner, J. M. (2001). Prevention of adolescent drug abuse: Targeting high-risk children with a multifaceted intervention model - The Early Risers "Skills for Success" program. *Applied and Preventive Psychology, 10,* 135-153.

Conduct Problems Prevention Research Group (1999). Initial impact of the Fast Track prevention trial for conduct problems: I. The high-risk sample. *Journal of Consulting and Clinical Psychology, 67*, 631-647.

Conduct Problems Prevention Research Group (2002). Evaluation of the first 3 years of the Fast Track prevention trial with children at high risk for adolescent conduct problems. *Journal of Abnormal Child Psychology, 30*, 19-35.

Conger, R. D., Patterson, G. R., & Ge, X. (1995). It takes two to replicate: A mediational model for the impact of parents' stress on adolescent adjustment. *Child Development, 66*, 80-97.

Conger, R. D., Wallace, L. E., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. H. (2002). Economic pressure in African American families: A replication and extension of the family stress model. *Developmental Psychology, 38*, 179-193.

Davies, P. T., & Cummings, E. M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin, 116*, 387-411.

Dumas, J. E., Prinz, R. J., Smith, E. P., & Laughlin, J. (1999). The Early Alliance prevention trial: An integrated set of interventions to promote competence and reduce risk for conduct disorder, substance abuse, and school failure. *Clinical Child and Family Psychology Review, 2*, 37-53.

Duncan, S.W. (1994). Economic impact of divorce on children's development: Current findings and policy implications. *Journal of Clinical Child Psychology, 23*, 444-457.

Garrison, M. E. & Hira, T. K. (1992). The effects of daily hassles, reported managerial behavior, family adaptability and cohesion on family health. *Family Perspective, 26*, 361-382

Illback, R. J. (1994). Poverty and the crisis in children's services: The need for services integration. *Journal of Clinical Child Psychology, 23*, 412-424.

Jacobs, E. Joffe, A., Knight, J. R., Kulig, J., Rogers, P. D., Boyd, G. M., Czechowicz, D., Siomkin, D., & Smith, K. (2001). Alcohol use and abuse: A pediatric concern. *Pediatrics, 108*, 185-189.

Kellam, S. G., Rebok, G. W., Ialongo, N., & Mayer, L. S. (1994). The course and malleability of aggressive behavior from early first grade into middle school: Results of a developmental epidemiologically-based prevention trial. *Journal of Child Psychology and Psychiatry, 35*, 359-382.

McLoyd, V.C. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53,* 185-204.

Moffit, T. E. (1993). Adolescent-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674-701.

Munoz, R. F., Mrazek, P. J., & Haggerty, R. J. (1996). Institute of Medicine report on prevention of mental disorders: Summary and commentary. *American Psychologist, 51*, 1116-1122.

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). An early starter model for Predicting delinquency. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 139-165), New Jersey: Lawrence Erlbaum.

Petterson, S. M., & Albers, A. B. (2001). Effects of poverty and maternal depression on early child development. *Child Development, 72,* 1794-1813.

Reid, J. B., Eddy, J. M., Fetrow, R. A., & Stoolmiller, M. (1999). Descriptive and Immediate impact of preventive intervention for conduct problems. *American Journal of Community Psychology, 27,* 483-517.

Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*, 330-366.

Tremblay, R. E., Pagani-Kurtz, L., Masse, L. C., Vitaro, F., & Pihl, R. O. (1995). A bimodal preventive intervention for disruptive kindergarten boys: Its impact through mid-adolescence. *Journal of Consulting and Clinical Psychology, 63*, 560-568.

FUNCTIONAL ANALYTIC REHABILITATION: A CONTEXTUAL BEHAVIORAL APPROACH TO CHRONIC DISTRESS

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The chronic distress many consumers experience may be a result of perpetuating factors associated with lifestyle rather than with the signs and symptoms associated with a formal diagnosis. Frequently, these individuals require a highly structured treatment environment to maximize contact with the contingencies associated with effective illness management and social skills. Functional Analytic Rehabilitation (FAR) is a behavioral approach which keeps consumers in contact with relevant contextual factors as they participate in traditional curriculum-based interventions (e.g., UCLA and DBT skills training). Thus, the program is organized with the goal of creating a functional similarity with real-life environments. As a result, behavioral momentum is developed to maintain social effectiveness and to overcome the numerous disincentives to participating in community-based activities.

The present paper outlines a treatment approach, Functional Analytic Rehabilitation (FAR), which creates a treatment context in which persons who experience chronic distress learn to cope more efficiently in social settings. The term "chronic distress" refers to a state in which individuals, in response to psychiatric symptoms, create lifestyles that inadvertently perpetuate and even amplify their problems. These persons often develop an inflexible and ineffective interpersonal style, marked by the avoidance of aversive emotional states, which they apply across multiple social roles and situations. The short-term relief from aversive emotional states via experiential avoidance (Hayes, Strosahl, & Wilson, 1999; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) obscures the aversive but slow and cumulative consequences.

Individuals experiencing chronic distress can be found across numerous diagnostic categories. In fact, this condition is better understood from the contextual perspective than that of a formal psychiatric diagnosis (Hayes & Follette, 1992).

Traditional day-treatment approaches to rehabilitation tend to have limited benefits for persons experiencing chronic distress (e.g., Linehan, 1993). Most such programs tend to focus on manualized topographical skills training and less so on the contextual factors associated with the expression of a particular illness. Despite efforts to promote the generalization of newly acquired skills via the use of homework exercises and joint planning with ancillary workers and/or family members, minimal direct intervention occurs within relevant contexts (e.g., in the residential facility, home; Heinssen, Liberman,& Kopelowicz, 2000).

Manual-based treatments generally follow a specified sequential outline in order to increase treatment fidelity. In contrast, principle-based interventions have more flexibility because they are able to respond to particular consumer needs in the moment (Miller & Rathus, 2000). FAR takes into account the contextual factors (i.e., discriminative, eliciting and reinforcing stimuli) relevant to skills acquisition and generalization, combining the strengths of both manual-based and principle-based interventions in order to promote effective living for multi-problem, treatment-refractory consumers. It thus attempts to provide a functionally relevant context for optimizing manual-based therapies (e.g., UCLA skills training modules) using principle-based interventions. FAR draws heavily upon radical behavioral assumptions and in particular, applies principles of Functional Analytical Psychotherapy (FAP; Kohlenberg, Hayes &

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Tsai, 1993; Kohlenberg and Tsai, 1991; Hayes, Kohlenberg, & Melancon, 1989) to the broader context of the rehabilitation treatment milieu. FAR has been extended to conditions as diverse as schizophrenia, borderline personality disorder, and recurrent major depression.

THEORETICAL ASSUMPTIONS

Fundamental Components of FAP

A brief overview of FAP will serve to familiarize the reader with concepts used in FAR. FAP is a radical behavior psychotherapy that focuses on the moment-to-moment interactions between the therapist and the consumer occurring in the therapy room. FAP therapists track verbal behavior (Skinner, 1957) in order to identify clinically relevant behaviors. Consumer verbalizations about events occurring either outside or inside the office are always considered in light of their implications for the ongoing relationship between therapist and consumer.

The concept of Clinically Relevant Behaviors (CRBs) is central to an understanding of FAP. Kohlenberg and Tsai (1991) outline three types of CRBs: a CRB1 is an ineffective behavior that interferes with successful living; a CRB2 is an effective behavioral alternative that leads to increased success in living; and a CRB3 is a behavioral interpretation of the context of a behavior. The FAP therapist basically serves three functions in the therapy session, that of a discriminative, an eliciting and a reinforcing stimulus. The therapist acts as an eliciting stimulus of consumer respondent behavior, a discriminative stimulus for operant behavior, and a reinforcing stimulus for effective behavior. In serving these functions, Kohlenberg and Tsai have outlined five tasks that increase the likelihood that a therapist will effectively influence consumer behaviors: She is to be vigilant to CRB1s; create an interpersonal context that will evoke CRBs; reinforce instances of CRB2s; be aware of the relationship between therapist behavior and CRBs; and, finally, interpret controlling variables that influence consumer behavior.

Theoretical Assumptions of Contextual Behaviorism

FAR is grounded in many of the assumptions associated with both radical and contextual behaviorism (Kohlenberg & Tsai, 1991; Skinner, 1957; Hayes, 1991). It assumes that all behavior, whether public or private (e.g., thoughts), has its origins in the environment. The contingencies associated with these behaviors are assumed to shape as well as to maintain their occurrence.

From a FAR perspective, behavior is best understood via a description of the context in which it occurs, including both its setting and consequences (Hayes, 1991). These contextual factors may be either public or private. They may also be either immediate or remote in time. Behavior is most effectively influenced when the contextual factors associated with its performance are present. Thus, in the rehabilitation setting, when target behaviors are present, the treatment team assumes that the current situation possesses a functional similarity to an individual's natural environment. That is, the discriminative and/or eliciting stimuli for identified problem behaviors occurring in natural settings are assumed to be present in the treatment context. At the moment that the problem behavior occurs, the treatment milieu shares features with the person's real-life situation. The treatment team conceptualizes behavior in the milieu using explanations or interpretations that involve a description of the "controlling variables" of target behavior. These variables consist of the public and/or private, remote and/or immediate events that exert influence on current behavior (Kohlenberg & Tsai, 1991).

FAR: RATIONALE

Persons who experience chronic distress behave in ways that are functional in their current environments but that tend to perpetuate their individual malaise (Hayes, 1999). Influencing change requires a highly structured environment that keeps the individual in contact with contingencies that reinforce effective living. Weekly psychotherapy may not provide adequate behavioral momentum for effective behaviors to endure in natural settings (Linehan, 1993). Functional Analytic Rehabilitation creates a context within which traditional manualized skills training treatment strategies (e.g., Psychosocial Rehabilitation [PSR], Dialectic Behavior Therapy [DBT]) can work more successfully for chronically distressed persons. Traditional rehabilitation and behavior therapies (e.g., PSR, DBT) combine two separate activities: skills training and individual

therapy. FAR extends behavioral influence beyond the therapy hour (i.e., beyond interventions such as skills group and individual therapy) to the broader social context of the treatment milieu. Rather than being a therapy approach used by individual therapists or case managers, FAR is a therapy approach adopted by all staff in the milieu. Therefore, the treatment environment in FAR performs some of the same functions as the individual psychotherapist does in FAP.

FAR attempts to address many of the unique factors associated with persons experiencing chronic distress. For example, Docherty and Hebert (1997) found that persons with severe mental illness show poor overall recognition of facial affect. Nonetheless, these same individuals appeared to be highly sensitive to what Docherty and Hebert called "arousing affect" (e.g., fear and anger), despite poor comprehension. This research suggests an association between social cues involving negative affect, increased physiologic arousal and disturbed communication. Thus, individuals with schizophrenia have specific deficits that interfere with the ability to identify the nuances that influence social exchange (Corrigan & Green, 1993).

A behavioral perspective on these findings suggests that due to neurobiological anomalies, individuals with schizophrenia are often insensitive to the subtle *contingencies* that shape social exchange. Holmes and River (in review) suggest that these individuals may lose rules that govern most peoples' social behaviors as a result of a deliteralization of language during acute symptom exacerbation. New rules are learned as a result of direct contact with contingencies associated with sensitivity to social cues (e.g., facial affect expressing fear and/or anger) that elicit increased levels of physiological arousal. Behavior is increasingly governed by escape and avoidance behavior that is reinforced via a reduction in arousal (e.g., disorganized speech in a social context changes the demands in the setting). Schizophrenia is only one of many possible psychiatric conditions that can lead to chronic distress.

Like FAP, FAR attempts to establish a social context with functional similarities to the natural environment. However, most chronically distressed individuals live in environments that inadvertently reinforce their current behavior repertoire (e.g., institutional behavior). As a result, FAR differs from FAP in that it does not create a functional similarity in the rehabilitation setting to the consumer's current environment. Instead, it creates a context functionally similar to environments in which the consumer hopes to live after successful treatment (e.g., living independently within their community).

FAR suggests specific strategies and provides a context for traditional behavioral interventions for persons experiencing chronic distress. Incentive programming and psychosocial skills training, while not new, are understood within FAR from a contextual perspective. It considers behavioral influence at three levels: Program structure; individual targets; and moment-to-moment interaction. Intervening at all levels of influence increases the potential for significant impact on consumer functioning.

FAR: PROGRAM STRUCTURE

Program structure provides a context within which effective rehabilitation can occur. As stated earlier, FAR attempts to create a social context that shares functional similarities with environments to which consumers hope to gain access as a result of rehabilitation. Functional similarities among environments means that the eliciting and discriminative stimuli present in one context are also present in a second. Rather than create a treatment environment that mirrors the *physical characteristics* of the neighborhood in which the consumer hopes to live (i.e., stimulus generalization), FAR incorporates many of the *social stimuli* of real world settings. Thus, to the degree that ineffective behaviors are present, a functionally similar environment is created in the treatment milieu. The goal is to influence the consumer at the three levels outlined above in order to shape behaviors toward increasing approximations of effectiveness. With a functionally similar treatment setting, generalization of skills is enhanced since they are learned in the context of relevant eliciting and discriminative stimuli. Therefore, unstructured social interaction in the treatment context is as important as formal skills training. Consumers acquire skills via their group participation and then contextualize (act-in-context) their use in the milieu.

The social institutions in which persons with chronic distress live share few characteristics with those of the average citizen

in a western industrialized society. Ordinarily, an individual's social contexts take the form of an interpersonal hierarchy associated with power, privilege and status. Inherent in these hierarchies is a set of rules that govern how individuals within the system improve their position vis-à-vis these three factors. Behavioral norms exist that specify how one interacts with peers, with those more advanced, and with those below one in the hierarchy. Further, rules exist that govern advancement and demotion within the system (Raven & Rubin, 1983).

Unlike ordinary social contexts, many persons in chronic distress live in a social flatland, devoid of incentives to change. Instead, their behaviors tend to be governed by rules associated with immediate contingencies and with survival in current conditions. There is a lack of natural contingencies for gaining access to increasing levels of freedom and independent living.

As noted above, FAR attempts to create a context within which interventions at other levels of influence may effectively promote change by using a level system and incentive program. The program structure of FAR makes explicit in the treatment community what is understood implicitly in ordinary social settings, specifically, the complex relationship between behavioral expectations, privileges, status, and accountability.

For example, at the Trinity Services Inc., Emotion Management Program (TSI-EMP), the social hierarchy and individual movement within it are based on three factors: 1) increasing levels of sophistication in a consumer's ability to effectively interact with peers and staff; 2) increasing responsibility for his own recovery program; and 3) increasing commitment and contribution to the treatment community. Behaviors at each level are progressively complex and demanding. Thus, as an individual moves up the level system, he gains access to an increasing number of privileges, status positions within the milieu, and responsibilities for maintaining the social fabric of the treatment community. By making the social hierarchy explicit, the level system exposes consumers to rules similar to those that govern general social discourse. Feelings of optimism as well as increasing levels of competence are frequently reported by consumers as they acquire new skills and assume new roles within the program. Over time, the natural contingencies associated with gaining access to privileges, status, and responsibilities increasingly govern consumers' behavior.

The level system shapes the focus of both consumers and staff. Rather than focusing on problems or ineffective behaviors, staff and consumer collaborate in efforts to increase social effectiveness. In rehabilitation programs where a well-defined social structure is lacking, staff may increase their focus on ineffective behaviors. In these settings, they may be experienced by consumers as behavioral "cops." Attempts to decrease ineffective behaviors via aversive interactions foster an adversarial relationship between consumers and staff. As a result, an environment is created that tends to recapitulate innumerable past invalidating experiences for consumers.

As stated earlier, individuals with chronic distress decrease their level of social contact due to aversive interactions experienced in many social contexts. Frequently, these aversive contingencies are of sufficient strength to negate the influence of naturally occurring incentives in the treatment milieu. FAR uses artificial reinforcers to shape increasingly accurate approximations of effective social behavior. These incentives support behaviors that otherwise might be extinguished due to a lack of reinforcement. By increasing the density of the positive reinforcement associated with target behaviors, behavioral momentum is created which keeps consumers actively engaging in socially effective behavior. With time, consumer behaviors are maintained less by artificial reinforcers as these behaviors are naturally reinforced by the consequences of successful social behavior.

For example, most program participants at the TSI-EMP receive social security disability payments and live in residential facilities. Typically, residential programs provide a minimal amount of money to consumers each month for their own consumption (e.g. $30.00). Many consumers spend these funds on sundries such as cigarettes. Unlike the average citizen, consumers do not have the funds to shop at places like K-Mart for shampoo, tooth brushes, toothpaste, hand lotion, bracelets, walkman, baseball caps, etc. The only viable economy in which they can participate is the Program's. Thus, although many consumers who enter the

program have little interest in learning illness management or interpersonal effectiveness skills, they attend and participate in psychoeducational groups in order to earn points with which to purchase items from the Program's store.

Usually, if a consumer remains in the program for six to eight weeks, he will stay for the remainder of his treatment (depending upon treatment goals, length of stay may range from 12 to 32 weeks; Corrigan, 1993). The incentive program not only meets the basic needs and wants of consumers but also keeps them in contact with didactic material about illness management and other skills via group involvement. In the process, they both observe their peers and experience for themselves the natural contingencies associated with illness management and relationship effectiveness. Therefore, incentive programming creates behavioral momentum for the effective social behaviors of consumers who participate in the social hierarchy of the milieu. This eventually leads to social behavior under the control of an ever-expanding number of rules. Rule-governance of social behavior fosters a decreased sensitivity to contingencies in the moment and may lower a consumer's vulnerability to arousing emotions and symptom exacerbation in natural settings.

The discussion thus far suggests that program structure creates a behavioral frame or context within which to address consumer behaviors that interfere with social effectiveness. This structure provides the "if…then" for the relationship between increasingly complex social behavior and access to privileges. The step-wise organization of the social context maximizes participants' opportunities for success as they develop increasingly sophisticated social behavior. The incentive program keeps participants in contact with training opportunities until their skillfulness becomes intrinsically rewarding. As a result behavioral momentum is generated and leads to increasingly sophisticated, rule-governed social behavior (Plaud, 1997).

FAR: TARGETING INTERPERSONAL BEHAVIORS

Contextualizing Current Coping

Within the context set by the program structure (e.g., level system, incentive program), a hierarchy of clinically relevant behaviors guides staff-consumer interaction in the various settings in the program (i.e., individual session, skills group or unstructured milieu interaction). Targets are purposefully vague and are designed to direct staff to classes of behavior, providing a guide for responding based on consumer behaviors in the moment. Targets are organized hierarchically in terms of their priority in the milieu:

1) Physical Aggression
2) Self-harm
3) Emotional/Physiological Arousal
4) Experiential/Emotional Avoidance

Physical Aggression

Maintaining a safe treatment environment for consumers and staff is a basic necessity to learning new skills. Physical aggression toward others, property or self can have a detrimental impact on the rehabilitation environment. Structuring the program in a way that takes into consideration factors associated with the potential for aggression may reduce the number of these incidents. Further, having staff actively involved in the milieu and monitoring pre-aggressive behaviors can set the occasion for applying alternative skills in response to factors that in the past may have resulted in aggression.

There are a number of factors that lead to physical aggression in the rehabilitation context. Programs that are structured to clarify staff and consumer roles and to clearly outline the means for obtaining desired outcomes report fewer incidence of aggression (Corrigan, et al., 1994). Often a combination of proactive and reactive interventions can significantly reduce aggressive behavior. For example, de-escalation strategies such as removing the target of aggression (e.g., removing John when Joe is "going off" on him), reducing stimuli in the immediate area (e.g., turn lights out, relocate other consumers) and focusing on the function of current behavior rather than the content of consumer verbalization are several strategies used to manage physical aggression in the milieu.

Frequently, consumers are inadvertently reinforced for using intimidation and/or outright physical aggression to escape aversive private experiences such as frustration and anger.

Typically, these types of behaviors change the social context (e.g., lower the demands made of the consumer) in which the intense emotion is experienced thereby changing the emotion itself.

FAR staff's first priority is maintenance of the treatment milieu. Therefore, a combination of proactive and reactive interventions is used to decrease the probability of incidents of aggression and/or reduce the duration, intensity and the destructive impact should they occur. Emphasis is placed on identifying contextual factors associated with potential for aggressive behaviors. Often aversive private experiences are poorly tolerated and lead to aggression. Keeping distressed consumers in contact with factors that evoke these bodily states enables them to apply skills learned in the skills group. Rather than focusing on changing the consumers private experience (e.g., frustration and anger), staff work to teach the consumer how to be mindful of contextual factors associated with intense emotion, minimize emotional avoidance and apply effective emotion regulation skills (Linehan, 1993).

Self-harm

Self-harm is considered any behavior undertaken by a consumer in which the intent is to inflict bodily harm and/or death. This class of behavior can be difficult to extinguish. Self-injurious behaviors are powerfully reinforced due to the avoidance of aversive private experience (e.g., guilt, self-loathing). Frequently, consumers who engage in this type of behavior have a learning history that is replete with reinforcement for emotional avoidance. These consumers are unable to self-tact emotion but are acutely aware of action-urges to self-injure.

Staff members distinguish between self-injurious behavior elicited by current contextual factors (respondent behavior) and those maintained by changes in the interpersonal context in response to the behavior (operant behavior). In the former, staff members provide support, validate current action-urges and coach consumers to apply new skills while in contact with aversive states. When self-injury is an operant, staff therapists curtail reinforcing contextual consequences and focus on teaching the consumer how to make requests effectively and to observe limits. Physical aggression and self-injury are considered only two examples of a class of behaviors that are functionally defined in terms of how well they enable the individual to avoid aversive private experiences.

Emotional/Physiological Arousal

Many consumers titrate their exposure to interpersonal contexts that bring them in contact with controlling variables or cues that elicit aversive private experiences. Often, social isolation has become a perpetuating factor in a consumer's chronic psychological distress. The functional similarity of the treatment context with typical social settings exposes consumers to cues that are frequently avoided. Contact with these cues in the milieu can set the occasion for intense emotions. Staff members are present in the milieu in order to maintain a safe environment within which to learn emotion regulation skills (Linehan, 1993).

When consumers are in contact with relevant controlling variables, staff interact with them in order to provide accurate validation of emotional reactions. Validation enhances consumers' ability to remain in the present context without having to engage in emotional avoidance. As a result, consumers habituate to intense emotion and learn more experientially effective behaviors in the presence of previously avoided cues. They learn to experience their emotional responses as important sources of validation, motivation and communication (Linehan, 1993). The goal of staff interaction is to set occasions for and reinforce effective emotional responding by consumers within the social context of the program.

Experiential/Emotional Avoidance

Avoidance of cues that elicit emotion is a common practice of persons experiencing chronic distress. Any behavior can serve as a means to avoid such cues; examples include breaking eye contact, changing a topic of discussion, sudden withdrawal from a conversation or leaving the group (Kohlenberg & Tsai, 1991). The social context of the program both in formal treatment activities (e.g., skills groups and individual psychotherapy) and the unstructured social time between groups increases the probability of contact with eliciting and discriminative stimuli for emotional reacting and/or avoidance.

Group leaders engage consumers in skills group frequently and continually interact with consumers reticent to participate in order to decrease the benefits of not interacting. Further, staff find ways of reinforcing consumer

responses during group activities in order to increase participating behaviors in social contexts – always reinforcing the nugget of effectiveness of all attempts on the part of the consumer to contribute. During unstructured time, staff members remain in the milieu to monitor, initiate and shape interaction with and between consumers. Staff members engage in socially appropriate conversation, but attempts by consumers to discuss personal problems and concerns are redirected to their primary therapist.

An important target in individual psychotherapy is an examination of factors eliciting experiential avoidance in the milieu. Functional analysis of avoidance in the milieu serves to bring the consumer into contact with variables that are associated with avoidance. Together, therapist and consumer schedule planned exposure to cues to aversive private experiences and practice behavioral alternatives to avoidance in-vivo. With an emphasis on targeting avoidance, staff do not inadvertently reinforce avoidance behaviors; they intervene early in behavioral chains that otherwise may lead to more serious and destructive behavior.

When the treatment team is operating effectively, vigilance about and effective responses to consumer emotional dysregulation and experiential avoidance decreases the probability of behavioral responding at the level of physical aggression and/or self-injury. Emphasis is upon effective emotional responding that is, teaching consumers the function of emotion in dealing with conflict and intimate relating. Consumers learn that their emotional responses are not experiences to be changed and/or controlled but an important aspect of effective living.

Hierarchy for staff

At any given moment during the treatment day, various members of the FAR treatment team may be engaged in a variety of treatment activities. While the hierarchy of clinically relevant behaviors organize staff response to consumer behavior, a second hierarchy indicates the priority of clinical activities for staff at any given moment. Engaging in or remaining in a treatment activity is considered only after activities higher in the hierarchy are appropriately staffed and effectively implemented and/or monitored.

1) Milieu Management
2) Psycho-education
3) Individual Psychotherapy
4) Documentation

The program structure provides a context within which to identify the discriminative, eliciting, and reinforcing stimuli for clinically relevant behavior in the milieu. The hierarchy of relevant behaviors and staff priorities increases the probability of maintaining a safe environment and of creating opportunities for shaping consumer behaviors. Further, this creates behavioral momentum for effective social behavior and increases the probability that newly acquired skills will generalize to natural settings (Plaud, 1998).

FAR: Moment-to-Moment Interaction

Coordination of Topographical and Functional Skills Training in FAR

Traditionally, skills training is used to increase consumer skillfulness in a broad spectrum of areas including social interaction and illness management (e.g., Anthony & Liberman, 1992; Bellack & Mueser, 1989). Two types of skills training are outlined in the literature, topographical and functional. Each type of skills training presents barriers to successful learning for persons with severe mental illness. Utilizing only topographical skills training tends to teach skills outside of their relevant context. These skills are not associated with stimuli relevant to the consumer's natural settings. As a result, they frequently do not generalize to real-world experiences (Kendall, 1990). On the other hand, the exclusive use of a functional skills training approach in natural settings for persons with severe mental illness tends to have limited effect. The quantity and aversive quality of their ineffective behaviors result in punishing consequences in social settings. These punishing consequences generalize from specific behaviors to social settings in general. Thus, social contexts are experienced as aversive and persons with severe mental illness learn to avoid them.

FAR utilizes both topographical and functional skills training strategies to promote effective living. Topographical skills training provides consumers with formal instruction in a variety of illness management and social skills. Groups educate consumers to rules that govern behaviors that comprise complex social skills.

Functional skills training is utilized both during structured groups and unstructured time as consumers confront, in the program milieu, situations that are functionally similar to the real world. Consumers are differentially reinforced for successful use of skills in the milieu that were learned in groups. As a result, skills are contextualized via reinforcement during natural interaction in the milieu. In this regard, staff function as discriminative, eliciting and reinforcing stimuli in the milieu. Therefore, their presence during unstructured time in the milieu may be even more important than during formal group training.

FAR -- Application of FAP Principles to the Milieu

As stated in the introduction, Functional Analytic Psychotherapy (FAP) is a radical behavioral approach that focuses on the in-session behaviors of the consumer and therapist (c.f. Kohlenberg & Tsai, 1991 for a comprehensive outline of FAP principles). In FAP, consumer verbalizations are always considered as potential commentary about ongoing interactions between the two parties in the therapy session. Rather than focusing on the content of verbal behavior, the FAP therapist evaluates it in terms of its function.

For example, a therapist might arrive five minutes late for his appointment with a consumer. Once the session begins, the consumer's first words are a description of his reaction to having to wait for his boss "the other day." The FAP therapist considers the possibility that the therapist's behavior (being late for the therapy appointment) was the stimulus for the description of this particular event and explores with the consumer this hypothesis. In order to diminish experiential avoidance (the systematic avoidance of aversive stimuli), the therapist would present his hypothesis regarding the relationship between the consumer's description of events outside of the session and the therapist's own "late" behavior. This may lead to a direct expression of the consumer's reactions to the therapist's behavior and a discussion of his difficulty expressing anger directly to persons in authority and/or whom he respects.

In milieu-based programs, verbal behavior with suicidal content, threats of aggression, or descriptions of physical pain frequently function to shape staff behavior. Typically, staff respond to the acute crisis, allowing the consumer to avoid or escape contact with the cues that are eliciting aversive private experiences in the moment (e.g., flashbacks, sadness, boredom). In the context of the program structure and individual consumer targets, FAR focuses on the function of CRBs during both structured groups and unstructured milieu interaction. During moment-to-moment interaction staff respond to ineffective behaviors (CRB1s) in a non-reinforcing manner.

For example, Charlie J. has a habit of interrupting conversations by loudly asking questions about religious topics. In a team meeting, staff agreed to use extinction in order to decrease the frequency of this behavior. Thus, during a break time, John and Jill were discussing how they might arrange the chairs for the next event. In the midst of their conversation, Charlie stepped in and interrupted their dialogue. John and Jill responded by acting "as if" Charlie was not present, continuing to discuss possible options for arranging the chairs. Initially, Charlie increased his interrupting behavior (i.e., extinction burst) and as staff continued to respond to this behavior consistently, it subsided. In fact, Charles began commenting on what was happening (a CRB3), saying, "Come on, you guys! You're ignoring me." Staff examined the costs and benefits of the "interrupting behavior" with Charlie and taught him more effective ways of initiating contact with staff. In the process, Charlie learned both effective engagement and self-monitoring skills.

When a consumer displays effective behavior in situations with stimulus characteristics that in the past were associated with ineffective behavior, staff socially reinforce replacement behaviors. For example, Charlie began asking if he could talk to a staff person or peer before launching into a conversation (a CRB2). Staff reinforced his verbal behavior by acknowledging his request and describing topics of mutual interest. If they were not currently available, staff would arrange a time for a conversation later in the day.

Frequently, consumers with chronic distress are oblivious to the impact of their behavior on people around them. All too often, ineffective behavior is inadvertently reinforced. Staff give the person what he requests in order to quell their own aversive private experiences and to get on to the next task. For example, on one

occasion when Charlie interrupted and Jill did not respond, his speech became louder and more forceful. Rather than continue extinguishing, Jill (who was feeling increasingly uncomfortable) stopped her conversation with another consumer and addressed Charlie's concern. The frequency with which Charlie engaged Jill increased for the rest of the afternoon. Thus, the apparent contingencies associated with Charlie's ineffective behavior (attention from Jill) were more powerful than Jill's unapparent aversive response (Hayes, 1994).

CRBs include verbal behaviors that do not appear to be verbal at all. For example, behaviors (e.g., gestures) that function to influence the environment indirectly through a second person are classified as verbal behavior (Skinner, 1957). Many consumers with severe mental illness do not perceive the more subtle social cues (e.g., gestures, facial expressions) associated with interpersonal contact (Corrigan, 1993). Therefore, FAR-trained staff make the implicit, explicit. That is, staff describe their own unapparent responses to consumer behaviors (responses that most socially effective persons would readily observe) as they occur in moment-to-moment interactions in the milieu.

The case history of Lionel T. illustrates this intervention. Lionel was referred from a local community mental health center (CMHC) to the program for excessive touching of female staff. On his first day in the program, Lionel identified returning to his therapist at the community mental health center as an important goal for him. Nonetheless, he continued his habit of touching female staff, which was identified as a CRB1. Initially, staff attempted to use extinction, but with little impact on his "touching behavior." After consultation, female staff responded to Lionel's "touching behavior" in the following manner. "Lionel, I am committed to helping you return to working with your therapist at the local CMHC, and when you touch me like that, I feel disrespected. When I have this feeling, for the moment I lose interest in working with you. I want to work with you. So let's find a different behavior you can use to get my attention."

The previous statement by the staff person is example of a CRB3. When providing CRB3's, staff contextualize their reactions in the moment in terms of their relationships with the consumer over time. Initially, staff provide CRB3's. Greater responsibility for stating CRB3s is gradually to the consumer as he becomes more mindful of his behavior in context. Thus, consumers develop the skill to observe inapparent stimuli and response sets and learn rules to govern effective social behavior (Hayes, 1994).

For the sake of simplicity, when interacting with consumers in the milieu or individual session, staff are instructed to ask the following question: "Do I want to see more or less of the behavior I am now in contact with?" Staff attempt to naturally reinforce effective behavior—that is, behavior they want to experience more often. In contrast, they are instructed to extinguish or provide a CRB3 for behavior they wish to experience less often.

FAP suggests that a consumer's expression of emotion and/or attempts to avoid it are indications that cues in the present context have brought the consumer in contact with controlling variables associated with his learning history (Kohlenberg & Tsai, 1991). Attempts to control emotion include changing the subject, becoming thought disordered or avoiding direct discourse about a present interaction.

The distinction between the content and function of verbal behavior is illustrated in the following example. Jeff F. is a 34-year-old Caucasian who was referred to the program because of a thought disorder. During individual sessions, he and his case manager would talk about numerous topics. Staff observed the following pattern on a frequent basis. Jeff conversed in an organized manner about benign topics such as basketball; however, when the topic was changed to one that was emotionally charged, (i.e., a disagreement the night before between him and his mother) Jeff's speech became disorganized. He would make numerous unusual remarks including the following: "the Nazi's are coming," "my toe nails are missing," and "I need to because the wire is loud." Rather than focusing on the content of his verbal behavior, staff assessed its function. Using a CRB3, staff consistently pointed out to Jeff the antecedents to his disorganized speech. By keeping him in contact

with cues that increased arousal (e.g., the discussion of a disagreement with Jeff's mother), Jeff learned to respond more effectively. Eventually, Jeff was able to remain present with his case manager and with his private feelings during emotionally charged discussions. Interacting in this way changed the control of Jeff's verbal behavior from contingencies in the moment (e.g., the therapist's office) to relevant contingencies associated with past attempts to interact effectively with his mother.

Due to the number of consumers in most rehabilitation settings, each staff person typically does not have an intimate knowledge of the relevant CRBs for each consumer. Therefore, staff inform each other of important targets to be mindful of during interpersonal interaction in order to ensure that they do not inadvertently reinforce CRB1s or punish CRB2s. Typically, a target behavior sheet is created for each consumer that focuses on the most relevant CRB1 that occurs in the milieu. The target behavior sheet operationally defines a specific ineffective behavior, a response class of staff behaviors in the presence of a CRB1, a staff-response class with the occurrence of a CRB2, and, when necessary, a description of arbitrary contingencies to be provided to increase the behavioral momentum of CRB2s. Figure 1 is a sample of a target behavior sheet used by FAR staff at the Trinity Services Inc., Emotion Management Program.

Figure 1.

TARGET BEHAVIOR

Name _____. Date _____.

Target Behaviors (May be an ineffective behavior to be decreased or an effective behavior to be increased. Identify a behavior that can be influenced in the treatment context. Target one behavior per page)

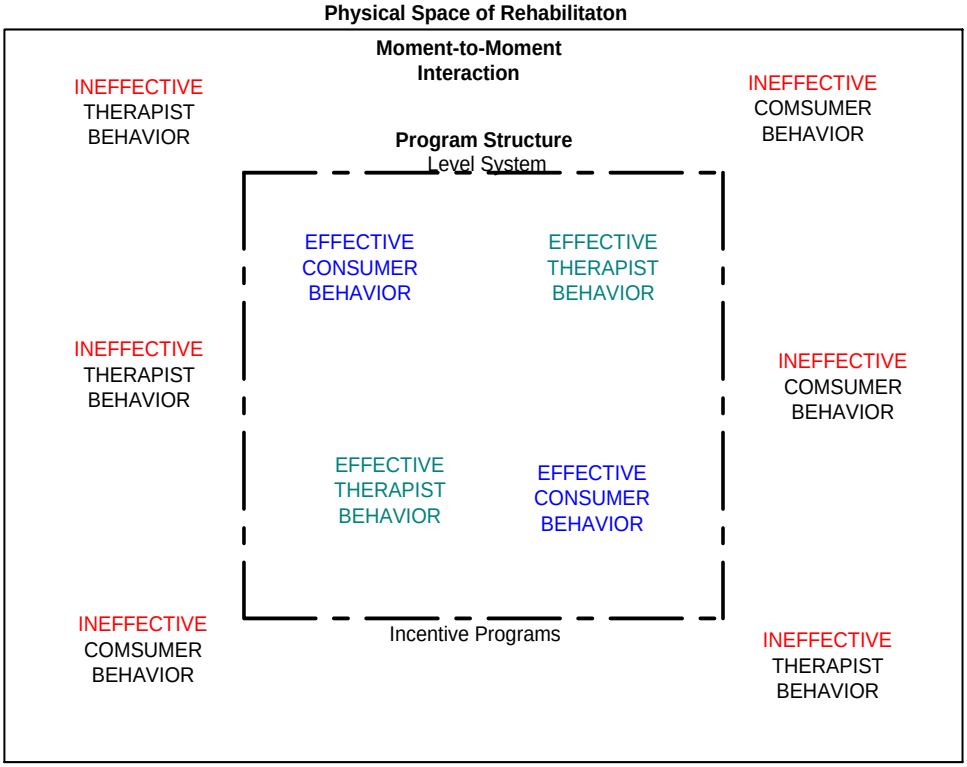
1.

Staff Response to Effective Alternative Behavior (Describe specific effective behaviors that replace/interfere with performance of target behavior and staff [natural reinforcer] response to an occurrence of this behavior)

Staff response to Ineffective Target Behavior (Specify staff response to occurrence of target behavior, e.g. extinction, description of private reactions to behavior.)

Figure 2

Differentiating Effective And Ineffective Behavior of the Consumer and Therapist



Incentive Program (If applicable, specify formal incentive program for target behavior. Describe the behavior you wish to influence [increase frequency], the arbitrary reinforcers contingent on performance of behavior)

Given the focus on effective and ineffective behaviors, the question often arises as to who decides whether a behavior is effective or not. Recent behavioral therapies have focused on the relationship between the therapist and consumer in the moment and on the differential reinforcement of effective verbal and nonverbal behavior in session (e.g., Dialectical Behavior Therapy and Functional Analytic Psychotherapy). This emphasis has traditionally been the purview of psychoanalytically informed psychotherapies and is discussed in the literature in terms of various topics, including transference, countertransference and projective identification. However, the psychoanalytic literature dedicates significant attention to identifying the ineffective behaviors of the therapist and to the structure of the therapy in order to provide a frame for determining whose ineffective behavior is at issue (Tansey & Burke, 1989; Gill, 1982). For example, Langs (1988) states that maintenance of the therapy frame (e.g., starting and ending the session promptly) is the responsibility of the therapist. When difficulties arise in maintaining the frame, the ineffective behavior of the therapist becomes the focus of therapy. To date, behavioral theorists have not adequately defined strategies for determining whether ineffective interaction in session is a consequence of therapist or consumer behavior.

FAR creates a frame from which both staff and consumer can determine the effectiveness of their behavior in the context of the milieu. As Figure 2 depicts, the program structure (i.e., the level system and the incentive program) defines increasing levels of effectiveness. The level system and incentive program delineate for consumers rules that govern behaviors maintained by social reinforcement (e.g., social status) and rule-governed behavior maintained by reinforcement for rule-following (e.g., arbitrary incentives). These strategies also provide a frame of reference for staff decisions about consumer behavior. Reliance on an operationally defined decision matrix decreases decisions about consumer behavior based on the private experience of individual staff members.

Summary

Functional Analytic Rehabilitation is a contextual behavioral approach. It creates a context that enhances the impact of traditional curriculum-based interventions such as the UCLA and DBT skills training manuals for persons with chronic distress. These individuals tend to require an intensive rehabilitation experience that optimizes contact with contingencies for each effective behavior. FAR emphasizes the management of contingencies at every level of influence. By increasing the density of reinforcement for effective behaving, the rate of skills acquisition increases. FAR uses a level system and incentive program to create a structure that is the basis for a functionally similar context to real life situations. Individual targets are the basis for collaboration between consumers and staff while moment-to-moment interaction provides in-vivo opportunities for shaping increasingly effective social behavior. By creating an environment with a functional similarity to real-life settings, and a high density of reinforcement for effective responding, FAR provides a context that develops the behavior momentum needed to increase effectiveness and to overcome numerous disincentives to moving toward community integration.

References

Anthony, W., & Liberman, R.P. (1992). Principles and practice of psychiatric rehabilitation. In R. P. Liberman (Ed.), *Handbook of Psychiatric Rehabilitation.* Boston: Allyn and Bacon.

Bellack, A.S., & Mueser, K.T. (1986). A comprehensive treatment program for schizophrenia and chronic mental illness. *Community Mental Health Journal, 22,* 175-189.

Corrigan, P.W. & Jakus, M.R. (1993). The patient satisfaction interview for parital hospitalization programs. *Psychological Reports, 72,* 387-390.

Corrigan, P.W., & Green, M.F. (1993). Schizophrenic patients' sensitivity to social cues: The role of abstraction. *American Journal of Psychiatry, 150,* 589-594.

Corrigan, P.W., Holmes, E.P., Luchins, D., Buican, B., Parks, J.J., Basit, A. (1994). Staff Burnout in Psychiatric Hospitals: A Cross-Lagged Panel Design. *Journal of Organizational Behavior 15*, 65-74.

Docherty, N.M., & Hebert, A.S. (1997). Comparative affective reactivity of different types of communication disturbances in schizophrenia. *Journal of Abnormal Psychology, 106(2),* 325-330.

Dougher, M.J. (1998). Stimulus equivalence and the untrained acquisition of stimulus functions. *Behavior Therapy, 29(4),* 577-591.

Gill, M. (1982) *Analysis of Transference.* Madison: International Universities Press, Inc.

Hayes, L.J. (1994). Thinking. In S.C. Hayes, L.J. Hayes, M. Sato, & K. Ono (Eds.), *Behavior Analysis of Language and Cognition* (pp.149-164). Reno: Context Press.

Hayes, S.C. (1996). Developing a theory of derived stimulus relations. *Journal of the Experimental Analysis of Behavior, 65,* 309-311.

Hayes, S.C., & Follette, W.C. (1992). Can functional analysis provide a substitute for syndromal classification. *Behavioral Assessment, 14,* 345-365.

Hayes, S.C., & Hayes, L.J. (1989). The verbal action of the listener as a basis for rule-governance. In S.C. Hayes (Ed.), *Rule-governed behavior: Cognition, contingencies, and instructional control* (pp. 153-190). New York: Plenum Press.

Hayes, S.C., & Hayes, L.J. (1992). Some clinical implications of contextualistic behaviorism: The example of cognition. *Behavior Therapy, 23, 225-249.*

Hayes, S.C., Kohlenberg, B.S., & Melancon, S.M. (1989). Avoiding and altering rule-control as a strategy of clinical intervention. In S.C. Hayes (Ed.), *Rule-governed behavior: Cognition, contingencies, and instructional control* (pp. 359-385). New York: Plenum Press.

Hayes, S.C., Strosahl, K., & Wilson, K. (1999*). Acceptance and Commitment Therapy.* New York: Guilford Press.

Hayes, S.C. (1991). A relational control theory of stimulus equivalence. In L.J. Hayes, and P.N. Chase (Eds.), *Dialogues on verbal behavior* (pp. 19-40). Reno, NV: Context Press.

Hayes, S.C., Wilson, K.G., Gifford, E.V., Follette, V.M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64(6),* 1152-1168.

Heinssen, R.K., Libermain, R.P. & Kopelowicz, A. (2000). Psychosocial skills Training for Schizophrenia: Lessons from the laboratory. *Schizophrenia Bulletin* 26(1), 21-46.

Herinckx, H. A., Kinney, R.F., Clarke, G.N., & Paulson, R.I. (1997). Assertive community treatment versus usual care in engaging and retaining clients with severe mental illness. *Psychiatric Services, 48(10),* 1297-1306.

Holmes, E.P., & River, L.P. *Self-experience in severe mental illness.* Manuscript submitted for publication.

Kohlenberg, R. J., Hayes, S. C., & Tsai, M. (1993). Radical behavioral psychotherapy: Two contemporary examples. *Clinical Psychology Review, 13,* 579-592.

Kohlenberg, R.J., & Tsai, M. (1991). *Functional Analytic Psychotherapy: Creating Intense and Curative Therapeutic Relationships.* New York: Plenum Press.

Kendall, P.C. (1990). Behavioral assessment and methodology. In C.M. Franks, G.T. Wilson, P.C. Kendall, and J.P. Foreyt (Eds.), *Review of Behavior Therapy: Theory and Practice* (pp. 44-71). New York: The Guilford Press.

Langs, R. (1988). *A Primer of Psychotherapy.* New York: Gardner Press.

Linehan, M.M. (1993). *Cognitive-behavioral Treatment of Borderline Personality Disorder.* New York: The Guilford Press.

Miller, W.R. (1996). Motivational Interviewing: Research, Practice, and Puzzles. *Addictive Behaviors, 21(6),* 835-842.

Mueser, K.T., Bond, G.R., Drake. R.E., & Resnick, S.G. (1998). Models of community care for severe mental illness: A review of research on case management. *Schizophrenia Bulletin, 24(1),* 37-74.

Nuechterlein, K.H., & Dawson, M.E. (1984). Information processing and attentional functioning in the development course of schizophrenic disorders. *Schizophrenia Bulletin, 10(2),* 160-203.

Plaud, J., & Vogeltanz, N.D. (1997). Back to the future: The continued relevance of behavior theory to modern behavior therapy. *Behavior Therapy, 28(3),* 403-414.

Raven, B.H., and Rubin, J.Z (1983). *Social Psychology* (2nd Edition). New York: John Wiley and Sons.

Skinner, B.F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.

Tansey, M.J., & Burke, W.F. (1989). *Understanding Countertransference: >From Projective Identification to Empathy.* Hillsdale: The Analytic Press.

Wachtel, P.L. (1993) *Therapeutic Communication: Knowing What to Say When*. New York: Guilford Press.

MODE DEACTIVATION THERAPY (MDT): CASE CONCEPTUALIZATION

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The theoretical constructs of Mode Deactivation Therapy (MDT) are based on the Mode Model (Beck, 1996), suggesting that people learn from unconscious experiential components and cognitive structural processing components. Therefore, to change behavior of individuals there must be a restructuring of the experiential components and a corresponding cognitive reformation of the structural components. MDT is an empirically based methodology that systematically assesses and restructures dysfunctional compound core beliefs. By restructuring these beliefs, MDT addresses underlying perceptions that may be applicable to setting in motion the mode related charge of aberrant schemas, that enable the behavior integration of Dialectic Behavioral Therapy (DBT) principles (Linehan, 1993) of treating of sex offending or aggressive behavior (Kohlenberg & Tsai, 1993). The Mode Deactivation framework also utilizes the case conceptualization methodology and emphasizes a team approach in working with clients; particularly those with reactive emotional dysregulation, which includes parasuicidal acts and aggression. The case conceptualization is systematically designed to provide functionally based treatment to complex emotional, thought, and behavior disorders. The following article demonstrates this comprehensive process and delineates the procedures used to develop the case within the mode deactivation theoretical perspective.

INTRODUCTION

The concepts of mode deactivation therapy (MDT) are derived from Beck (1996) and Alford & Beck (1997) and their conceptualizations of the expansion of cognitive behavioral therapy into more global constructs known as modes. The application of MDT from theory to practice included the adaptation of Linehan's (1993) application of dialectical behavioral therapy (DBT). The similarities of MDT and DBT are obvious. MDT treats the personality beliefs and behaviors with Linehan's notion of finding the grain of truth and validating the client's beliefs rather than challenging the cognitive distortions.

Underlying the MDT methodology is the Problem Solving Case Conceptualization. Problem solving case conceptualization is a combination of Beck's (1996) case conceptualization and Nezu, Nezu, Friedman, Haynes (1998) problem-solving model, with several new assessments and methodologies recently developed. The goal is to provide a blueprint to treatment within the case conceptualization.

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The Case Conceptualization helps the clinician examine underlying fears of the resident. These fears serve the function of developing avoidance behaviors in the youngster. These behaviors usually appear as a variety of problem behaviors in the milieu. Developing personality disorders often surrounds underlying posttraumatic stress disorder (PTSD) issues. The Case Conceptualization method has an assessment for the underlying compound core beliefs that are generated by the developing personality disorders. Thus far, preliminary results suggest that our typology of youngsters have a conglomerate of personality disorder compound core beliefs. This conglomerate of beliefs, is the crux of why youngsters fail in treatment. One cannot treat specific disorders, such as sex offending and aggression, without gathering these conglomerate beliefs. It is also apparent that these beliefs are not cluster specific. That is to say that the Conglomerate of Beliefs and Behaviors contains beliefs from each cluster that integrate with each other. Because of this complex integration of beliefs, it makes treatment for this typology of youngster more complicated. The conglomerate of compound core beliefs represents protection for the individual from their abuse issues, which may present as treatment interfering behaviors. The attempt to use the usual didactic approaches to treatment, without addressing these beliefs amounts to treatment interfering behavior on the part of the Psychologist, or treating professional,

is not an empirically supported and counter-initiated.

Mode Deactivation Therapy: Case Conceptualization

The Case Conceptualization is a schematic representation of Beck's (1996) theory of modes combined with Apsche & Ward (2002) interpretation of the applied methodology of Linehan (1993), Kohlenberg & Tsai (1993). It is intended to provide the blueprint for treatment for the youngster. The Case Conceptualization provides a functional treatment methodology that integrates into the treatment plan.

The Case Conceptualization is typology driven and individualizes the treatment based on empirically based assessment. The Case Conceptualization also provides a methodology to address the reactive adolescent emotional dysregulation. The typology of adolescents often reacts aggressively and destructively through emotions to threats or perceived threats. The case provides the structure of the Conglomerate of Beliefs to address the dysregulation by balancing the beliefs.

The Conglomerate of Beliefs identifies behaviors that correlate with beliefs and is the structure to work with the youngster. This provides a method to relate the emotional dysregulation to the beliefs. The goal is to teach the youngster to balance beliefs by recognizing that they activate the emotional and behavioral dysregulation.

The Case Conceptualization also provides a methodology to address the reactive adolescent emotional dysregulation. The emotional dysregulation refers to the Linehan (1993) model of the Borderline Personality Disorder (BPD) emotional dysregulation, integrated with the Reactive Conduct Disorder (Dodge, Lochman, Harnish, Bates and Petti, 1997).

Linehan (1993) sees individuals with borderline personality disorder analogous with burn victims where the slightest movement is automatic and causes extreme pain. "Because the individuals cannot control the onset and offset of internal or external events that influence emotional response" she suggests that the experience is itself a "nightmare of intense emotional pain" and a struggle to regulate themselves.

According to Dodge et al, (1997), there are two sub-groups of aggressive conduct type youngsters; Proactive, the sub type that receives benefit and rewards from aggression and Reactive, the sub type that is emotionally reactive or dysregulates. Forty percent of reactive adolescents have multiple personality disorder according to Dodge, et al. It appears that Reactive Conduct Disorder adolescents emotionally dysregulate and many of their aberrant responses are results of their emotional dysregulation.

Koenigsberg, Harvey, Mitropoulou, Antonia, Goodman, Silverman, Serby, Schopick and Siever (2001) found that many types of aggression, as well as, suicidal threats and gestures were associated with emotional dysregulation. The Case Conceptualization methodology provides the framework to assess and treat these complicated typologies of adolescents and integrates them into a functionally based treatment. The goal is to deactivate the Fear→ Avoids→ Compound Core Beliefs mode and teach emotional regulations through the balancing or beliefs.

Once the information is gathered and the case is formulated, the client and the therapist develop collaboratively the Conglomerate of Beliefs and Behaviors (COBB). The completion of the COBB follows the review of the five column Fear→ Avoids→ Compound Core Beliefs and moves to this form.

The Conglomerate of Beliefs and Behaviors is the crux of treatment for the client. Once he collaboratively validates the Fear→ Avoids→ Compound Core Beliefs and moves to do this form, he helps validate his behavior responses that are congruent with his compound core beliefs.

This form once completed remains with him throughout treatment and is the basis for all of his work in the MDT manual. The client recognizes that these beliefs could be activated throughout his lifetime and he continually works to deactivate his fears, avoids, and beliefs.

The case conceptualization is a systematic carefully designed sequential methodology intended to provide functionally based treatment, to complex emotional, thought and behavior disorders. First, complete all assessments: Typology Survey, Fear Assessment, and Compound Core Belief Questionnaire (CCBQ).

1. COMPLETE ALL ASSESSMENTS:

a. TYPOLOGY: SEX OFFENDER SURVEY: The Typology Survey gathers information about the resident's history including: family, substance abuse, medical, educational, emotional, physiological, interpersonal relationships/social, offenses, physical abuse, sexual abuse, emotional abuse, neglect, and expectations of treatment. Consult all records and parents/guardian for validation of specific responses before meeting with resident. Explain the nature of the assessment and its purpose. Enlist the resident's cooperation by letting him know that he can help him more effectively by providing this information, as he is an expert on himself.

Maintain an open conversation while administering this assessment to encourage the resident to speak more freely. Once you begin the assessment, write down all responses in the space provided. Be sure to complete all questions, even if they seem irrelevant. This information is essential for completing your Case Conceptualization as well as providing effective therapy.

b. FEAR ASSESSMENT: The Fear Assessment is a 60-question assessment exploring fears of the resident, providing insight into the resident's underlying traumas. The Fear Assessment is important and will be necessary to complete the Fear, Avoids, Compound Core Belief – Correlation component of the Case Conceptualization. It should be completed after

RELEVANT CHILDHOOD DATA (ABUSE HISTORY)

Date of Birth: 7/8/82
Date of Admission: 1/13/00
Physical/Emotional Abuse: Reports of physical abuse by mother. Joel and siblings were taken out of her custody by DYFS in 1992. Joel was beaten with extension cords, wire hangers, and baseball bats. Mother was arrested.
Sexual Abuse: Joel denies being sexually abused though there are reports that state that Joel was touched inappropriately by his mother at the age of 5 or 6 years old.

Developmental History (include age/date of birth, behavioral, environmental, social, biological): Joel has a history of oppositional and defiant behavior, particularly at school. At age 4, Joel grabbed his teacher's breast and put his fingers on her clothes, towards her vagina. At age 5, Joel kicked his principal. At a prior RTC, Joel was verbally abusive and oppositional towards staff. Joel has a history of aggression, both verbally and physically. Joel has some issues regarding the complexion of his skin being too dark.

Substance Abuse History (include drug of choice, frequency of use, familial substance abuse history, etc.): None noted

Current Medication: Zoloft 75 MG, Clarks AD 40 MG

Figure 1 Relevant Childhood Data (Abuse History)

SEX OFFENSE DATA

At age 15, Joel had two younger male cousins – ages 3 & 7 perform oral sex on Joel on one occasion. One younger male family friend, age 11, "grinding" on him on one occasion.

Figure 2 Sex Offense Data

DIAGNOSES

Axis I: 1. Posttraumatic Stress Disorder, Chronic
2. Sexual Abuse of Child (Victim and Offender Issues)
3. Physical Abuse of Child (Victim Issues)
4. Mood Disorder, NOS
5. Obsessive-Compulsive Disorder
Axis II: Borderline Personality Disorder
Axis III: none
Axis IV: psychosocial stressors related to physical abuse, legal system involvement
Axis V: Current GAF: 43
Highest GAF past year: 60

Figure 3 Diagnoses

the Typology Survey.

c. CCBQ (Compound Core Beliefs Questionnaire): The CCBQ (Compound Core Beliefs Questionnaire) is a 209-question assessment used to gather a succinct understanding of a resident's beliefs or thought processes. This worksheet offers the therapist to gather valuable information concerning beliefs endorsed by the resident. Beliefs endorsed on this assessment are necessary to complete the Fear, Avoids, Compound Core Belief – Correlation component of the Case Conceptualization.

FEAR ⟷	**AVOIDS**
Alone in dark rooms	Bedroom
Dusk to dark	Bedtime
SLP in room at night	Aberrant behaviors to get out of room, silly provoking other residents
Seclusion	Any behavior to get out of seclusion, probably restrained

Figure 4 Fear Avoids paradigm

2. COMPLETE THE CASE:

STEP I: RELEVANT CHILDHOOD DATA (ABUSE HISTORY): This section includes physical/sexual, emotional abuse, development, behavioral, aggression, suicidal, parasuicidal, substance abuse, and medication history. This information should be readily available with a completed Typology Survey. It is important to complete this review systematically to lay the foundation for your case conceptualization. Review the data from this case, ask yourself; "What do I need to know about this youngster, and how does the following information help to begin to understand this youngster?" Ask yourself, "What do I begin to look for behaviorally?" Remember, use Socratic questioning, ask if this is so, then what?

Example:

STEP II: SEX OFFENSE DATA: Include all relevant information specific to the resident's sexual offense. This should be attained from the typology survey and by completing the Sexual Offense System part of Mode Deactivation Therapy Workbook. Sexual Urge and Fantasies: View this as obsessive,

repetitive thoughts of deviant sexuality, as deviant masturbatory fantasies.

This section also includes Risk assessment instrument findings as well as, significant results from any objective measure of sexual interests. Examine the Able Assessment results and administer the JSOAP Juvenile Sex Offender Adolescent Profile. Please include these results in this section.

Example:

STEP III: DIAGNOSES: This is the diagnosis given by a physician or licensed clinical psychologist. It can be attained from the most recent monthly psychiatric progress note. Take notice of the concordance of Axis II diagnoses to beliefs endorsed in the CCBQ. There should be agreement between the results of the CCBQ and the diagnoses. Example:

STEP IV: FEARS, AVOIDS, COMPOUND CORE BELIEFS CORRELATION:

Fears: The key to the youngster is the proper administering of the Fear Assessment. Investigate the level of trauma. Begin by identifying the fears endorsed as occurring always and/or almost always. Prioritize the fears in order of the hierarchy of treatment according to Linehan's (1995) hierarchies of target behaviors within target classes in outpatient individual therapy.

You might hypothesize that this youngster is difficult to manage; he most likely has a well-learned set of avoidance behaviors to compensate for his underlying fears.

Avoids: The next step is to identify what the resident will avoid for each identified fear. Avoids are the functional alternatives to the fears. For example, if you fear elevators you avoid elevators. And, if you fear trusting people, you avoid disclosing relationships and/or intimacy. Think in terms of non-functional alternatives. Sort of opposites. If your resident is afraid of being alone in dark rooms and dusk to dark, what do you think he may avoid? Dark rooms, dusk → bedtime, seclusion rooms; dusk to dark → bedtime, evening and night shift.

Ask yourself what might your resident's life look like in the residential milieu/ ask yourself, when would expect your resident to have "behavioral" problems? Why?

This information should flow from the Fear Assessment. The fears produce an avoidance. It is important to understand the functional relationship between fears and avoidance. This should be your step wise program to implement exposure training, as well as the basis for your case conceptualization.

Understanding the fear ←→ avoidance relationship, will explain many of the problem behaviors in which the youngster engages. The youngster avoids these fears by escaping or avoiding.

Chemical Dependency and Compound Core Beliefs: Beck, Wright, Newman and Liese (1993) suggest that a major thrust of cognitive therapy of chemical dependency/ abuse is to help the individual in two ways. (1) Reduce the intensity and frequency of the urges by understanding the underlying beliefs and (2) Teach the individual specific techniques for controlling and managing their urges.

The case conceptualization methodology examines substance abuse from the framework of how the underlying disorder is involved in the use of substances. It is important that there is an understanding that this discussion is focusing only on the typology of the adolescent that is represented in these methodologies.

The compound core beliefs are the activation to the pathways to a variety of drug usage. Beliefs activate behaviors, engaged to help the resident avoid related fears. Behaviors may be sleeping, arguing, etc. and may include the need and/or desire for drugs and/or alcohol, which may lead to chemical dependency/ abuse. For example, beliefs such as "whenever I hurt, I do whatever I need to do to feel better" may activate a resident to use drugs and/or alcohol to reduce the intensity of hurting.

Pain is an emotional trigger that activates the dysregulation of emotions, which in turn activates the need to relieve/regulate their painful and hurtful emotions. Often drugs and/or alcohol are used to help relieve pain

and/or emotional dysregulation. Often, over doing is a method of reducing or regulating pain, therefore, drug usage is a methodology of regulating as well.

Beliefs endorsed as always and/or almost always from the CCBQ are used. The personality disorder beliefs are the pathways for numerous problem and aberrant behaviors, as well as, emotional dysregulation.

TRIGGER 1 Conscious Processing	TRIGGER 2 Unconscious Processing	FEARS	AVOIDS	COMPOUND CORE BELIEFS
Unfamiliar situations Trust versus betrayal Disrespect Pressure situations (confrontation, consequences, anything that triggers victim stuff) Showing weaknesses Situations that require showing feelings to others (emotional intimacy)	Situations that require trying, failing Situations of trust or counting on someone Victim stuff Trust Emotions (hurt, betrayal) Close feelings	Failing Hurting someone physically My anger No one will believe me Something is wrong with me My feelings	Trying new behaviors Relationships-trust Confrontation Being a victim Trusting others Showing emotions (especially hurt and anger) Close relationships	I am inadequate, I will do whatever I must to hide it. If I trust someone today, they will betray me later. Whenever I hurt emotionally, I do whatever it takes to feel better When I am angry, my emotions are extreme and out of control. Everyone betrays my trust. In relationships, if the other person is not with me, then they are against me. I try to control my feelings and not show my grieving, loss, sadness; but it eventually comes out in a rush of emotions. Everyone betrays my trust. Whenever I hope, I will become disappointed.

Figure 5 TFAB (Triggers, Fears, Avoids, Beliefs)

Identify compound core beliefs that correspond to the already identified fears and avoidance. These beliefs are identified through the CCBQ.

The identified beliefs are integrated with the fear assessment and the avoids. Remember, the avoids are the functional alternatives to the fears. If you fear trusting people, you avoid disclosing relationships and/or intimacy. A compound core belief that is congruent with the fear→ avoids is: if I trust someone today, they will betray me later.

Triggers: Triggers are anything that activates the fear, avoidance, compound core belief. They can be people, places, objects, noises, smells, sights, experiences, etc. Anything the resident may be aware of that would trigger or activate the fear, avoidance, compound core beliefs would be identified as Trigger 1 (conscious trigger).

Anything the resident is not aware of, but can be identified through observable behaviors to trigger or activate the fear, avoidance, compound core beliefs are assigned as Trigger 2 (unconscious trigger). Unconscious triggers are many times what the resident avoids. The same trigger may be both conscious (trigger 1) and unconscious (trigger 2).

When you have completed this section you should understand how the youngster committed his sexual offense, and be prepared to

explain it to him, when he reaches the appropriate section in his Thought Change Workbook.

Practice this section in the MDT Workbook. This should produce a cognitive pathway to the youngster's sexual offending behavior(s). Example:

COMPOUND CORE BELIEF	CORRESPONDING BEHAVIOR(S)
BORDERLINE PERSONALITY DISORDER 1 Everyone betrays my trust... always. 2 If I trust someone today, they will betray me later... always. 3 Whenever I hope, I will become disappointed... always. 4 When I am angry, my emotions are extreme and out of control... always, 5 When I hurt emotionally, I do whatever it takes to feel better... always. 6 Life at times feels like an endless series of disappointments followed by pain... always. 7 I try to control my feelings and not show my grieving, loss, sadness, but eventually it comes out in a rush of emotions... always. 8 In relationships, if the other person is not with me, then they are against me... always. DEPENDENT PERSONALITY DISORDER 1 If I am not loved, I am unhappy... always. 2 I am helpless and cannot make it on my own... always AVOIDANT PERSONALITY DISORDER 1 I am inadequate; I will do whatever I must to hide it... always. 2 I would rather do anything to avoid failing because I cannot succeed... always. ANTISOCIAL PERSONALITY DISORDER 1 Unless you have videotape of me, you cannot prove I did it... .always. 2 If he/she can't take care of himself, they get what they deserve... always. HISTRIONIC PERSONALITY DISORDER 1 I am so exciting, others want to be around me... always. 2 When I am bored, I need to become the center of attention... always. 3 If I act silly and entertain people, they won't notice my weakness... always.	1 Does n't trust people or engage in relationships. 2 Reserved, distanced, and blunted in relationships. 3 Gives up and becomes negative at any "bump" or disappointment. 4 Dysregulates, displays anger quickly. 5 Will clown or "mess around," or disengage. 6 Feels and acts depressed. 7 After disturbing family phone calls, becomes angry and aggressive. 8. Vacillates through all or nothing thinking. 1 Emotion vacillates, between extremes of idealization and devaluation.. 2 Sadness, anger. 3 Distances self, anger and aggression. 4 Anger, outbursts, emotional dysregulation. (but accepts responsibility for his sexual offending behaviors). Denial of small areas of responsibilities. 1 High opinion of self. 2 Anger, silliness. 3 Silly in groups and other tense situations.

Figure 6 Conglomerate of Beliefs and Behaviors

STEP V: CONGLOMERATE OF BELIEFS AND BEHAVIORS: The conglomerate of beliefs and behaviors incorporates compound core beliefs and the corresponding behaviors. It developed as a defense to underlying trauma. It is the pathway to the complex series of moods, schemes, and behaviors. Beliefs endorsed as always and/or almost always from the CCBQ are used. The personality disorder beliefs are the pathways for numerous problem and aberrant behaviors, as well as, emotional dysregulation.

Remember, complete the compound core belief, the cluster B's, and dependent personality disorders. Synthesize these 4 compound core beliefs on the Conglomerate of Beliefs and Behaviors form and you have your treatment interfering behaviors, as well as, possibly a separate discreet personality disorder that a youngster may develop, from physical, sexual, emotional and environmental abuse. Understand that these cluster of beliefs present the most challenging part of treatment interfering behaviors. These compound core beliefs are the underlying protection to the fears, anxieties and trauma. Be complete, and do not rush through developing a treatment hypothesis.

Example:

STEP VI: SITUATIONAL ANALYSIS: This section requires an analysis of actual situations in which the youngster has been involved. Completing the situational analysis provides an opportunity to test the hypotheses you formulated in the Fear, Avoids, Compound Core Belief – Correlation section.

Be sure to complete all three situations!
Example:

STEP VII: MODE ACTIVATION/ MODE DE-ACTIVATION:

Beck, Freeman and Associates (1990) suggested that cognitive, affective and motivational processes are determined by the

idiosyncratic structures or schema that constitute the basic elements of personality.

considers personality to be grounded in the coordinated operations of complex systems that have been selected or adapted to insure

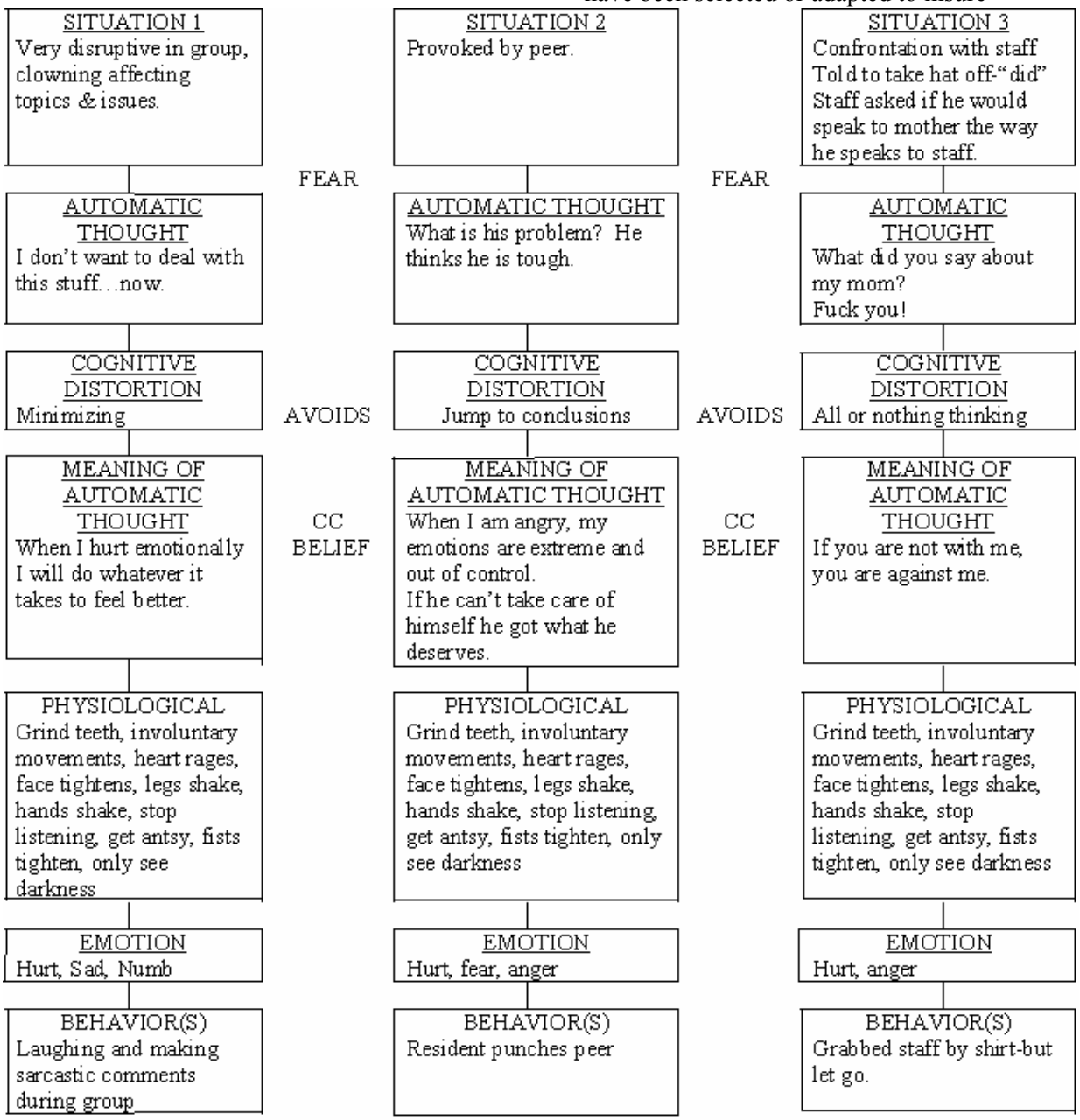


Figure 7 Situations

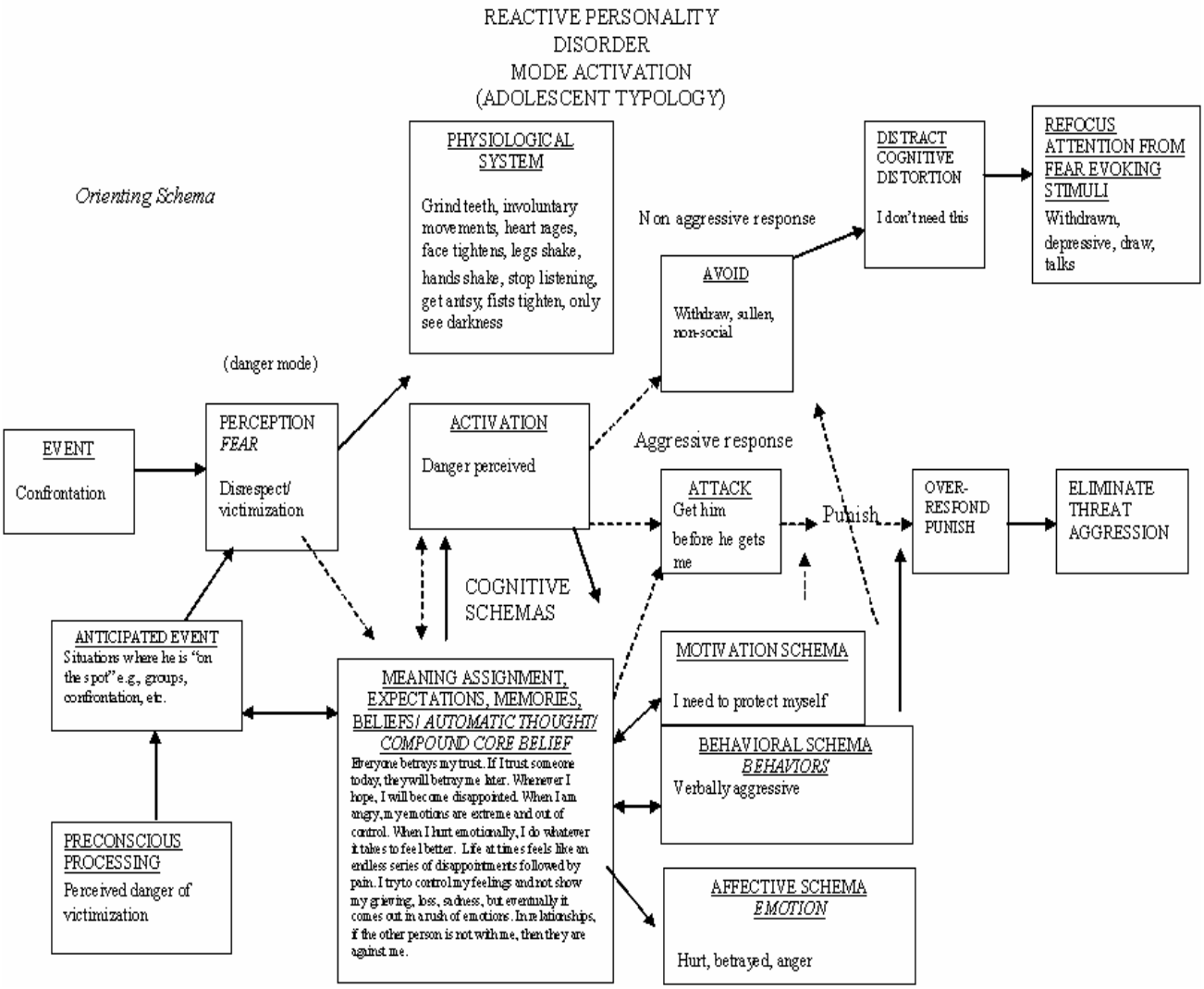
Alford and Beck (1997) explain that the schema typical of personality disorder is theorized to operate on a more continuous basis than is typical in clinical syndromes.

Further study of cognitive therapy emphasizes the characteristic patterns of a person's development, differentiation, and adaptation to social and biological environments (Alford & Beck, 1997). Cognitive theory

biological survival.

These consistent coordinated acts are controlled by genetically and environmentally determined processes or structures termed as "schema." These schema are essential both conscious and unconscious meaning structures." They serve survival functions by protecting the individual from the trauma or experience.

Modes provide the content of the mind, which is reflected in how the person conducts their perspectives. The modes consist of the schemas (beliefs) that contain the specific memories, the system on solving specific problems, and the experiences that produce memories, images and language that forms perspectives. As Beck (1996) states disorders of personality are conceptualized simply as "hypervalent" maladaptive system operations, coordinated as modes that are specific primitive strategies."



Although the operation of dysfunctional modes are in present state maladaptive, it is important to note that they were developed over time for survival and adaptation.

Mode Activation: Modes are important to the typology we serve in that they are particularly sensitive to danger and fear, serving to charge the modes. The understanding of conscious and unconscious fears being charged and activating the mode system explains the level of emotional dysregulation and impulse control of the typology of youngsters that we treat.

To address the schema processing based on thoughts and beliefs without understanding the modes is insufficient and does not explain the specific adolescent typology referred to in Mode Deactivation Therapy methodology.

The Mode System is compounded by the charge of analogous schema once danger activates the orienting schemas.

Mode De-Activation: There are four areas where a mode can be deactivated prior to an aggressive act or other forms of emotional dysregulation: orienting schema, perception or interpretation of the fear to danger activation, physiological system, and avoids. The mode

deactivation system takes into account the reactive type of dysregulation, which includes parasuicidal acts, as well as aggression.

STEP VIII: FUNCTIONALLY BASED TREATMENT FORM: The Functionally Based Treatment Development Form is the culmination of all previous components of the case conceptualization. This form is intended to give direction to treatment based on what has been learned about the resident through doing the case. The basis of this form is the development of a new, healthier belief system. These beliefs are healthy alternatives to the compound core beliefs identified in the Fear, Avoid, Compound core belief Correlation.

This is the blueprint to treatment. It takes time and thought. When you finish you should have measurable goals for you treatment plan. You also should be able to set up your program. A rule of thumb, is to set up trial groups of 10, which is congruent with a percentage score. An example of this is the scale of trust. A score of 1 indicates no trust, a score of 10 indicates total trust. You can use the scale of trust to objectively measure the level of trust your resident has for you (the therapist) and anyone else significant in his life.

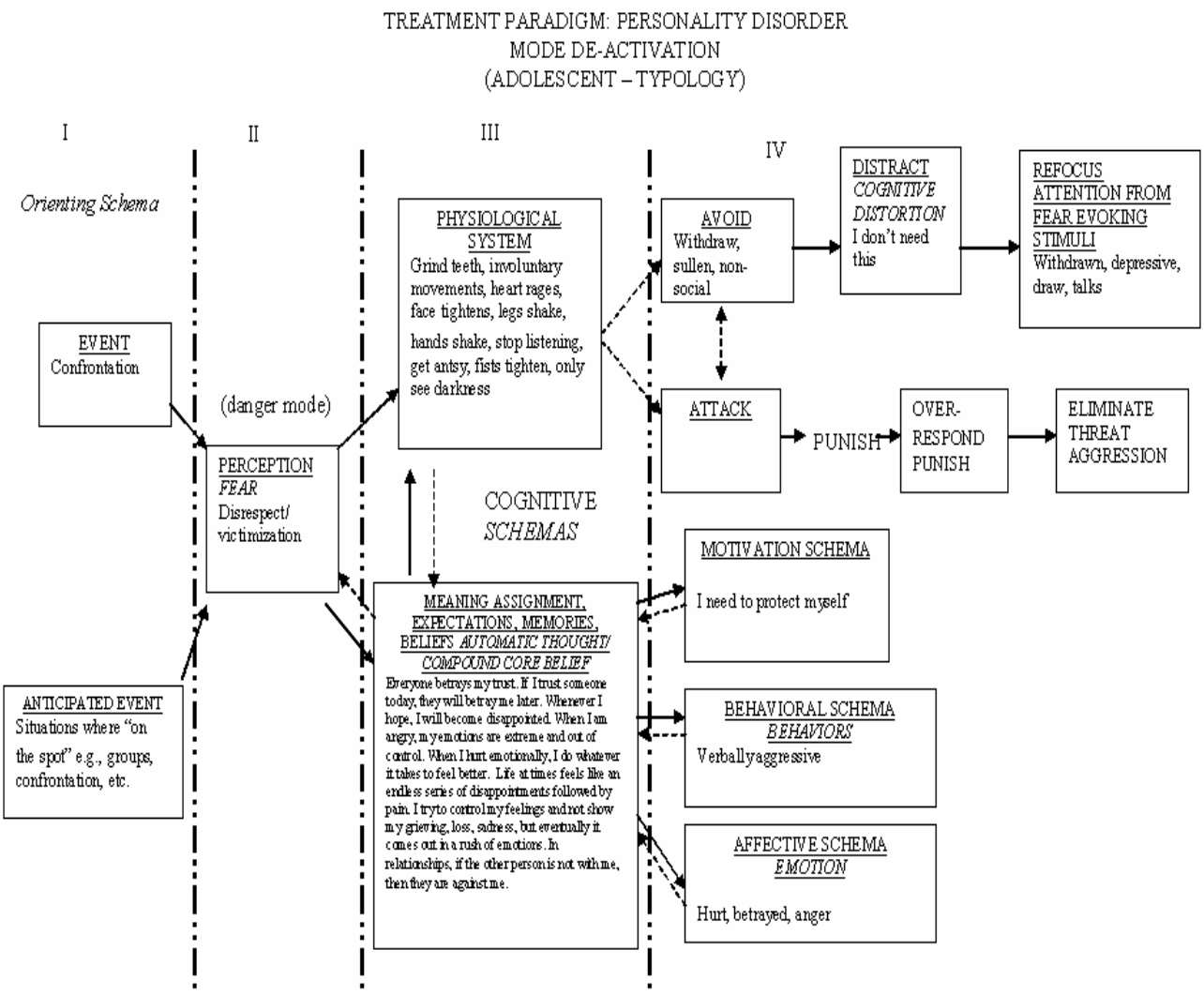


Figure 9 Mode De-Activation

The Functionally Based Treatment Form is designed to identify desired behaviors and prescribe the implementation of these new behaviors through validating, clarifying, and redirecting. It is important to continuously validate-clarify-redirect during individual therapy. Validate the grain of truth in the resident's responses. Clarify content of his responses. Redirect his responses.

FUNCTIONALLY BASED TREATMENT DEVELOPMENT FORM					
IDENTIFY NEW BELIEF SYSTEM	IDENTIFY HEALTHY ALTERNATIVE THOUGHTS	FUNCTIONAL ALTERNATIVE COMPENSATORY STRATEGY	FUNCTIONAL REINFORCING BEHAVIOR(S)	SPECIFIC FUNCTIONAL TREATMENT INDIVIDUAL THERAPY TO MILIEU	VALIDATE/ CLARIFY/ REDIRECT (VCR) Validate the grain of truth in his responses/ clarify content of his responses/ Redirect his responses
I can trust some people some times. I am adequate. I can balance myself. When I hurt (emotional) I can balance myself. My anger can be balanced.	If others disagree, they may not be against me. I can take a risk to feel. I can balance my pain. I can deactivate my anger.	I will take small steps and measure others…trust level. I accept others' faults; they accept mine. Practice rational thought and balance. Identify physiological triggers, rank – identify cognitions and anticipated events.	Work on scales of trust with therapist to develop alliance. Work on balance of belief scales. Identify my balance thoughts. Practice through imagined exposure to all physiological & cognitive triggers	Try to trust one staff, Ms. Margaret. Pick one issue and take a risk one step at a time, in group. Identify issues that cause pain and practice balance. Practice mode activation with staff in vivo. Identify when physiological triggers initiate. Identify continuum of fear activation. Identify when beliefs go out of balance.	It's okay to not trust some people at times, identify one person he does trust some of the time and use scale of trust to measure trust daily It's okay to make mistakes, help him identify areas of adequacy and use belief scales to balance It's okay to feel overwhelmed by emotions, identify thoughts/ beliefs to balance emotions It's okay to feel angry, identify physiological system and beliefs to slow down, prevent, or reduce escalation Use belief scales to balance beliefs

Figure 10 Functionally Based Treatment Development Form

REFERENCES

Alford, B.A., & Beck, A.T. (1997). The integrative power of cognitive therapy. New York, NY: Guilford Press.

Apsche, J.A. & Ward, S. R. (2002). Mode deactivation therapy (MDT): Case conceptualization, unpublished.

Beck, A.T. (1996). Beyond Belief: A Theory of Modes, Personality, and Psychopathology. In P.M. Salkovaskis

(Ed.), Frontiers of Cognitive Therapy (pp. 1-25). New York, NY: Guilford Press.

Beck, A.T., Freeman, A., & Associates. (1990). Cognitive therapy of personality disorders. New York: Guilford Press.

Beck, A.T., Wright, F.D., Newman, C.F., & Liese, B.S. (1993). Cognitive therapy of substance abuse. New York: Guilford Press.

Dodge, K.A., Lochman, J.E., Harnish, J.D., Bates, J.E., and Petti, G.S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. Journal of Abnormal Psychology, 106 (1), 37-51.

Koenigsberg, H.W., Harvey, P.D., Mitropoulou, V., Antonia, N.S., Goodman, M., Silverman, J., Serby, M., Schopick, F., & Siever, L. (2001). Are the interpersonal and identity disturbances in the borderline personality disorder criteria linked to the traits of affective instability and impulsivity? Journal of Personality, 15 (4), 358-370.

Kohlenberg, R.J. & Tsai, M. (1993). Functional Analytic Psychotherapy: A Behavioral Approach to Intensive Treatment. In W. O'Donohue & L. Krasner (Ed.), Theories of Behavior Therapy: Exploring Behavior Change (pp. 638-640). Washington, DC: American Psychological Association.

Linehan, M.M. (1993). Treating borderline personality disorder: The dialectical approach. New York: Guilford Press.

Nezu, A.M., Nezu, C.M., Friedman, S.H., & Haynes, S.N. (1998). Case Formulation in Behavior Therapy: Problem-Solving and Functional Analytic Strategies. In T.D. Eells (Ed.), Handbook of Psychotherapy Case Formulation (pp.368-401). New York, NY: The Guilford Press.

ORGANIZATIONAL CHANGE APPLICATIONS IN BEHAVIOR ANALYSIS: A REVIEW OF THE LITERATURE AND FUTURE DIRECTIONS

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Implementing lasting organizational change has received an increasing amount of attention in the literature over the last 20 years. Despite this general trend, behavior analysts have been slow to address this when presenting applied research. This article reviews research published in *The Journal of Organizational Behavior Management* (JOBM) since 1990. The review suggests that the major areas of systematic applications in OBM target performance of first line employees and supervisors and that the impact of such interventions are rarely linked to companies' financial success and survival. Conclusions concerning the directions of the field of organizational behavior management in consideration of these findings are offered.

Global market change is occurring at a fast pace. A recent report published by The Conference Board in Canada, titled "Leadership for Tomorrow: Playing Catch-up with Change", reveals that the complexity and speed of change is beyond what most high-level executives can manage or their own. Increasingly, corporate leaders are relying on the skills, education, and competence of their employees at all levels of organization (Papmehl, 2002). Accordingly, successful organizational response to market demand requires response from individuals at all levels. This means that organizational effectiveness depends on the alignment of responses from the top management level down to the performer level (i.e., front line worker).

In a review of Industrial /Organization (I/O) psychology literature, Tharenou (2001) stresses the need for a greater focus on organizational change. Tharenou (2001) states that as the world continues to move to a global economy, organizations will need to adapt to changing cultural and economic contingencies. She argues that even though individual performance certainly cannot be ignored, the changing climate calls for a greater focus on the context in which an organization functions. Tharenou (2001) also discusses how lasting, structural change might be carried out given contextual constraints. Given the need to focus on organizational change, it is important to consider various ways through which such change may be approached.

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Theoretical Perspectives

At the theoretical level, organizational change has been studied from a variety of perspectives incorporating an array of assumptions. Prochaska (2000) argues that organizational change can be viewed as a developmental process through which the organization passes through a variety of stages. Desired changes are made possible when the change agent is able to successfully recognize and adapt to the developmental stage that the organization is resting in (Levesque, Prochaska, & Prochaska, 1999). McKenna (1999) takes a more humanistic approach in arguing that successful change comes about as a function of the manager's need for control and his or her ability to understand the complexity of the system in need of change. Olson (1990) takes a psychoanalytic perspective in arguing that orchestrating successful change involves capitalizing on the conflict between conscious and unconscious understandings of that change.

In the behavioral literature, organizational change is addressed theoretically through the meta-contingency analysis (Mawhinney, 1992, 2001; Malott, 2002). According to this perspective, when the products of organizational practices contribute to the

materialistic survival of the organization, the practices that generated them are more likely to reoccur. More specifically, like any other cultural practice, organizational practice can be defined as "a set of interlocking contingencies of reinforcement in which the behavior and behavioral products of each participant function as environmental events with which the behavior of other individuals interact" (Glenn, 1988). Furthermore, group practices (e.g., production methods, marketing techniques, process management, etc.) in organizations are selected by their consequences. Therefore, there is a contingent relation between a cultural practice in an organization and the outcome of that practice (e.g., group survival, in turn, maintains the future production of organizational product). This relationship is called a metacontingency.

Theories of selection and metacontingencies are also applied within the framework of behavioral systems analysis. According to this perspective, which is based on general system theory, organizations are behavioral systems that are formed by individuals' interaction toward a common goal. This interaction toward a common goal occurs within the context of the organization's interaction with a broader cultural and economic environment (Brethower, 2000, 2002; Malott, 2001, 2002; Rummler, 2001; Rummler & Brache, 1995).

Applied Research

Applied research in organizational change has demonstrated a similar breadth of approaches. One common approach is the classification of personality traits, the various reactions that people demonstrating such traits might have toward organizational change, and how the prevalence of such traits might help or hinder change (Wanberg & Banas, 2000; Rousseau & Tijoriwala, 1999; Judge, Thoresen, Pucik, & Welbourne, 1999; Janssen, de Vries, & Cozijnsen, 1998; Myerson & Scully, 1995). While these authors tend to view personality traits as innate characteristics of the individual, which the organization may use or must overcome, other researchers have approached attitudes towards change as a function of the change process and recommended strategies toward generating positive reactions to the change process. Often conceptualized as "stress" or "resistance", researchers have recommended overcoming these attitudes through role-clarification (Yousef, 2000), employee empowerment (Labianca, Gray, & Brass, 2000; Loekk, & Arnetz, 1997), training of coping strategies (Mack, Nelson, & Quick, 1998), and employee participation in the change (Sagie & Kowolsky, 1996), to name a few.

Additional research, primarily in the area of health service delivery, has focused on the outcomes of organizational change. McDougal, Moody Clonan, and Martens (2000) examined the effects of a pre-referral intervention program on the number of students referred to a special education program and the acceptability of that intervention to the referring staff. Rosenheck and Horvath (1998) studied the effects of organizational restructuring on the number of clients receiving in-patient and community-based health services. Additionally, Lord, Ochocka, Czarny, and MacGillivary (1998) reported the effects of change processes on the role of the consumer in the distribution of mental health services.

Literature such as the aforementioned is only a sample of a growing body of research in the area of organizational change. Despite the increasing attention from the psychological sciences that organizational change is receiving as a subject matter, the field of Organizational Behavior Management (OBM) has been slow to address organizational change as a subject matter in its own right. Though much of the research generated by organizational behavior managers could be presented as dealing with organizational change, more often than not, the attention organizational change receives and inferences regarding its processes are discussed only very generally, if at all, in research findings. Given the robust demonstrations of behavioral principles that have been reported at the organizational level and the implications these findings have for organizational change, this is somewhat surprising. Accordingly, the purpose of this paper is to 1) analyze several areas and methods that have been published since 1990 in a prominent journal in the field of OBM (i.e., Journal of Organizational Behavior Management), 2) discuss the implications that such research has in relation to organizational change, and 3) close with a discussion of possible benefits the field of OBM might realize as a result of turning more attention toward this topic.

Method

Procedures

Volumes 11-21 of the Journal of Organizational Behavior Management (JOBM) were reviewed by four graduate and undergraduate students. Each student reviewed the method and results sections of ten or more articles. Only articles that referenced applied, empirical research within actual organizations or businesses were selected. We considered articles to be empirical if data concerning behavior or behavioral outcome were represented in the context of a "Results" section. One article was excluded, even though it included all sections specified for study since it was an addendum to an article appearing prior to volume 11. Further, we constructed a data collection sheet to identify the level of analysis utilized, where intervention was targeted, who measures where taken for, and the intervention strategies implemented. Operational definitions were developed to define each category corresponding to the data-collection sheet utilized. Further, operational definitions were defined for each category in addition to their subcategories.

Operational Definitions

Unit of measure. The units of measure are identified as (a) group data only, (b) individual data only, or (c) group and individual data. Group data is defined as an analysis represented as a conglomerate of outcome or behavior data, including financial data. Individual data is defined as any within subject analysis or any representation of outcome or behavior data for an individual participant. None of the individual data include financial measures.

Level of intervention. Level of intervention is the target unit of measurement and is defined as all of the people whose behavior was directly intervened upon. The subgroups consist of (a) front-line staff, (b) front-line managers, and (c) high level management. Front-line staff is defined as those individuals whose performance directly impacts a product or the public. Front-line managers are defined as those individuals who directly supervise front-line staff performance. High level management is defined as any individuals whose responsibilities include administrative duties and do not directly supervise front-line staff.

Target measures. These are the implemented measures and are defined as all of the people or measures whose behavior or behavioral outcomes are represented in the data. The subcategories include (a) front-line staff, (b) front-line managers, (c) high level management, (d) financial measures, and (e) other measures. Financial measures are defined as any fiscal measure that data were collected for. Other measures include any data that are presented that do not include any of the previous subcategories.

Intervention strategies. Intervention strategies are identified as any of the following subcategories which improve production or efficiency: (a) feedback, (b) goal-setting, (c) incentives, (d) self-monitoring, (e) training, (f) procedure change, (g) physical plant, (h) punishment, (i) prompts, and (j) job aids. Feedback is defined as any process by which workers are informed of their performance. Goal-setting is defined as any procedure where employees or employers set goals for performance. Incentives are defined as money or other items used to increase behavior. Self-monitoring is defined as any procedure where employees maintain data relating to their own behavior or behavioral outcome. Training is defined as education and skill acquisition pertaining to performance and occurring prior to any data collection at the level of intervention. Procedure change is defined as a modification to the process by which a specific task is carried out. Physical plant is defined as changes to the physical environment. Punishment is defined as the application of consequences to reduce behavior. Prompts are defined as interventions occurring prior to the behavior, aimed at increasing desired behavior and occurring in an ongoing manner during intervention. Job aids are defined as the distribution of materials aimed to assist performance. Policy change is defined as any change to or addition of rules aimed at controlling employee behavior or business change.

Interobserver Agreement

Reliability measures were taken to ensure accurate categorization. Interobserver agreement was collected on approximately 38% of articles reviewed. The reliability index used was the number of agreements divided by the number of agreements plus disagreements

multiplied by 100. The mean interobserver reliability was 96.8% with a range of 85.7 to 100%.

Results

137 articles were published in the volumes of JOBM reviewed. Of those articles, 38 met the above criteria for inclusion. Of those articles reviewed for this study, 36 targeted front-line staff, 12 targeted front-line management, and 2 targeted high-level management. Of the 36 articles targeting front-line staff, 9 also targeted front-line management and 1 targeted front-line management and high-level management. 1 article targeted front-line management exclusively and 1 targeted front-line management and high-level management.

Data concerning unit of measure are summarized in Table 1. Group level was the most common method of analysis for all intervention targets. Individual level of analysis was employed in 12 of 36 interventions conducted at the front-line, in 2 of 12 interventions conducted at the level of front-line management and in neither of the studies targeting high-level management.

Data concerning intervention strategies are shown in Table 2. As an intervention strategy, feedback was the most frequently employed method of intervention at the level of front-line staff and high-level management and the second most employed intervention at the level of front-line management. At the level of front-line management, training was the most frequently employed intervention and was the second most employed intervention at the level of front-line staff. At the level of front-line staff, goal setting and self-monitoring were used at equal rates over the study period followed by procedural change, prompts and job-aids. Finally, physical-plant change, punishment and policy change were used only once during the study period and only at the level of the front-line staff.

Procedural change was the third most commonly used at the level of front-line management, followed by incentives and goal setting. Self-monitoring and prompts were employed only once at the level of front-line management. No other interventions were directed at front-line management. Training, incentives and goal-setting were each applied once toward high-level management and no additional interventions were employed for this target group.

Table 3 indicates data concerning target measures as they relate to interventions targeting various levels of employment. In other words, this analysis compared the level of employment at which an intervention was aimed with the level of employees whose behaviors or behavioral outcomes were included in data analysis. To clarify, an intervention might include training at the level of front-line management but only represent front-line staff in the data. Looking at the table, one can see that of 12 studies targeting front-line management, 7 included behavior or behavioral outcomes measured at the level of front-line staff, 5 interventions targeted at front-line management contained measures for front-line management, and so on. In most cases, data were reported for the level at which intervention occurred, though in certain cases only financial data were shown. Additionally, interventions targeted at management levels were more likely to incorporate data from lower levels of employment. Though data were not collected concerning what types of measures were included in "other measures", data collectors descriptively reported that these generally referred to measures of satisfaction with an intervention strategy or, in certain cases, client outcome.

Data concerning financial measures and follow-up measures are depicted in figure 1. Financial measures were included in a total of 9 out of 38 studies and, when represented, were often the only measures included. Additionally, follow-up measures that identified the lasting effect of organizational interventions were included in only 9 out of 38 studies.

Discussion

Our aim in this paper was to identify major areas of research and methodologies that have been published in JOBM since 1990, discuss the implications of such research in relation to organizational change, and provide a discussion of possible benefits the field of OBM may realize as a result of turning more attention towards this topic.

One conclusion that may be drawn from this review is that behavior analysis has a variety of methods that demonstrate effective change in a variety of organizations and at varying levels

within the organization. Feedback, incentives, training, prompts, and so on have repeatedly been shown as effective agents for behavior change when used in an organizational setting. The value of the strategies employed by the various researchers whose work is represented here is not in question. However, our review suggests that the major areas of systematic applications in OBM target performance of first line employees and supervisors and that the impact of such interventions are rarely linked to companies' financial success and survival. As shown, less than a fourth of the articles reviewed included an analysis of the financial impact an intervention might have for the organization. Additionally, just as few studies took measures to ensure that the changes implemented would have a lasting effect. In that regard, the issue is whether or not the generalization of our scientific technology to broad-scale change in organizations is a worthwhile goal to pursue.

According to organizational literature, broad-scale organizational change that targets the complex organizational contingencies at all levels of the organization is likely to produce lasting change (Brethower, 2000, 2002; Rummler, 1995, 2001; Malott, 2001). This is a noteworthy cause for OBM researchers and practitioners since the primary goal of the science of human behavior is to produce utilitarian technologies that bring about positive and lasting change in the behavior of individuals and ultimately the practices of groups and cultural collectivities.

With regard to the analysis of cultural practices, we define practices in organizations as learned interactions with institutionalized stimuli (e.g., rules, policies, mission, vision, other organizational members, etc.), acquired under group auspices, and shared among members of a given organization. More specifically, with regard to organizations (which we consider as cultural settings), cultural practices involve the interindividual transmission of organizational information. We believe that the dominant patterns of behaviors of organizational members are perhaps the most challenging components of any organizational system since they are somewhat informal, contextual, implicit, and are strengthened and transmitted interindividually as well as intraindividually. Therefore, the challenge in designing interventions and their maintenance lies in making explicit what is usually implicit. This process requires an account of operating contingencies that govern and maintain interrelated behaviors of individuals in organizational settings and ultimately impact organizational interaction with its environment. Scholars such as Malott (2001, 2002) Abernathy (1996, 2000), Abernathy and Harshbarger (2002), Brethower (2000, 2002), and Mawhinney (1992, 2001) have addressed the broad-scale organizational issues and have provided systematic approaches to organizational change that are based on an environmental selection perspective. Our challenge then is to demonstrate systematic applications of such perspectives and broaden the scope of behavioral science.

In addition, application of our broad-scale technology seems worthwhile since it will help us respond to market demand and hence promote the growth of our field. This approach may require an increase in our response effort as researchers however, since broad-scale application implies interaction with many environmental complexities and variability. However, the aforementioned literatures offered by behavioral analysts who are interested in broad-scale application provide a solid foundation for our pursuance of such challenges. Further, the resources required (e.g., cooperative organizations, labor associated with data analyses and implementations, etc.) for broad-scale applications may not be as readily available as the ones that have been used in small-scale interventions. However, many scholars in OBM are successful practitioners who have expertise and access to potential sources of data and systematic applications. In that regard, increased collaboration between academicians and such practitioners may contribute to our goal of systematic organizational change interventions.

To conclude, we believe that further analyses associated with precise specification and demonstration of the means by which organizational contingencies influence dominant patterns of organizational members' behaviors that ultimately impact organizational performance and survival is a challenge that is worth the direct attention of behavior analysts in the field of OBM. Though the development of strategies targeting the behaviors of specific individuals or practices of groups is important work, the ultimate goal of such interventions is

to first ensure the survival, and second facilitate the improvement of the organization more generally. Therefore, the final measure of the success or failure of an organizational intervention is at the organizational level. If OBM is to remain current not only with trends in business but the goals of the organizational science as well, we feel the field must account not only for the behavior of individuals working for an organization, but the impact that behavior change has for the success of the organization more broadly.

References

Abernathy, W. B. (1996). *Sin of wages*. Memphis, TN: PerfSys Press.

Abernathy, W. B. (2000). *Managing without supervision: Creating an organization-wide performance system*. Memphis, TN: PerfSys Press.

Abernathy, W. B., & Harshbarger, D. (2002). A proposed new program perspective and curriculum for organizational behavior management. *Organizational Behavior Management*. Retrieved October 10, 2002, from http://www.behavior.org.

Brethower, D.M. (2002). Behavioral system analysis: Fundamental concepts and cutting edge applications. *Organizational Behavior Management*. Retrieved October 10, 2002, from http://www.behavior.org.

Brethower, D. M. (2000). A systematic view of enterprise: Adding value to performance. *Journal of Organizational Behavior Management*, *20*, 3/4, 165-190.

Glenn, S. S. (1988). Contingencies and metacontingencies: Toward a synthesis of behavior analysis and cultural materialism. *The Behavior Analyst, 11*, 161-179.

Janssen, O., de Vries, T., & Cozijnsen, A. J. (1998). Voicing by adapting and innovating employees: An empirical study on how personality and environment interact to effect voice behavior. *Human Relations, 51*, 945-967.

Judge, T. A., Thoresen, C. J., Pucik, V., & Welbourne, T. M. (1999). Managerial coping with organizational change: A dispositional perspective. *Journal of Applied Psychology, 84*, 107-122.

Labianca, G., Gray, B., & Brass, D. J. (2000). A grounded model of organizational schema change during empowerment. *Organization Science, 11*, 235-257.

Levesque, D. A.; Prochaska, J. M.; Prochaska, J. O. (1999). Stages of change and integrated service delivery. *Consulting Psychology Journal, 51*, 226-241.

Loekk, J., & Arnetz, B. (1997). Psychophysiological concomitants of organizational change in health care personnel: Effects of a controlled intervention study. *Psychotherapy and Psychosomatics, 66*, 74-77.

Lord, J., Ochocka, J., Czarny, W., & MacGillivary, H. (1998). Analysis of change within a mental health organization: A participatory process. *Psychiatric Rehabilitation Journal, 21*, 327-339.

Mack, D. A., Nelson, D. L., & Quick, J. C. (1998). The stress of organisational change: A dynamic process model. *Applied Psychology: An International Review. Special Issue: Applied Psychology in the USA, 47,* 219-232.

Malott, M. E. (2002*). Paradox of organizational change*. Manuscript submitted for publication.

Malott, M. E. (2001). Putting the horse before the cart: Process-driven change. In L. J. Hayes, J. Austin, R. Houmanfar, & M. C. Clayton (Eds.), *Organizational Change* (pp. 297-320). Reno, NV: Context Press.

Mawhinney, T. C. (2001). Organization-environment systems as OBM intervention context: Minding your metacontingencies. In L. J. Hayes, J. Austin, R. Houmanfar, & M. C. Clayton (Eds.), *Organizational Change* (pp. 137-166). Reno, NV: Context Press.

Mawhinney, T. C. (1992). Evolution of organizational cultures as selection by consequences: The Gaia hypothesis, metacontingencies, and organizational ecology. *In T. C. Mawhinney (Ed.), Organizational Culture, Rule-Governed Behavior and Organizational Behavior Management* (pp. 1-26). New York: The Haworth Press, Inc.

McDougal, J. L., Moody Clonan, S., & Martens, B. K. (2000). Using organizational change procedures to promote the acceptability of prereferral intervention services: The school-based intervention team project. *School Psychology Quarterly. Special Issue: Acceptability research in school psychology, 15*, 149-171.

McKenna, S. (1999). Learning through complexity. *Managmenent Learning, 30*, 310-320.

Myerson, D. E. & Scully, M. A. (1995). Tempered radicalism and the politics of ambivalence and change. *Organization Science, 6*, 585-600.

Olson, E. E. (1990). The transcendent function of organizational change. *Journal of Applied Behavioral Science, 26*, 69-81.

Papmehl, A. (2002). Employee development in a changing organization. *CMA Management*, *75*, 10, 12-15.

Prochaska, J.M. (2000). A transtheoretical model for assessing organizational change: A study of family service agencies' movement to time-limited therapy. *Families in Society, 81*, 76-84.

Rosenheck, R., & Horvath, T. (1998). The impact of VA reorganization on patterns of mental health care. *Psychiatric Services, 49*, 53.

Rousseau, D. M., & Tijoriwala, S. A. (1999). What's a good reason to change?

Motivated reasoning and social accounts in promoting organizational change. *Journal of Applied Psychology, 84*, 514-528.

Rummler, G. A. (2001). Performance logic: The organization performance rosetta stone. In L. J. Hayes, J. Austin, R. Houmanfar, & M. C. Clayton (Eds.), *Organizational Change* (pp. 111-132). Reno, NV: Context Press.

Rummler, G. A., & Brache, A. P. (1995). *Improving performance: How to manage the white space on the organizational chart* (2nd ed.). San Francisco: Jossey-Bass.

Sagie, A., & Kowolsky, M. (1996). Decision type, organisational control, and acceptance of change: An integrative approach to participative decision making. *Applied Psychology: An International Review, 45*, 85-92.

Tharenou, P. (2001). The relevance of industrial and organisational psychology to contemporary organisations: How far have we

come and what needs to be done post-2000? *Australian Psychologist, 36*, 200-210.

Wanberg, C. R., & Banas, J. T. (2000). Predictors of outcomes of openness to change in a reorganizing workplace. *Journal of Applied Psychology, 85*, 132-142.

Yousef, D. A. (2000). The interactive effects of role-conflict and role-ambiguity on job-satisfaction and attitudes toward organizational change: A moderated multiple regression approach. *International Journal of Stress Management, 7*, 289-303.

TREATING OBSESSIVE-COMPULSIVE DISORDER WITH EXPOSURE AND RESPONSE PREVENTION

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Exposure and Response (ritual) Prevention (EX/RP) for obsessive-compulsive disorder (OCD) is a behaviorally based treatment that is the most effective treatment available for most patients with OCD. In this paper, we will provide a brief description of OCD and outcome data on EX/RP, followed by discussion of the procedures and techniques involved in EX/RP which include imaginal exposure, in vivo exposure, and ritual prevention.

OCD

Obsessions are intrusive thoughts, images, or impulses that keep coming back to people and that do not make sense. Some common obsessions include fear of contamination, fear of harm to self or others, fear of sin or immorality (also known as scrupulosity), intrusive sexual thoughts, a need for symmetry or exactness, and fear of losing things or throwing things away. Compulsions are behaviors or "mental acts" which people feel driven to perform and have difficulty resisting. Common compulsions include washing, checking, reviewing, hoarding, reassurance seeking, and mental neutralizing. Compulsions, whether overt behaviors or "mental rituals," are meant to alleviate the distress brought on by obsessional thoughts and/or to prevent bad things from happening (e.g., patients with contamination obsessions wash their hands to prevent themselves from getting ill). Most patients tend to have more than one type of obsession or compulsion. When patients engage in an hour or more of obsessions or compulsions in a day, or if they are distressed or impaired due to these symptoms, then the patient is considered to have OCD.

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EX/RP

Effective treatment for OCD must involve *both* exposure and ritual prevention. Exposure involves confronting situations, objects, and thoughts that evoke anxiety or distress because they are unrealistically associated with danger. Response (ritual) prevention is conceptualized as blocking avoidance or escape from feared situations. By encouraging the individual to remain in the feared situation without any avoidance behaviors, EX/RP affords patients the opportunity to learn that their fears are unrealistic.

It is essential that clinicians and patients understand why it is so important to do exposure and ritual prevention together. Many patients would not mind confronting a feared stimulus (e.g., touching something contaminated) if they could then engage in rituals (e.g., handwashing). Rachman and his colleagues (see Rachman & Hodgson, 1980) showed that exposure to cues that trigger obsessions increase anxiety and discomfort and that ritualistic behavior led to a decrease in anxiety and discomfort. When patients were exposed to obsessional cues, but were prevented from engaging in rituals, anxiety and discomfort decreased over time. When patients were then exposed to their obsessional cues again, the urge to ritualize had decreased as compared to the previous trial. This decrease in urge to ritualize did not occur if patients continued to engage in rituals in response to obsessional cues.

Foa and colleagues (1984) showed further evidence for the importance of using

both exposure and ritual prevention in the treatment of OCD. In this study, patients with OCD were randomly assigned to receive either exposure alone, ritual prevention alone, or combined EX/RP. The component treatments seemed to have unique effects on OCD symptoms – ritual prevention led to reduction in compulsions and exposure led to reduction in the anxiety response to feared stimuli. Not surprisingly then, the combined treatment was found to be superior to the component treatments, with patients in this group showing the greatest reductions in both anxiety and compulsions.

EX/RP treatment programs have gained empirical support, with both adults (Foa, Liebowitz, & colleagues, in preparation) and children (deHaan et al., 1998) treated with EX/RP showing more improvement in OCD symptoms than those treated with medication. Currently, many researchers are interested in whether combined treatments (medication and therapy) confer a greater advantage than monotherapies. The study done by Foa, Liebowitz, and colleagues suggests that there is not an advantage to using combined medication and EX/RP in the treatment of OCD over EX/RP monotherapy (see also Foa, Franklin, & Moser, in press).

Information Gathering

Most frequently, we conduct EX/RP two to five times a week, in two hour sessions, for a total of 17 sessions and include extensive homework assignments. Typically, the first two sessions of treatment involve information gathering; the remaining sessions are spent doing exposures and ritual prevention.

The first step in implementing EX/RP is for the clinician and the patient to get a clear sense of the functional relationship between obsessions and compulsions. While the distinction between obsessions and compulsions might be clear to clinicians, it is likely less clear for patients and perhaps not even something they have thought about. Clinicians should provide patients with clear definitions for obsessions and compulsions, using examples that are relevant to the patient's unique OCD symptoms. In addition to identifying compulsions as behaviors which function to reduce discomfort, non-ritualized avoidance behaviors need to be identified. For example, a person who fears getting contaminated by food might never eat outside their own home and a person who is worried about catching their house on fire by leaving the stove on might avoid ever turning the stove on in the first place. Getting a clear picture of avoidance patterns is also crucial to good treatment planning since EX/RP will include exposure to cues that are being avoided and subsequent ritual prevention. Starting after the first session, the patient is assigned self-monitoring homework which then continues throughout treatment in order to facilitate a continuous assessment process.

In Vivo Exposure

In vivo exposure is probably the most commonly known type of exposure used as part of EX/RP. After creating a hierarchy of situations related to the patient's specific OCD symptoms, the therapist works with the patient to select a situation on the hierarchy that is moderately anxiety provoking (around a 50 on a 1 to 100 scale). The first exposure that is chosen is one that the therapist is relatively confident that the patient will be successful at staying in without ritualizing in order to habituate. After this, the therapist works with the patient to quickly move up the hierarchy, with the goal of accomplishing the highest item by the 6th session. While this may sound overly ambitious, we find that most of the time it can be accomplished. After the 6th session, most of the sessions are spent working on generalizing the gains to other contexts and finding variations that are more difficult for the patient. Thus, while we reach the top of the hierarchy, anxiety usually does not decrease to consistently low levels without repetition.

During exposure exercises, the therapist should not engage in distraction by constantly discussing other topics. Rather, focus should be placed on processing the activity that the patient is engaged in through discussing what they are doing and why they are doing it. For some patients, this may take the form of discussing the likelihood of the feared consequence occurring and for others it may be discussing the realistic consequences. One of the most important concepts to teach the patient during *in vivo* exposure is that the idea of exposure is to expose

oneself to anxiety and to learn that it will naturally decline over time even if nothing is done to reduce it. Any time one tries to suppress the anxiety through some form of escape or avoidance, it is likely to recur again without having learned anything. The art of using exposure is to determine what is the best way to expose patients to situations/stimuli that will elicit the core fear and help them to stay in situations long enough to allow the anxiety to decline and learning to occur.

Imaginal Exposure

Another component of EX/RP is imaginal exposure. While unnecessary for some patients, imaginal exposure can be an important component of treatment for others. There are a number of feared consequences that one is not able to expose the patient to directly, thus making *in vivo* exposure impossible. In imaginal exposure, patients must habituate to the *idea* of their feared consequences were they to actually occur.

Another important principle that is addressed in imaginal exposure is that thoughts are not the equivalent of actions, a problem called thought-action fusion, which is one of the major cognitive errors made by patients with OCD (Coles, Mennin, & Heimberg, 2001). As an example, a patient might fear killing his family with a knife. In imaginal exposure, the patient would be asked to repeatedly imagine himself doing so in detail. While the patient will be extremely anxious initially, after repeated trials he will habituate to this scene and no longer find it as anxiety provoking. Over time, the patient will also realize that thinking such thoughts does not mean he actually will kill his family and he will learn to accept the temporary presence of the thought when it intrudes. Once the patient stops suppressing the thought, it is likely that it will return less frequently and with less intensity (see Abramowitz, Tolin, & Street, 2001).

There are a few important guidelines to keep in mind before embarking on imaginal exposure with patients. First, exposures of any sort should not be conducted until a careful assessment has been completed. One goal of the assessment process is determine the functional relationship between obsessions and compulsions. By definition, obsessions are experienced as intrusive, unwanted, and anxiety provoking; rituals are meant to alleviate the discomfort brought on by obsessions. Imaginal exposure should not be used if patients present with thoughts that are not experienced as intrusive and unwanted (e.g., when a patient thinks about sexual relations with a child and experiences these thoughts as arousing). People with OCD who have sexual and aggressive obsessions experience these thoughts as intrusive, terribly frightening, and completely incongruent with their beliefs and desires.

Secondly, imaginal exposures need to be conducted through a collaboration of the therapist and the patient in order to tailor the scene to the patient's core fears. For example, if a patient presents with fear of becoming ill, it is important to get a clear sense of the nature of this fear. One patient might fear contracting a specific illness and has a clear picture of how this would happen. Another patient might believe that she will just start to feel a general malaise and might be most frightened by not knowing the nature and cause of the illness. Imaginal exposures must take into account these subtle differences that underlie very similar core obsessions (e.g., "I am going to get sick and die").

The basic procedure for imaginal exposure begins with getting sufficient details to help the patient create a vivid scene that taps the core fears. The first time through the exposure, the therapist describes a scene for the patient, using details and the present tense. After this, the patient is encouraged to develop future scenarios under the therapist's guidance until they can do so without guidance. Each time the scene is tape recorded and listened to repeatedly, for 45 minutes or until habituation occurs (whichever comes first). It is important that the patient continues to listen to the same scene for a number of days without altering it in order to facilitate habituation. Generalization to similar scenarios typically occurs after between-session habituation has been demonstrated. The duration of each imaginal exposure really depends on how much context the patient needs to become engaged in the scene.

Ritual Prevention

In our treatment protocol, the first exposure is completed during Session Three, and at this time, ritual prevention is also introduced to patients. It is unrealistic to tell patients to simply stop engaging in rituals – if it were that simple, they would have stopped on their own. The best way to explain the need for ritual prevention (RP) is to return to the model of OCD and emphasize that only through exposure and ritual prevention will patients learn that anxiety decreases on its own without having to resort to rituals and that feared consequences are unlikely to happen. It is important to make clear that as long as patients acquiesce to that urge, the obsessional thoughts will be maintained over time. Given that obsessive thoughts are a source of distress, knowing that the thoughts should become less frequent and intense can be very motivating for patients. Of course, most patients also relish the idea of not having to engage in compulsions – even though this idea can be quite frightening. It can be very useful to spend some time with patients picturing a life without OCD. Many will voice a desire to spend more time doing pleasurable things and less time doing rituals.

For some OCD patients, rituals occupy their entire day and it would be near impossible for them to simply stop engaging in all rituals from one day to the next. Even with less pervasive rituals, some patients will refuse to do complete RP even if they understand the rationale for it. Rather than lose patients, it is sometimes appropriate to implement RP more gradually. Early success experiences can then be used to encourage more complete RP as treatment continues.

Some patients who have rituals in many different areas (e.g., washing, symmetry, checking) might be able to handle doing widespread ritual prevention right away. Others might be less overwhelmed if they can start with one focused area. In making this decision early on in treatment, clinicians should be mindful of the importance of giving their patients success experiences. If an overwhelming assignment is given early on in treatment, patients might feel as if they have failed and might see the prospect of living life without OCD as impossible. It is certainly better to initially assign a manageable ritual prevention task and use the success of that experience as a motivator for working on more difficult OCD symptoms. As therapy continues, it is essential that patients understand the principle of generalization. Particularly for complicated cases, there will not be time in therapy to individually tackle each OC symptom. Rather, patients should see that the principles of exposure and ritual prevention can be applied to all OC symptoms and they must become comfortable working on difficult symptoms on their own. This is important in terms of long-term maintenance of gains since once therapy ends, since patients might experience recurrences of OC symptoms and might also develop new concerns. It is essential that they be able to apply the principles of EX/RP at these challenging times regardless of the nature of the symptoms.

Although clinicians should certainly be flexible about ritual prevention, they should clearly communicate to patients that complete ritual prevention is the goal of treatment and that they should develop a commitment to living life without OCD. It is important to recognize though that patients might violate ritual prevention rules and that they should see these violations as learning experiences, rather than as failures. This is particularly true early in treatment. When patients do engage in rituals, they should make a note of what happened and try to develop an awareness of what triggered the ritual. This knowledge can then be used to design subsequent exposures that specifically target these problematic areas.

As therapy progresses, ritual prevention violations should become less frequent and clinicians should be more firm about the importance of this progression. When patients do engage in rituals, they should know to immediately re-expose themselves to the cue that triggered the urge to ritualize. For example, when a person with contamination fears washes their hands after touching something they perceive to be contaminated, they should touch the object again and try again to resist the urge to ritualize.

Knowing When to Terminate EX/RP

Finally, clinicians need to consider when it is optimal to terminate OCD treatment. It is usually unrealistic to keep patients in treatment until they have *no* OCD symptoms.

An important component of treatment is to help patients realize that they might continue to have some intrusive thoughts and urges to ritualize. The important issue is how patients handle these challenges. Patients will likely be ready to discontinue treatment when they recognize the importance of not suppressing obsessive thoughts and are able to refrain from ritualizing the great majority of the time. When they do slip, they should know to re-expose. Furthermore, as we mentioned earlier, it is important that patients know what to do if an old symptom starts to cause problems again or if a new concern arises. In short, we should feel confident sending patients away if they have the skills to be their own clinicians. As treatment progresses, it is essential to make patients comfortable in that role. Patients should take a more active role in designing exposures and if they come in to sessions with questions about how to deal with a challenging situation, they should be encouraged to try to devise strategies on their own first before the clinician offers suggestions.

References

Abramowitz, J.S., Tolin, D.F. & Street, G.P. (2001). Paradoxical effects of thought suppression: A meta-analysis of controlled studies. *Clinical Psychology Review, 21(5),* 683-703.

Coles, M.E., Mennin, D.S., & Heimberg, R.G. (2001). Distinguishing obsessive features and worries: The role of thought-action fusion. *Behaviour Research & Therapy, 39,* 947-959.

deHaan, E., Hoogduin, K.A.L., Buitelaar, J.K., & Keijsers, G.P.J. (1998). Behavior therapy versus clomipramine for the treatment obsessive-compulsive disorder in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 37,* 1022-1029.

Foa, E. B., Franklin, M. E., Moser, J. (In press). Context in the clinic: How well do CBT and medications work in combination. *Biological Psychiatry*.

Foa, E.B., Liebowitz, M.R., Kozak, M.K., Davies, S., Campeas, R., Franklin, M.D., Huppert, J.E., Kjernisted, K., Rowan, V., Simpson, H.B., Schmidt, A., & Tu, X. (in preparation). *Treatment of obsessive-compulsive disorder by exposure and ritual prevention, clomipramine, and their combination: A randomized, placebo-controlled study.*

Foa, E.B., Steketee, G., Grayson, J.B., Turner, R.M. & Latimer, P.R. (1984). Deliberate exposure and blocking of obsessive-compulsive rituals: Immediate and long-term effects. *Behavior Therapy, 15,* 450-472.

Rachman, S.J. & Hodgson, R.J. (1980). *Obsessions and compulsions.* Englewood Cliffs, NJ: Prentice-Hall.

BUILDING CONSTRUCTIVE PRISON ENVIRONMENTS: THE FUNCTIONAL UTILITY OF APPLYING BEHAVIOR ANALYSIS IN PRISONS.

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The present author evaluated a correctional program that applies the principles of behavior analysis with in a "Supermax" correctional facility that housed 128 adult male inmates with severe behavior problems. An interdisciplinary team systematically assessed behaviors to be targeted. An individualized program was created for each inmate. Criteria for discharge from this unit were to have completed the assigned programs and to have not engaged in any violations of the rules of prohibited conduct. Data were recorded by correctional staff on problematic behaviors and appropriate behaviors of inmates in this unit. Appropriate behavior was positively reinforced with increasing access to visitors, personal property and negatively reinforced by escaping from the unit upon completion of the assigned program. Results showed a significant decrease from years prior in the rate of misconduct reports and inmate grievances to the administration.

By the end of 2001, there were 2.1 million people incarcerated in America's prisons (Harrison and Beck 2002). In 2000, the National Center for Policy Analysis reported, "an estimated 630,000 inmates were released from prison last year, with an estimated 160,000 of those being violent inmates" (Du Pont 2000). These statistics beg several questions: is it surprising that the United States has surpassed South Africa as Western Civilization's most imprisoned people? What is being done, during the inmates' incarceration, to address antisocial behaviors that are being reinforced in prisons today? What are the maintaining variables that reinforce a person's development of pro-social behaviors? Does the society that imprisons these people recognize that criminal behavior does not simply stop at the entrance or the exit of a correctional facility? What is being done to change the behavior of these inmates into people who will eventually become our neighbors? Over the last twenty years there has been much advancement in the technology of Applied Behavior Analysis. Have these advancements facilitated the building of constructive prison environments? The purpose of this paper is to describe a current program that applies Behavior Analysis in a maximum-security prison setting.

History

Although the national trend toward more stringent sentencing laws is decreasing, prisons are left to deal with a subset of the population that is considered "unteachable". Likewise, "unteachable" was also the term used in the 1950's and 1960's to describe people with severe and profound retardation. It was in the 1960's that Behavior Analysts began to research the field of Mental Retardation and Dual Diagnoses (MR/DD), and today, there are few behaviors that cannot be changed through the systematic manipulation of environmental factors. Also, starting in the 60's and continuing into the early 80's, Behavior Analysts became interested in the application of the principles of behavior analysis in the correctional setting. In 1974, B.F. Skinner spoke out on the issue of how to build constructive prison environments in a "letter to the editor" of the New York Times:

"It is possible for prisoners to discover positive reasons for behaving well rather than the negative reasons now in force, to acquire some of the behavior which will give them a chance to lead more successful lives in the world to which they will return, to discover that the educational establishment has been wrong in branding them as unteachable and for the first time to enjoy some sense of achievement. But that can only be brought about through positive action."

Most of the groundwork for building Behavior Analytic based constructive prison environments have been outlined in the research emanating from this era in Behavior Analysis. A specific example of this research was undertaken in 1971by John McKee, a Behavior Analyst, regarding the issue of contingency management in a correctional institution. McKee describes a system in which 16 inmate

volunteers' performance in academic areas were effectively managed through the use of contingency management. The study consisted of three phases. The first phase was a three-week baseline period in which academic productivity was established. During phase-two, the experimenter systematically controlled the "academic output" of the inmates. During phase-three, the inmates were taught to generalize what they had learned during this experiment in the form of self-management. Overall, the inmates' performances were increased by 20%. Another example is that of Levinson et al (1968). Levinson and his colleagues used negative reinforcement (an increase in any behavior that terminates decreases, removes or avoids the aversive stimulus). In this paper, he describes a system in which the subjects were 17 inmates who had been repeatedly classified to the "Segregation Unit". The negative reinforcer used was continued involvement in therapeutic group therapy. "Escape" from the unit required the individual go three months without engaging in a pre-defined, maladaptive behavior. Eleven subjects completed the program, thereby successfully escaping from group attendance. Of the 11 subjects, three did not return to segregation in three months, and six were placed on work release.

Disagreements regarding incarcerated individuals as research participants, research methodologies, technical terminology and the political environment of the prison itself resulted in many Behavior Analysts leaving the prison environment. When the empiricists left this setting, the prisons were left without a technology of behavior change.

Once incarcerated, the majority of inmates will participate in the programs and treatments that are available, and do not engage in problematic behavior. Some, however, take a different path and become what is termed a "behavior problem." Mental health providers are usually unable to effectively treat the behaviors of individuals that range from harassing and provocative to dangerous and deadly because the behaviors are not due to a documented mental illness, and are therefore resistant to typical forms of therapy and psychopharmacological approaches. The task of managing the behavior of such inmates is left to security staff who are poorly trained to deal with the extreme behavior of such inmates on a long term or on an ameliorative basis. As a result, the inmate is often placed in the most restrictive housing that a states' Department of Corrections, or the Federal Bureau of Prisons has to offer, the Supermax.

The Supermax, or Intensive Management Unit (IMU), is a prison within a prison. The National Institute of Corrections (NIC), an arm of the U.S. Department of Justice, defines a "Supermax" as:

"*…a free-standing facility, or a distinct unit within a facility that provides for the management and secure control of inmates who have been officially designated as exhibiting violent or serious & disruptive behavior* while *incarcerated [emphasis added]. Such inmates have been determined to be a threat to the safety and security in traditional high-security facilities, and their behavior can be controlled only by separation, restricted movement, and limited direct access to staff and other inmates…"*

The same 1997 NIC report listed 32 states, the Federal Bureau of Prisons and the Correctional Service of Canada, as having at least one Supermax. Most supermax prisons operate similarly; the inmates are housed in their cells for 23 hours a day. Termed isolation by some, it may seem anything but that upon a tour of such a facility. The Supermax is an often-noisy environment where inmates are keenly aware of what is going on within the area in which they are housed. In addition to the high security setting many states utilize a programmatic structure referred to as "the program." The

program is a behavioral ladder or levels system. Maladaptive behavior is consequated through a series of "demotions", that occur quickly after the behavior. An interdisciplinary team reviews behavior at regular intervals to allow for upward progress on this ladder. The higher the level the more privileges such as increased recreational time and visits with family as well as allowances for personal property, conversely the lower the level the fewer the privileges and property. The lowest level allows only personal hygiene items, religious artifacts and legal materials. Typically there are some educational and treatment services available within this setting, though few, if any are empirically derived or based in research. Prison administrators may be compelled to respond to these "problematic inmates" that assault staff and inmates by further decreasing the privileges of these inmates and essentially "locking the problems away" by imposing longer and longer sentences to the Supermax with no objectively defined release criteria. Therein lies a functional paradox: how does a prison provide for the safety of their staff while creating an environment that is effective in increasing pro-social behaviors while decreasing maladaptive behavior? Recently, the present author has been investigating applying the principles of Behavior Analysis in a correctional facility. While Applied Behavior Analysis in corrections is not novel, an application in the 21st Century brings the research from the last 20 years into the correctional facility, and with that a new era in corrections.

In many cases, negative punishment (the removal of previously earned privileges or tangible items to decrease the rate of a behavior) is the sole tool used to manage inmates' behavior while in prison. If an inmate does his time and stays out of trouble he is ignored. If he gets into trouble, he has privileges and personal property removed in effort to reduce the rate of such behavior. The problem begins when all privileges and personal property have been removed. What does the inmate do when he has nothing to loose? The answer is that he does what he has always done when he had nothing left to loose. If an inmate came from a background of education and communication, then he would use the coping skills he had been taught and he would manage while he earned the privileges and personal property back. If the inmate came from a background of aggression and acting out, he would aggress and act out until he is given back the item or he exhausts himself. One of the ways that Behavior Analysts build constructive prison environments is to limit the sole reliance on negative punishment used to reduce the rate, magnitude or duration of maladaptive behaviors and provide alternative approaches to inmate management.

The Oregon Department of Corrections has launched an alternative approach to the management high risk or "problematic" inmates, which involves a functional change in their program management. This facility had historically relied heavily on negative punishment to reduce the rate of anti-social or problematic behavior. The changes to the IMU program have to mediate the need for lawfully mandated security with the need for behavior change. The most significant change to the IMU program will be the implementation of an empirically derived behavioral treatment model. This model is similar to McKee's Contingency Management in a Correctional Institution (McKee 1974) but rather than addressing academic behavior, this program address problematic or dangerous behaviors. The programmatic model under the present investigation also has some underpinnings of Levinsons' negative reinforcement based group therapy. The basis for the model is cooperation between security and programs staff with the understanding that the IMU is a unit where behavior change must occur to qualify for release. An interdisciplinary team made up of mental health professionals, Behavior Analysts, social workers, educational professionals, medical and security staff function as the program committee with oversight capacities for this unit. The unit offers opportunities for access to tangible rewards, social attention and escape maintained behaviors.

Admission Process to the IMU

The inmate is classified to maximum custody as a result of an observed behavior deemed as "dangerous" and "a risk to the safe and secure operation of the facility". The operational definition of a behavior that is termed "a risk to the safe and secure operation of the facility" is any class "A" violation. Class "A" violations include, among other descriptors, assault (sexual, physical, with or without a weapon), escape, and creating a disturbance or "riot". This classification is applied by staff in a section,

independent from the management of the IMU. All inmates are afforded due process and have access to an appeal process. Currently there are about 128 male inmates ranging in age from 18 to 59.

IMU Program Level-2: Program Determination

The inmate enters at IMU program level-2. When outside of his cell, the inmate is handcuffed and two staff escort the inmate to the desired location. A nylon tether is attached to the handcuffs. In the event the inmate moves to assault a staff or another inmate being moved, the attending officers physically restrain the inmate using the nylon tether to maintain physical control of the inmate. An interdisciplinary team works in conjunction to assess the inmate in global skill areas such as communication, social, academic, and coping skills. The deficient skill areas are objectively defined and prioritized. These skills and deficiencies are objectively behaviorally defined and specific behaviors targeted on a form called a Behavior Action Plan (BAP). The inmate must maintain this level with no misconduct reports (a report issued by staff of any observed behavior that violates the Rule of Prohibited Conduct) issued for 60 days. Once completed the inmate may progress to program level-3.

Behavior Action Plan Design

The BAP includes the description of the targeted behaviors and the criteria for successful performance. BAP programming may be subdivided into two categories: macro-behavior management and micro-behavior management techniques

Macro-behavior management techniques

Macro-behavior management in the IMU consists of different "in-cell" study packets and group participation programs and the use of the consequence based IMU program level system. Macro-behaviors consist of several discrete behaviors. An example of a macro-behavior is anger management. Anger management may consist of learning one's behavior cycles, recognizing and responding to antecedent stimuli and relaxation training. In-cell study packets are a set of written packets that encompass various subject matters such as: anger management, learning to do prison time, journaling, and alcohol and drug treatment materials. These materials have been divided into packets that are handed-out to inmates and picked up by correctional officers on consecutive weeks. An inmate must achieve a proficiency score of 80% to successfully pass that packet and receive the subsequent packet. Correctional staff serve as a proctor to the inmate if the inmate does not pass the packet. If the inmate fails twice, he will be reassessed for different programming. An inmate may be assigned one or more programs from a list of approximately 14 programs. Inmates are consequated for compliance with the rules of the IMU, and successful program completion with climbing levels in the IMU program level system. Consequences for climbing levels include releasing from the IMU after having completed all assigned programs, the addition of certain privileges or access to personal items, and more visits. Inmates are consequated for non-compliance with the rules of the facility or refusing to engage in assigned programs by being demoted one or more levels in the IMU program level system. The consequence of having a level demotion may include some or all of the following consequences: spending longer in the IMU, having one's program re-evaluated for effectiveness, the restriction of privileges or access to personal items, visits or phone calls. Inmates that engage in behaviors that are classified as a "major misconduct" under the Rules of Prohibited Conduct are demoted to IMU program level-1. Major misconduct includes assault, creating a disturbance, and contraband smuggling or possession. Level-1 is a restrictive level in which the inmate has access to only personal hygiene items, religious artifacts and legal materials. All inmates in the IMU are reviewed monthly at an interdisciplinary team meeting; Inmates at level one are reviewed weekly while at this level. After an absence of behaviors that can be classified as a major misconduct for 30 consecutive days, the inmate is promoted to IMU program level-2. Inmates cannot be demoted to IMU program level-1 for refusing to complete assigned programs.

Micro-behavior management techniques

Micro-behavior management in the IMU consists of the application of an Individualized Behavior Plan (Webb 2001). A Micro-behavior

consists of a discrete behavior such as self-injury or assault. The Individualized Behavior Plan (IBP) is a part of the BAP and a set of instructions to the correctional staff and data collection techniques that the correctional staff employ in response to certain events. The behavior often starts outside of the IMU, but persists once the inmate is transferred to the IMU.

Potentially reinforcing and punishing consequences are determined through a descriptive analysis (Vollmer, Borrero, Wright, Van Camp, and Lalli, 2001). A functional analysis (Derby and Wacker, 1992) can also be used to identify antecedent stimuli or those stimuli that set the occasion for a problematic behavior. An example of an antecedent would be the mail is late in coming to the tier and the inmates begin to yell, bang cell doors and otherwise cause the tier to become noisy. Mail not coming at a predetermined time would directly precede an increase in the rate of "acting-out." To continue this example, a training opportunity is created in the presence of this clear of an antecedent. For staff, the training opportunity would be in how an antecedent sets the occasion for certain behaviors to occur; the increase in acting-out on the part of the inmates directly followed the mail being late. The training opportunity for the inmates would be flexibility, because as a consequence for their behaviors they received a misconduct report and therefore may have extended their stay in the IMU because the mail was late.

A functional analysis can also be used to determine the contingencies that are reinforcing the rate of maladaptive or problematic behavior and punishing the rate of adaptive or pro-social behavior. An example of the use of consequences derived from a functional analysis in a prison setting is in Webb (2001). In this paper, the author removes the opportunity for the inmate to escape from his cell, which had been previously applied as an unintended consequence for maladaptive behaviors. The participant would engage in disruptive behaviors (yelling, screaming, and banging on the cell doors with his shoes) and the correctional staff would move him to a cell that was located in the hall away from the other inmates. Through a functional analysis the author noted that the rate of disruptive behaviors increased in conditions that allowed for escape from the inmates cell. The rate of disruptive behavior decreased in all other conditions that did not allow for escape from cell. The functional analysis was videotaped and used to train the correctional staff how the environment affects the rate of the participants behavior. An IBP was written that encouraged the inmate to make appropriate verbal requests to move from the noise of other inmates without engaging in disruptive behaviors. If the inmate made an appropriate verbal request without engaging in disruptive behaviors then he was allowed leave his cell to be escorted to a less noisy cell. The result was the inmate decreased the rate of disruptive behaviors (banging and screaming late at night) and an increased "pro-social" verbal behavior (verbally requesting a move). All Individualized Behavior Plans (IBP) are included in the overall Behavior Action Plan (BAP).

IMU levels 2 and 3: Implement Program

Data collection

The BAP is implemented under observation by correctional staff. Observation systems include the use of direct correctional staff observation, and recorded video observation. Baseline rates of targeted behaviors are established and behavior change documented through the use of a customized database called Special Inmate Management System (SIMS©). The SIMS© database is used for recording the rate and frequency of behaviors, the number and type of assigned programs, the inmates' current programmatic level and other relevant identifying information 24 hours per day. In short, this database allows for concurrent management of thousands of individualized BAP's. The SIMS© database has built-in behavior graphing and analysis tools, allowing behaviors across groups or sections of the IMU to be evaluated. Using a computerized database also allows for longitudinal studies of recidivism (the return to prior criminal behaviors) and ensures that if an inmate were to return to the IMU, the failure of the previous program can be noted and addressed in a new BAP for that inmate.

Correctional staff were trained to collect data using a paper system that is transferred to

the SIMS© database. During 50% of initial training trials, a second observer simultaneously but independently record data to assess interobserver agreement. Agreement percentages were calculated by dividing the training trails into 10-s intervals and comparing observers' recorded data on an interval-by-interval basis. The number of scoring agreements between the correctional staff and the independent observer was divided by the total number of intervals and then multiplied by 100%. The mean percentage agreement between correctional staff and the independent observer was 95% with a range of 82% to 100%.

Consequating behavior at IMU level-2

After 60 days with no misconduct reports issued, or targeted behaviors observed, the inmate is promoted to IMU program level-3. IMU program level-3 includes increased visits, personal property and an increase of the amount of money the inmate may spend at the commissary. There is no criterion set for completion of programming at IMU program level-2

IMU Level 3 to 4: evaluating the efficacy of the BAP

Interim progress was assessed by determining if the objectives of the specific needs identified in the BAP have been met. If the objective for that targeted behavior has been met, then treatment is faded. If further programming of the targeted behavior is warranted because the objective was not attained or there is a need for further programming of that target behavior the portion of the BAP is reassessed. Once all outcome behaviors have been attained for that target behavior, the next priority in the BAP is addressed. Once all targeted behaviors identified through the BAP have been met, planning for release to a less restrictive environment begins. Levinson's use of negative reinforcement is also applied at this point; the inmate must have been misconduct report free during his "program". If at any point the inmate received a misconduct report, then his BAP may be reassessed and he may loose one or more levels.

Consequating behavior at IMU level-3

After 90 days with no misconduct reports issued, or targeted behaviors observed and successful completion of the BAP, the inmate is promoted to IMU program level-4. IMU program level-4 includes further increased visits, personal property and an increase of the amount of money the inmate may spend at the commissary. The inmate is also allowed to move from his cell unescorted by security staff.

IMU Level 4: Planning for generalization of learned behaviors

Some inmates return to the IMU after being discharged, which suggests that behavior modification techniques employed in the IMU are not maintained after leaving the IMU. Generalization is the degree to which a change in behavior will transfer to another setting or situation or the degree to which a behavior change program influences behaviors other than then targeted behavior. In 1977, Stokes and Baer stated that Generalization (when contrasted with behavior change programs), "…*has been considered the natural result of failing to practice a discrimination technology adequately, and thus has remained a passive concept almost devoid of a technology*." Much effort is put into targeting behaviors, but very little is done to maintain the behavior in other settings. Generalization of the behaviors targeted in the IMU to a less restrictive environment called the Close Supervision Unit (CSU). The CSU is a transitional services program unit similar to the IMU, but without the high security precautions. Communication of the plan for generalization is accomplished via the SIMS© database. With SIMS©, the staff at the CSU is able to access the inmate's previous BAP, the rate and type of behaviors observed, and progression through the IMU program levels system. Macro-behaviors of compliance with staff directives and integration with staff and inmates are targeted through a transitional BAP. The two units' tandem operation will be the subject of subsequent papers.

Consequating behavior at IMU level-3

After 30 days with no misconduct reports issued, or targeted behaviors observed, the inmate is transferred to the CSU. IMU program level-4 includes further increased visits, personal property and an increase of the amount of money the inmate may spend at the commissary. The inmate is also allowed to move from his cell

unescorted by security staff.

Preliminary Results

This IMU was opened in 1991. The aforementioned procedures were put in place in January of 2002. It is difficult to decisively state that the change to the IMU has changed inmates behavior, correlated with the most recent changes, are significant decreases in the rate that misconduct (a violation of the Rules of Prohibited Conduct) and in the rate of inmate grievances (an administrative appeal route used to address prison management/inmate disputes over the interpretation or application of the rules and, in some instances, the procedures of the Department of Corrections) are reported (see figure 1).

Challenging Concepts

The belief that there is "nothing that can be done to change the behavior of criminals" is as dated as the concept that behavior analysis could not affect the behavior of people with retardation. Through careful planning, communication and the application of the principles of applied behavior analysis we have, and will continue to change the behavior of even the most violent people. Further areas for investigation in the area include the effect that this type of programming has on inmates returning to prison and to this unit.

References

Derby, K. M., D. P. Wacker, et al. (1992). "Brief functional assessment techniques to evaluate aberrant behavior in an outpatient setting: A summary of 79 cases." *Journal of Applied Behavior Analysis* **25**(3): 713-721.

Du Pont, P. (Author). (2000). *Radio America Essay*. National Center for Policy Analysis. (Available from NCPA 655 15th St. N.W., Suite 375 - Washington, DC 20005)

Harrison, P.M. & Beck, A.J. (2002). U.S. Department of Justice. *Prisoners in 2001* (Bureau of Justice Statistics Bulletin NCJ Publication No. 195189)

Levinson, R.B., Ingram, G.L., & Azcarate, E. (1968). "Aversive" group therapy – sometimes good medicine tastes bad. *Crime and Delinquency, 14,* 336-339.

McKee, J.M. (1971). Contingency management in a correctional institution. Educational Technology, 11(4), 51-54

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis*, 10, 349-367

Skinner, B.F. (1974, January). To build constructive prison environments [Letter to the editor]. *New York Times*, 36

U.S. Department of Justice, National Institute of Corrections. (1997). Supermax housing: a survey of current practice. (NIC Publication No. NIC-013722). Longmont, Co.

Vollmer, T. R., Borrero, J. C., Wright, C. S., Van Camp, C., and Lalli, J. S. (2001). Identifying possible contingencies during descriptive analyses of severe behavior disorders. *Journal of Applied Behavior Analysis*, 34, 269-287.

Webb, L.R. (2001). Addressing severe behavior problems in a "super-max" prison setting. U.S Department of Justice. *National Institute of Corrections* (NIC Publication No. 016869)

THE MOLAR VIEW OF BEHAVIOR AND ITS USEFULNESS IN BEHAVIOR ANALYSIS

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The molar view of behavior contrasts with the older, molecular view. The difference is paradigmatic, not theoretical. No experiment can decide between them, because they interpret all the same phenomena, but in different terms. The molecular view relies on the concepts of discrete, momentary events and contiguity between them, whereas the molar view relies on the concepts of temporally extended patterns of activity and correlations. When dealing with phenomena such as avoidance, rule-governed behavior, and choice, the molar view has the advantage that it requires no appeal to hypothetical constructs. The molecular view always appeals to hypothetical constructs to provide immediate reinforcers and stimuli when none are apparent. As a result, the explanations offered by the molar view are straightforward and concrete, whereas those offered by the molecular view are awkward and implausible. The usefulness of the molar view for applied behavior analysis lies in the flexibility and conceptual power it provides for talking about behavior and contingencies over time.

The molar view of behavior is relatively new. Although its origins may be traced back earlier, its first partial articulation was by Baum and Rachlin (1969), in a paper called "Choice as time allocation." It was presented more fully in a paper by Baum (1973), "The correlation-based law of effect." Rachlin (1994) offered a book-length presentation, and Baum (2002) elaborated on his 1973 paper in another paper, "From molecular to molar: A paradigm shift in behavior analysis" and some papers in-between (Baum, 1995a; 1997).

The molar view contrasts with an older view that behavior analysis inherited from nineteenth-century psychology. I call this older view "molecular," because it is based on the notion explanations of behavior may be constructed by thinking of small discrete units being joined together into larger units, like the joining together of atoms into molecules in chemistry.

The difference between the molecular and molar views of behavior is paradigmatic, not theoretical. No data, no experiment can decide between the two views, because no matter what behavioral phenomenon one chooses, a proponent of either view is able to construct an account of it. The difference between the two lies in the concepts each brings to bear in such an account. The molecular view relies on momentary events and momentary causation, which leads to postulating hypothetical momentary events and causes when none are apparent, whereas the molar view relies on extended activities and extended causation, avoiding postulation of hypothetical constructs.

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Replacing the concept of momentary response with the concept of extended activity requires one to become familiar with thinking in more continuous terms—that is, in terms of extended patterns that cannot be seen at a moment in time. A familiar example is the concept of probability. An unbiased coin, when flipped, comes up heads with a probability of .50. What does this mean? On any particular flip, the coin comes up heads or tails; nothing more can be observed. Only for a long series of flips can one observe the probability of .50. If one says that on a particular flip the probability is .50, all one means is that in a long series of such flips about half would show heads. The same is true of response rate. At any particular moment, an activity (lever pressing) is occurring or not. One can only observe the response rate over some substantial time period. A response that occurs 60 times per minute cannot occur 60 times per minute at a moment.

Although Skinner advocated the use of response rate as a dependent variable, he was a molecularist. In his well-known paper on superstition, Skinner (1948) proposed a "snapshot" view of reinforcement, in which delivery of a reinforcer strengthens whatever behavior happens to be occurring at the moment. The molecularity of his approach is perhaps nowhere clearer than in a short piece he wrote called "Farewell, My Lovely!" in which he deplored the absence of cumulative records in the pages of *JEAB* and extolled the virtues of

being able to observe "molecular," moment-to-moment changes in behavior (Skinner, 1976). A cumulative recorder, however, is an averaging machine; it only produces smooth curves because the chart moves slowly and the pen moves in small steps. At any particular moment, either a response is occurring or not. The local changes in response rate are changes from one interval to another. If, however, one were to fit a truly continuous curve to a cumulative record, then one might think of momentary rate as the slope of the curve at a particular point. This, however, requires abstracting the continuous function.

In the molecular view, each response is taken as a concrete particular (i.e., the basic observation), and response rate is a "derived" measure (i.e., an abstraction) summarizing behavior over a period of time. The molar view turns this distinction around, making the extended pattern the concrete particular and the momentary response the abstraction. A response rate or activity exists as a pattern through time. Any attempt to infer activity at a moment depends on abstraction, as in the example of the cumulative record. In fact, no behavior can be observed at a moment, because even the simplest unit of behavior—lever press, key peck, button push—takes up time and must unfold from beginning to end before it can be recorded with certainty (for further discussion, see Baum, 1997; 2002). Because every activity takes up time, the concept of behavior at a moment is an abstraction, an inference made after the fact.

Although it has little use for momentary events, the molar view supports analysis in more and less extended time frames (Baum, 1995; 1997; 2002). That patterns take up time in no way precludes them from being brief. A pigeon's key peck, for example, is an extended pattern that takes a fraction of a second. Analysis may be as local or as extended as suits one's purpose. When trying to change behavior, one should make sure that reinforcers are closely coordinated with the activity one is trying to increase. The molecularist insists reinforcers must immediately follow the responses they are to strengthen; the molarist says reinforcers should coincide closely with the activity to be increased. Such local relations often have powerful effects, sometimes to our grief, when they override more extended relations (Rachlin, 2000). Each additional drink might seem harmless, but in the long run they add up to ruin. The likeliest way to overcome problem drinking is with local reinforcers for abstinent behavior. Thus, the molar view, like the molecular view, says that, in practice, the one who would shape behavior needs to be swift with the reinforcers.

The molecular view has one point in its favor: It coincides with a prejudice toward immediate causes. The notion that the events that affect behavior occur either immediately before or immediately after a response lends simplicity to analysis. One knows just where to look for the antecedents and consequences that control the response. That simplicity, however, comes at a high price: the necessity of inventing immediate antecedents and consequences when none are apparent. Perhaps the best example is explaining avoidance.

To explain avoidance, in which success means that nothing happens following a response, molecularists turn to two-factor theory. Since a reinforcer must follow the avoidance response, even if none is apparent, one has to be invented. Suppose that the stimulus preceding the response becomes a Pavlovian conditional stimulus, eliciting "fear." Then, when the response turns off the stimulus, the reduction in fear reinforces the response. Avoidance responding occurs, however, even if no stimulus precedes or is terminated by the activity (Herrnstein & Hineline, 1966; Herrnstein, 1969). Having already invented the fear-reduction reinforcer, the molecularist now also invents the stimulus. Dinsmoor (2001), for example, argued that response-produced stimuli, paired with a lower frequency of electric shock than their absence, become safety signals. The cost of maintaining the molecular view here is that one must appeal to hypothetical reinforcers and stimuli when none are observable. The result is a theory that cannot be refuted.

The molar view of avoidance is arguably simpler, but requires one to think in terms of temporally extended patterns. Avoidance activity is acquired and maintained because when that activity is present the rate of noxious events is lower than when it is absent. People avoid sensitive topics in conversation to lower the likelihood of embarrassment to themselves and others. People buy insurance to lower the likelihood of financial hardship. Much apparently dysfunctional behavior may be understood as avoidance. If working and failing would be too hard an outcome, one may avoid it by being ill.

Another example of paying a high price to retain a molecular view is in accounting for rule-governed behavior. Rules present a problem for the molecular view because they are invariably associated with behavior that has important consequences in the long run (Baum, 1994; 1995). Since long-delayed effects must be ineffective to the molecularist, if rule-governed behavior is maintained, some immediate (effective) consequences must be found. Why would someone eat vegetables instead of candy when no one else is present to observe? Why would someone save a piece of trash until a trash can appears, when it might have been dropped on the street with impunity? Mallott (2001), in a paper about moral and legal control, provides the molecularist's answer: thoughts and self-punishment. He argues, "For moral control to work, society must have established a special, learned aversive condition—the thought of the wrath of one's God or the thought of the wrath of one's parents. And those thoughts must be aversive, even when no one is looking" (p. 4). Again the molecular view leads directly into the realm of the hypothetical and unverifiable.

The molar view of rule-governed behavior allows that any contingency, no matter how extended, may control behavior, even though more local contingencies may be more powerful than more extended ones (Baum, 1994; 1995; Rachlin, 1994; 1995; 2000). Rules exist, however, because extended contingencies are weak. A rule is a discriminative stimulus produced by one person that induces in another person behavior that is reinforced socially in the short run (and reinforced in some major way in the long run). The behavior may come under the control of the long-term contingency—for example, the relationship between diet and health. Although people often say that then the rule has been "internalized," from the molar point of view, it actually is further externalized, because the control is exerted by a more extended contingency. In looking at rule-governed behavior this way, the molar view introduces no hypothetical events and no new terms.

Perhaps the strongest area of application of the molar view is to choice, the allocation of behavior among alternatives. At any moment, behavior is assigned to only one alternative. Over time, however, one sees a pattern of allocation among alternatives. In the molar view, such a pattern constitutes a concrete particular. The molecular view, focusing on a moment, immediately moves to hypothetical constructs. Each alternative has a certain strength, unobservable at the moment but existing at the moment. The extended pattern of allocation is thought to reveal the relative strengths of the alternatives. If a pigeon pecks twice as often at the left key than the right key, the strength of left pecking is considered twice that of right pecking. If a child spends twice as much time disrupting classroom activities as the child spends doing schoolwork, the strength of disrupting is twice that of remaining on task. In the molar view, no hypothetical strength enters in, because these patterns of allocation are what the science is about.

Even if the molar view seems to allow such phenomena as avoidance, rule-governed behavior, and choice to be understood more readily, the question arises as to whether the molar view has any implications for applied behavior analysis. It makes for the same sort of rule of thumb as the molecular view when one is trying to change behavior: reinforcement must be frequent and quick. Beyond this, however, I think the molar view might have some advantages for applications. First, it offers flexibility in thinking about goals and treatments. No need arises to define some artificial discrete response for reinforcement. One needs only to make sure that reinforcers accompany appropriate activity. For example, in school settings applied behavior analysts already often talk about time on task as a reinforceable activity. The molar view allows this kind of flexible thinking about reinforcement of activities to be extended indefinitely. Second, it frees one to think about time spent instead of response rate. Without artificial discrete responses, activities like reading, playing, grooming, and the like can be measured by timing them. Time spent should be no harder to measure than counting responses and often will be less ambiguous, because one may be able start and stop timing more easily than decide whether exactly the right response occurred. Once applied behavior analysts grow accustomed to the molar way of talking, they will find it more congenial for communicating with one another about behavior and contingencies, because it is more flexible and more concrete.

In conclusion, two points might be made. First, although the molecular view was useful early in the development of behavior analysis, the science has outgrown it, and the molar view supplies the conceptual power required for the new developments. Second, the molar view may be recommended for the flexibility and power that it allows both applied and basic researchers in talking about behavior and contingencies.

References

Baum, W. M. (1973). The correlation-based law of effect. *Journal of the Experimental Analysis of Behavior, 20,* 137-153.

Baum, W. M. (1994). *Understanding behaviorism: Science, behavior, and culture*. New York: HarperCollins.

Baum, W. M. (1995a). Introduction to molar behavior analysis. *Mexican Journal of Behavior Analysis, 21,* 7-25.

Baum, W. M. (1995b). Rules, culture, and fitness. *The Behavior Analyst, 18,* 1-21.

Baum, W. M. (1997). The trouble with time. In L. J. Hayes & P. M. Ghezzi (Eds.), *Investigations in behavioral epistemology* (pp. 47-59). Reno, NV: Context Press.

Baum, W. M. (2002). From molecular to molar: A paradigm shift in behavior analysis. *Journal of the Experimental Analysis of Behavior, 78,* 95-116.

Baum, W. M., & Rachlin, H. C. (1969). Choice as time allocation. *Journal of the Experimental Analysis of Behavior, 12,* 861-874.

Dinsmoor, J. A. (2001). Stimuli inevitably generated by behavior that avoids electric shock are inherently reinforcing. *Journal of the Experimental Analysis of Behavior, 75,* 311-333.

Herrnstein, R. J. (1969). Method and theory in the study of avoidance. *Psychological Review, 76,* 49-69.

Herrnstein, R. J., & Hineline, P. N. (1966). Negative reinforcement as shock-frequency reduction. *Journal of the Experimental Analysis of Behavior, 9,* 421-430.

Mallott, R. W. (2001). Moral and legal control. *Behavioral Development Bulletin, 1,* 1-7.

Rachlin, H. (1994). *Behavior and mind: The roots of modern psychology*. New York: Oxford University Press.

Rachlin, H. (1995). Self-control: Beyond commitment. *Behavioral and Brain Sciences, 18,* 109-159.

Rachlin, H. (2000). *The science of self-control*. Cambridge, MA: Harvard University Press.

Skinner, B. F. (1948). "Superstition" in the pigeon. *Journal of Experimental Psychology, 38,* 168-172.

Skinner, B. F. (1976). Farewell, my lovely! *Journal of the Experimental Analysis of Behavior, 25,* 218.

THE CBA LEARNING MODULE SERIES, INSTRUCTIONAL DESIGN, AND FUTURE DIRECTIONS

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Skinner (1958) described some of the early teaching machines and the behavioral technology underlying their operation. However, it wasn't until the late 1990s that the teaching machine finally came of age with the aid of modern computers and software. In this article, I discuss one model of computer-based training that has been used to teach behavior analysis. Features of the model relevant to a behavior analytic approach to instructional design are highlighted. I talk about how the model addresses fluency, reinforcement, and strategies for teaching conditional discriminations and concepts. Other applications of the model (e.g., exam preparation for certification in other disciplines, skills needed by factory workers, elementary and high school curricula, paraprofessional skills) are entertained and research questions are posed.

In the past few years, the fluency-based computer program CBA Learning Module Series (Eversole, 1998) has been used by approximately 600 people to prepare for the certification exam in behavior analysis. The purpose of this discussion is to describe the basic instructional design model used for the CBA Learning Module Series, other instructional applications of the model, and future research directions. First, let's discuss the CBA Learning Module Series.

The CBA Learning Module Series

The model used in the CBA Learning Model Series is based on one taught by Guy Bruce and John Eshleman in a workshop on instructional design I attended at the Association for Behavior Analysis conference (Bruce & Eshleman, 1996a). In that workshop (and the more recent book *Instructional Design Made Easy* [Bruce, 1999]), the focus is on an efficient learning program that provides instructions, practice, and consequences that reduce the learning time required to achieve competent performance. In particular, design features included development of goals and valid performance objectives, presentation of instructions during practice and only when needed, strategies to ensure appropriate stimulus control, consequences that reduce learning time (e.g., immediate praise or corrective feedback), evaluation of learning efficiency, and revision of content as needed. Behavior analysts are well versed on the advantages of most of these elements. Therefore, I will provide a basic description and focus only on a few features that may be counter-intuitive and as they have been applied to the development of the CBA Learning Module Series.

In the Series, aside from a few screens explaining how to use the program, the user is first presented with a question or stem, and four options. If the user is not sure of the answer, s/he may click on a hint button. The hint directly or indirectly provides the correct answer. Also, a text book reference is provided for individuals desiring additional material. A second button click causes the hint to disappear. If a correct option is then clicked, a brief praise statement is provided. If an incorrect selection is made, a corrective feedback statement is given. Each 5-minute timed module includes approximately 20 such frames. After 5 minutes, the user cannot answer any more questions and the number and percent correct is presented. Users are advised to practice the modules until they get 100% correct within the time allotted, and then to do occasional review sessions. I do not know of anyone who has completed any of the modules with 100% correct on the first practice. To achieve this criterion, and thus foster maintenance (Binder, 1993), learners have to be fluent responders to most questions—they have to answer quickly and accurately.

There are some counter-intuitive features of the CBA Learning Module Series. Note that the Series begins with a question or stem, thus by-passing instructional material that may not be needed by the learner. This is done so that the learner doesn't have to spend time on material s/he already knows—s/he simply

answers the question and then moves on to the next question.

Another counter-intuitive aspect of the Series is that of repeated practice. That is, questions that are answered correctly remain in the pool of questions presented during each practice. It could be argued that if the question has been mastered, why waste time re-presenting it? In this respect, the repeated presentations may introduce an element of inefficiency. However, there are some benefits to keeping the question in the pool. One benefit is that the learner receives additional practice on that item, thus possibly enhancing maintenance through overlearning. The second reason for keeping mastered questions in the pool is the reinforcing aspect. People like to be correct. I receive regular reports of learners finding the Series very reinforcing. Understandably, if they are answering questions at a high rate and getting nearly all of them correct, they are operating under a high density of reinforcement. This benefit may outweigh the disadvantage of repeated presentations. Indeed, I've had no complaints that questions were presented too often. Also, learners receive feedback on the percent correct at the end of each practice. This score is meaningful only as long as they are responding to the same material. Seeing one's score improve is another likely reinforcing consequence. Of course, I draw these conclusions based only upon my casual observations. The benefit of leaving in questions that have already been mastered remains an empirical question.

Another important aspect to the design process is ensuring that conditional discriminations are learned. That is, strategies must be used to ensure that concepts are learned—not that answers are memorized. Various strategies are used to achieve this.

First, the order of the questions is randomized. This is needed due to the learner being presented repeatedly with the same items. It ensures that responding on a given question is not under the stimulus control of the preceding question (i.e., a behavior chain resulting from the question sequence learned over multiple presentations).

Second, the position of the options is randomized. One time through the correct answer might be listed first. The next time through it might be last. This ensures that position cues from previous presentations do not exert control over responding.

Third, another type of inappropriate cue is avoided by embedding unique irrelevant words in the middle of the option. That is, a unique irrelevant word at the beginning or end of a phrase may be a particularly salient stimulus and "jump out" at the user, thus exerting control over option selection. Note that this is not an issue if the unique word is critical to the discrimination being taught. For example, when teaching reinforcement, we want terms such as "increases," and "follows behavior" to control responding. We don't want terms such as "likes" to control option selection.

Fourth, in example questions, persons' names are avoided. Otherwise, response selection might come under the control of the name instead of the critical feature of the statement. The user could learn, for example, "The option with 'Terry' is correct for the punishment question and the option with 'Kelly' is correct for the reinforcement question."

Fifth, correct options are similar in length to at least some of the incorrect options. We don't want the irrelevant feature of length of the option to control responding.

Sixth, correct options for one item are sometimes incorrect options for another item. This avoids responding coming under the control of the option out of context of the question or stem. For instance, the option "increases the future probability of a response" is correct if the stem is "Reinforcement;" but it is incorrect if the stem is "Punishment."

Seventh, screen design could sometimes exert inappropriate stimulus control. For example, if the items were numbered or the layout was not consistent from one screen to the next, option selection could be brought under the control of the features of the layout.

Eighth, a content analysis can foster development of appropriate stimulus control by employing "close-in" discriminations—that is, teaching discriminations between correct and almost correction options (Bruce, 1999). For example, when teaching the concept of establishing operations, distracters would be included that involve discriminative stimuli—another antecedent influence that is often confused with establishing operations. Also, several examples would be provided to promote generalization of correct responding to stimuli that fall within the parameters of the concept.

At the same time, the individual would be learning not to select stimuli with features that fall outside the parameters of the concept. (Cooper, Heron, & Heward, 1987)

Finally, most material to be taught requires definitional, conceptual, and applied items to ensure that the concept is learned. For example, to teach the concept of reinforcement, the learner must be presented with items that teach its definition, items that portray the concept, and items that exemplify the process. Short of this, the concept would be unlikely to be learned. As a result, although 100% correct might be achieved, stimulus generalization would be unlikely and attempted applications of the concept of reinforcement are likely to fail. Note that to teach concepts requires numerous items. To teach a single concept may take 10 or more items. An entire module of 20 items was required to teach induction and deduction. The current version of the CBA Learning Module Series has over 1200 items.

Other Applications

This instructional design process may be applied to a variety of applications. The populations and instructional content parameters have yet to be determined. Similar to users of the CBA Learning Module Series, individuals of other disciplines seeking professional certification may benefit from this instructional model. The reinforcing aspect of the design would suggest that it could also be applied to learners with disabilities and school-age children. Some elementary school-age children might need additional reinforcers in the form of games or animation, but the performance of young children can be strongly enhanced by a high rate of reinforcement and errorless learning procedures. Other populations that may benefit from this design model are paraprofessionals and factory works. Bruce and Eshleman (1996b) taught assembly skills to factory workers using a similar model and Bruce (1996) taught data analysis skills to switch capacity managers. Here illustrations and photos were used as part of the instructional stimuli. Other applications may require the use of video.

Research

Research conducted on the CBA Learning Module series has demonstrated a functional relation between using the modules and improved quiz scores (Eversole, 2002). Using a multiple baseline design across modules, three BCBA candidates improved their quiz scores after having completed the modules. Score improvements ranged from 10% to over 400%. Quiz items were similar to, but different than items on the modules. While this research demonstrates that the CBA Learning Module Series can teach behavior analytic content, it does not empirically demonstrate that completing the modules results in improved BCBA exam scores.

Other questions abound. The applications described earlier suggest several parameters along which the efficacy of this instructional design model could be evaluated. Among them are the following:

1. Is the rate of approximately 20 questions per 5-minutes (i.e., 5 questions per minute) sufficient to achieve maintenance? Perhaps a lower rate would achieve the same result. Perhaps a higher rate would achieve greater maintenance.
2. What duration should exercises be to maximize learning? Perhaps 15 minute exercises would be more efficient. It would seem that 20 or 30 minute exercises would result in fatigue and a degradation of performance. One advantage to having 5-minute exercises is that learners could use them when they have a short period of time available; possibly resulting in more distributed trial instruction.
3. Is distributed trial learning (i.e., doing one exercise at a time) more efficient than massed practice learning (i.e., doing back-to-back practice sessions)? For example, does doing 12 5-minute exercises spread out over a day equivalent to doing 12 5-minute sessions in a one hour session?
4. In the CBA Learning Module Series, only percent correct out of the questions answered and percent correct out of the total number of items in the module is reported. It is unclear whether this feedback has any influence on performance. Other forms of performance feedback that may influence responding include a graph depicting the number correct per minute or a cumulative graph of the modules successfully completed.
5. Would some instructional material presented prior to the questions improve learning? This wasn't needed in the CBA Learning Module Series and it runs counter to the

primary advantage of the model. However, the advantage has not been empirically validated and one might expect prior presentation of some material to be advantageous given certain types of instructional content. This might include text book-type instruction, summary information, structured notes, etc. The research interest is to determine for which type(s) of instructional content the advantage holds.

6. Do you need both an accuracy and rate criterion? In the CBA Learning Module Series, learners are asked to do each module until a criterion of 100% correct is obtained within the 5 minutes allotted—a rate of approximately 20 correct per 5 minutes. However, is this adequate to achieve fluency? Perhaps 100% correct in 3 minutes is needed? Or, perhaps 100% in 8 minutes is adequate?
7. Should stability be part of the criterion? For example, is achieving the criterion rate for a single session adequate or does it need to be maintained over several sessions to establish fluency? Furthermore, after achieving mastery, what schedule of review is needed to ensure maintenance?
8. Are answer "hints" (i.e., gives the answer explicitly) or indirect hints (i.e., requires some intraverbal [thinking] behavior) more efficient and lead to maintenance and generalization? One might expect that answer hints may lead to quicker acquisition; but perhaps indirect hints foster maintenance and generalization because they require a more concentrated interaction with stimuli that need to acquire discriminative stimulus properties.
9. Most importantly, does achieving criterion performance on the Series correlate to improved scores on the Behavior Analysis Certification Board exam? Although testimonials would suggest a correlation, empirical data are not available.
10. Finally, what are the requisite skills for content developers? Clearly, content developers must be able to develop objectives. Perhaps the second most important (and more difficult) skill is the ability to teach conditional discriminations within a multiple choice format.

Conclusion

The instructional design model described holds promise as an efficient and effective tool for teaching a variety of cognitive skills. Experimental data indicate that it is effective at providing behavior analysis instruction and testimonials support this conclusion. Experimental research is underway to provide additional empirical support. As indicated by the questions posed, research on this application and others is needed.

References

Binder, C. (1993, October). Behavioral fluency: A new paradigm. *Educational Technology*, 8-14.

Bruce, G. S. (1996). Quality control: The key to effective training design. *Performance Management Magazine*, *14* (2), 12-15.

Bruce, G. S. (1999). *Instructional design made easy*. Tucker, GA: Performance Management Publications.

Bruce, G. S., & Eshleman, J. W. (1996a). *New developments in instructional design*. Workshop conducted at the Association for Behavior Analysis, San Francisco, CA.

Bruce, G. S., & Eshleman, J. W. (1996b). *New developments in instructional design*. Paper presented at the Association for Behavior Analysis, San Francisco, CA.

Cooper, J. O., Heron, T. E., & Heward, W. L. (1987). *Applied behavior analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Eversole, S. (1998). *CBA learning module series* [Computer software]. Woodbury, CT: Behavior Development Solutions.

Eversole, S. (2002). *The CBA learning module series: Does it teach?* Presented May 26, 2002 at the Association for Behavior Analysis: Toronto, ON.

Skinner, B. F. (1958). Teaching machines. *Science, 128* (3330), 969-977.

CLINICAL SIGNIFICANCE OF THE OUTCOME QUESTIONNAIRE (OQ-45.2)

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The Outcome Questionnaire-45.2 (OQ-45.2) is purported to measure important areas of functioning (symptoms, interpersonal problems social role functioning and quality of life) that are of central interest in mental health. In recent years research employing the OQ-45.2 has focused on tracking patient change over time and indicating if and when patients return to a normal state of functioning as proposed by criteria for clinically significant change. This study examined the OQ-45.2 cut-off scores for clinical significance by comparing concordance rates with cut-off scores based on other measures of psychotherapy outcome. Instruments of each area of functioning were administered to patients undergoing psychotherapy at the beginning and end of treatment. Each patient's degree of success was then classified by each instrument and differences between the measures were examined. The results provided evidence for the construct validity of the concept of clinical significance and the OQ-45.2 cut-off scores demarking the boundaries for functional/dysfunctional samples. Correspondence between measure estimates for classifying patients as functional or dysfunctional averaged 85%. Estimates of agreement between measures classification of patients as meeting criteria for clinically significant change averaged 65%. Implications of these results were discussed in reference to use of the OQ-45.2 and the concept of clinical significance.

Contemporary research focused on applied clinical questions often relies heavily on using operational definitions of meaningful change at the level of the individual patient. This research includes studies that explore the dose-effect relationship, i.e., the amount of therapy needed for recovery (e.g., Anderson & Lambert, 2001; Maling, Gurtman, & Howard, 1995). In such studies a definition of meaningful change (clinically significant change) allows researchers to estimate the number of sessions needed to meet such an event. In addition, studies aimed at improving the quality of services require operational definitions to judge a particular patient's treatment response and the need for additional services (Kordy, Hannover, & Richard, 2001; Lambert, Hansen & Finch, 2001; Lueger et al, 2001). Finally, the call for presentation of the results of clinical trials research that include estimates of the practical consequences of treatment for individual patients is widespread (e.g., Barlow, 1981; Hugdahl & Ost, 1981; Kendall, 1999; Saunders, Howard, & Newman, 1988).

Author Note

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The most frequently used method for operationalizing clinical significance for the preceding research activities is that described by Jacobson and Truax (1991). They proposed a two step criteria. The first step entails an evaluation of reliable change by calculating a Reliable Change Index (RCI). As defined by Jacobson and Truax, the RCI is obtained by subtracting a pre-treatment score from a post-treatment score and dividing by the standard error of the measurement (Christensen & Mendoza, 1986 [1]; Jacobson, Follette, & Revenstorff, 1984). A particular change is considered to be reliable when it exceeds measurement error at the .05 level of confidence.

The second step consists of defining a cut-off point between functional and dysfunctional samples. This cut-off represents the point at which a person's score is more likely to fall in the distribution of scores characteristic of normal functioning. The use of this social comparison methodology has the advantage of referencing a client's state of functioning against

peer functioning rather than demanding that the client be asymptomatic in order to be considered healthy (Kendall & Grove, 1988; Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999). When both the RCI and the normative group comparison criterion are met, the change is regarded as clinically significant according to the Jacobson method.

Despite widespread use of the Jacobson method (Ogles, Lunnen, & Bonesteel, 2001), little research has been conducted on its' validity. A review of the literature revealed only two studies that examined the validity of classifying a client's change as clinically meaningful using the Jacobson method. Ankuta and Ables (1993) were the first to address this question by comparing clients who met Jacobson's criteria with their self-rated satisfaction with therapy. They found that those clients who met criteria for clinically significant change were more satisfied with treatment than those who did not meet criteria. Lunnen and Ogles (1998) expanded on the Ankuta and Ables evaluation by performing a multiperspective, multivariable analysis of the RCI component of Jacobson's method. They divided outpatients into three groups based on reliable change: Improvers, No-changers, or Deterioraters. Clients in all three groups rated their perceived change, satisfaction with treatment, and the helping alliance. Their spouses/significant others also rated perceived change and satisfaction with treatment, and their therapist rated perceived change and the helping alliance.

Results indicated that perceived change and the alliance were significantly higher for those who showed reliable improvement than for those who were No-changers or Deterioraters from both client and therapist perspectives. Satisfaction with services did not differ across groups. None of the measures distinguished Deteriorators from No-changers from any of the perspectives. They concluded that the RCI is an effective method of evaluating symptomatic improvement, but a less valid indicator of deterioration. Ogles et al. (2001) called for more research into the validity of the Jacobson method as a means of operationalizing the concept of meaningful change.

The current study was undertaken in response to the need for further research on the concept of clinically significant change. In particular, this study was designed to examine the correspondence between the way different outcome measures classify a client, before and after treatment, as being a member of the functional or dysfunctional distribution. Reliable change classification following psychotherapy was also examined. The reference measure for the current study was the Outcome Questionnaire (OQ-45; Lambert & Finch, 1999). This measure has been used in several outcome management studies (Lambert, Whipple et al., 2001; Lambert, Whipple, et al., 2002; Lambert, Whipple, Bishop, et al., 2002) that rely on the concept of clinically significant change for clinical decision making in quality improvement efforts. The OQ was designed to measure four areas considered essential and theoretically related to change: 1) levels of psychiatric symptoms, 2) performance in various roles and activities, 3) interpersonal functioning, and 4) levels of life satisfaction or quality of life. Four comparison measures were chosen based on: (1) their solid psychometric properties; (2) their widespread use and presence in psychological literature (Froyd, Lambert, & Froyd, 1996), and; (3) their ability to effectively tap domains related to those included in the OQ.

The following instruments were chosen for use in the present study: the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983) for assessing symptomatic improvement; the Social Adjustment Rating Scale-Self Report/and Other Report (SAS-SR or OR; Weissman, Prusoff, Thompson, Harding, & Myers, 1978) for measuring social role performance; the Inventory of Interpersonal Problems-Short Form (IIP-S; Hansen, Umphress, & Lambert, 1998; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988) for assessing interpersonal problems; and the Quality of Life Inventory (QOLI; Frisch, 1988) for assessing life satisfaction. Additionally, the Client Satisfaction Questionnaire-8 (CSQ-8; Larson, Attkisson, Hargreaves, & Nguyen,

[1] Numerous other less commonly used statistical methods for determining reliable change exist (Edwards, Yarvis, Mueller, Zingale, & Wagman, 1978; Hsu, 1989; Jacobson & Truax, 1991; Nunnally & Kotsch, 1983). Speer and Greenbaum (1995) can be consulted for a comparative analysis of these less frequently used statistical methods. In their analysis (Speer & Greenbaum), they endorse using the Jacobson and Truax pre-post difference approach for the following three reasons: 1) it circumvents statistical complications related to "residualized true score adjustments" (p. 1047), 2) its calculation is unambiguous, and 3) there is a growing literature base that reports change using this method.

1979) was administered to assess the general level of satisfaction with psychotherapeutic services received.

It was hypothesized that there would be statistically significant concordance between the classification of each individual based on the OQ-45 functional/dysfunctional cut-off, and cut-offs derived from each of the four measures. It was further hypothesized that each client's classification with regards to Jacobson's two- step criteria of clinically significant change would also be statistically significantly concordant. Finally, it was hypothesized that clients whose change was classified as clinically significant would be more satisfied with treatment than no-changers and deterioraters.

Methods

Participants

Clients. Clients for the study were drawn from individuals requesting psychotherapy services at a non-profit university training clinic (TC) and a university student-counseling center (CC). Given that the TC was a training clinic for graduate students, the following diagnostic categories are screened out to the extent possible, and are referred to licensed practitioners in the community: 1) acute psychotic disorders, 2) severe eating disorders, 3) primary serious drug (including alcohol) related disorders that might be treated in hospital or day treatment programs, and 4) immediate, high risk for suicide. The TC generally receives referrals from individuals in the community who are unable to afford psychotherapy services due to financial or insurance reasons. Consequently, many of the clients tend to come from lower income families. The TC serves a region of about 270,000 residents.

Unlike the TC, the CC has no restrictions on the type of diagnosis treated. Clientele at the CC are comprised of students enrolled at a large western university. All types of psychological services are offered at the CC, which serves a university population of about 35,000 students. Of the 86 adults who participated in the study, 51 (59%) were female, and 76 (88%) were Caucasian. Their average age was 28.9 years and their average education was 15.9 years.

Therapists. Graduate students who were supervised by licensed clinicians provided the therapy services at TC. The TC student therapists were enrolled in clinical psychology (doctoral), social work (masters), and marriage and family therapy (masters) programs. The CC therapists were licensed psychologists, supervised interns or graduate students (enrolled in clinical and counseling psychology doctoral programs).

Measures

Outcome Questionnaire-45.2. The OQ-45.2 is a 45-item self-report scale designed to track and measure client progress in psychotherapy. The scale is designed specifically with the purpose of being repeatedly administered (e.g., either pre- and post-treatment, or after every psychotherapy session), providing the psychotherapist with an assessment of progress, deterioration, or no change The items address common symptoms and problems (mostly depressive and anxiety-based) that occur across the most frequently occurring psychiatric disorders. Each item is rated using a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = frequently, 4 = always), with a range of 0 to 4, yielding a range of possible scores from 0 to 180. The OQ45.2 provides a total score and three subscale scores. The three subscales are operationalizations of the three aspects of a client's life functioning—social role, symptom distress, and interpersonal relationships. Nine of the items measure the presence of positive mental states evenly divided across the three subscales. In this study, the Total Score (as opposed to the subscales) was utilized to estimate clinical significance. Lambert et al. (1996) reported the 3-week test-retest reliability for the total score to be .84. Additionally, internal consistency values were found to be high (α = .93). Concurrent validity was estimated by correlating the OQ-45.2 Total Score with corresponding total scores on the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1983), Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Zung Self-Rating Anxiety Scale (ZAS; Zung, 1971), Zung Self-Rating Depression Scale (ZSRDS; Zung, 1965), Taylor Manifest Anxiety Scale (TMA; Taylor, 1953), State-Trait Anxiety Inventory (STAI; Spielberger, 1983, Spielberger, Gorsuch, & Lushene, 1970), Inventory of Interpersonal Problems (IIP; Horowitz et al., 1988), and the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976). The concurrent validity for the total score was significant at the .01 level (ranging from .55-.85). Sensitivity to change of

the OQ-45.2 has been reported by Vermeersch, Lambert, and Burlingame (2000).

Symptom Checklist-90-R. The SCL-90-R is a ninety item self-report measure that is intended to measure current psychiatric symptom status. The SCL-90-R can be administered at pre- and post-treatment in order for the clinician to monitor changes in symptoms. Client disturbance is measured along nine primary symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The SCL-90-R provides the clinician with three global indices of distress. The Global Severity Index (GSI) was the primary index score used in this study and is recognized as the best indicator of pathological symptom disturbance on the SCL-90-R (Ogles, Lambert, & Masters, 1996). The items are based on a 5-point Likert scale (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely).

The SCL-90-R has been demonstrated to have excellent psychometric properties. Derogatis (1983) reported high test-retest reliability with coefficients ranging between .78 and .90. Additionally, Derogatis, Rickels, and Rock (1976) found internal consistency estimates to be satisfactorily high, with alphas ranging from .77 to .90. The ability to measure group change with the SCL-90-R has been extensively studied and reported in numerous settings and with diverse populations (e.g., Baum, Gatchel, & Schaeffer, 1983; Peltz & Merskey, 1982). Research suggests the SCL-90-R has strong concurrent validity (Peveler & Fairburn, 1990).

Social Adjustment Rating Scale-Self Report/Other Report. The SAS-SR is a 54 item self-report questionnaire that measures performance over the past two weeks in six areas of functioning: work; domestic or academic responsibilities; social and leisure activities; relationship with extended family; marital role as a spouse; parental role; and membership in the family unit (Weissman et al., 1978). Questions on this measure generally fall into four domains: client performance at expected tasks, the amount of interpersonal discord, elements of interpersonal relationships, and personal feelings (e.g., feeling shame, upset, worry, or discomfort while fulfilling roles) and satisfactions (Weissman et al., 1978). Each item is rated on a five-point scale, with the higher score being indicative of greater distress or impairment. The scale provides the clinician with a mean score for each of the areas of functioning discussed above.

The SAS-SR has been found to have good psychometric properties. Fischer and Corcoran (1994) found the SAS-SR to have adequate test-retest reliability ($r = .72$). Additionally, this same report suggests that the SAS-SR has fair internal consistency ($\alpha = .74$). There is also evidence to suggest that the SAS-SR has adequate concurrent validity (Weissman et al., 1978). The SAS-Other Report is much less used and its properties are virtually unknown.

Inventory of Interpersonal Problems-Short Form. The IIP-S (Hansen et al., 1998) is an 18-item self-report measure designed to assess stress and difficulty arising from interpersonal relationships and problems. The IIP-S is a shortened version of the 127-item IIP (Horowitz et al., 1988), designed to maintain the original purpose of the longer instrument. The items are ranked on a five -point scale (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, to 4 = extremely), yielding a range of possible scores from 0 to 72. The summed total score is a global score of interpersonal distress or dysfunction.

The IIP-S has adequate psychometric properties (Hansen et al., 1998). The test-retest reliability coefficient (over a three-week period) was .68, significant at the .01 level. Additionally, high coefficients of alpha were obtained for the internal consistency of the test ranging from .88 to .90. Concurrent validity estimates were obtained by correlating the IIP-S with both the IIP and the SCL-90-R. Results indicated that the IIP-S has concurrent validity coefficients comparable to the longer version of the IIP. Additionally, it was reported that the IIP-S showed excellent ability to discriminate between symptomatic and asymptomatic states, suggesting the measure could discriminate between various interpersonal states.

Quality of Life Inventory. The QOLI is a 34-item self-report questionnaire designed to assess general life satisfaction. The scale measures 17 areas of life satisfaction that were empirically derived from previous research on this topic (Frisch, Cornell, Villanueva, & Retzlaff, 1992). Clients rate each of the seventeen items as to how important each area is to their overall happiness (0 = not important, 1 = important, 2 = very important). Current levels of satisfaction are then rated for each life area (-3 = very dissatisfied to 3 = very satisfied.).

The QOLI has been demonstrated to have excellent psychometric properties. Frisch et al. (1992) reported that the QOLI has high test-retest reliability with coefficients of .91 and .80. High internal consistency was also reported, with Cronbach's coefficient alphas ranging from .77 to .89. The same study reported strong evidence for the instrument's convergent validity, given that QOLI scores "correlated significantly with seven measures of subjective well-being and life satisfaction, which included five widely used self-report measures, a peer rating measure, and a measure consisting of a clinical rating of interviews" (p. 96). Additionally, evidence for nomological validity was offered, in that the QOLI "correlates, in the expected ways, with other psychological constructs of theoretical importance to the concept of life satisfaction" (p. 96). Specifically, the QOLI was found to positively correlate with measures of happiness, life satisfaction, and general self-efficacy, and negatively correlate with measures of anxiety, depression, and general psychopathology. Preliminary indications suggest that the QOLI is sensitive to change, but the samples involved were small, and more research is needed.

Client Satisfaction Questionnaire-8.

The CSQ-8 is an 8-item self-report questionnaire that measures post-treatment client satisfaction with therapy. The CSQ-8 is the shortened form of a 31-item post service questionnaire (CSQ-31). The original scale was designed to assess the following nine areas of client satisfaction: physical surroundings, support staff, type of service, treatment staff, quality of service, quantity of service (amount or length), outcome of service, general satisfaction, and procedures. From the original 31 items, 8 items were selected that had the highest loadings on the general satisfaction factor. The client rates each item on a 4-point scale (1 = poor, 2 = fair, 3 = good, 4 = excellent) yielding a global score with a range of score from 0 to 32. This global score is then compared to the appropriate norm group score.

The CSQ-8 has been demonstrated to have excellent psychometric properties. Larson et al. (1979) reported that the instrument had excellent internal consistency with alphas ranging from .83 to .93. The construct validity of the CSQ-8 has also been established. Research has shown statistically significant correlations between the CSQ-8 and other instruments of client satisfaction (Larson et al.).

Procedures

Prospective participants from the TC were contacted and informed that the study involved both a pre- and a post-test. Individuals agreeing to participate were scheduled to meet with an undergraduate research assistant who had been trained in the test administration and protocol of the instruments in the battery. Similar protocol was followed at the CC, with the exception of how clients were invited to participate in the study. At the CC, information regarding the study was included in client intake packets, explaining the study and inviting them to participate.

In the pre-test assessment battery, the following tests were included: Outcome Questionnaire 45.2, Symptom Checklist 90-R, Quality of Life Inventory, Inventory of Interpersonal Problems, Social Adjustment Rating Scale-Self Report, and the Social Adjustment Rating Scale-Significant Other. The Social Adjustment Rating Scale-Significant Other (SAS-SO) contains the same questions as the SAS-SR, but is filled out by a significant other. Upon completion of these tests, the client was given an addressed envelope with the instructions that the questionnaire, which would be completed by a significant other, should be returned in the envelope as soon as it had been completed.

A research assistant kept track of when each of the clients attended therapy. As soon as participants terminated therapy or did not attend for a two-week period regardless of the reason, they were contacted and arrangements were made to complete the post-testing. This post-test protocol was followed to increase the likelihood that participants would comply with post-testing, and to maximize the likelihood of observing changes that were made in therapy. Those clients who remained in therapy were asked to complete the post-test battery following their tenth session. The tenth session was selected for post-test given that research suggests that a substantial number of clients have made clinically significant or reliable change by this point in therapy (Anderson & Lambert, 2001). The post-test battery included the same assessments that were given at pre-

testing, with the addition of the Client Satisfaction Questionnaire-8.

Establishment of Cutoffs and RCIs.

Prior to beginning the data collection portion of the study, published normative data were gathered for all of the tests used in the assessment battery. These normative data were used to calculate cutoff scores and reliable change indices for each measure. The establishment of the cutoff score was done following the clinical significance methodology outlined by Jacobson and Truax (1991), using the following formula: $\underline{c} = [(SD_1)(mean_2) + (SD_2)(mean_1)] / (SD_1 + SD_2)$

The establishment of the cutoff score allowed each of the participant's tests to be classified as either being in the functional population or the dysfunctional population. This classification suggested that a given participant obtained a standardized score on each assessment that was either more similar to those who appeared to be in the normal range or the clinical range on that particular test.
The reliable change indices (RCI) were also calculated prior to data collection. Using the criteria established by Jacobson and Truax (1991), the following formula was utilized:
$RCI = [(pre\text{-}test) - (post\text{-}test)] / S_{diff} = X$

If X (from the above RCI formula) is greater than 1.96, this suggests reliable change at the .05 alpha level of confidence.

The standard error of difference was computed by using the internal consistency value of the particular test and a pooled standard deviation, which resulted in an estimate of the test's standard error of measurement. Following procedures recommended by Jacobson and Truax (1991), estimates to complete the RCI and normative cutoff score were obtained from available published norms rather than the participants in the current investigation.

For the OQ-45.2, the SCL-90-R, and the IIP-S, there existed previous research in which the RCIs and cutoff scores had been calculated. For the OQ-45.2, community samples and outpatient clinic samples were used in the calculation (Lambert et al., 1996). The SCL-90-R RCI and cutoff were calculated using a moderately symptomatic sample and community samples (Tingey, Lambert, Burlingame, & Hansen, 1996). The IIP-S RCI and cutoff were calculated using a community sample, and a sample from an outpatient clinic (Hansen, et al., 1998). The QOLI RCI and cutoff scores were tabulated from a counseling center sample and from a general undergraduate population (Frisch et al., 1992). The SAS-SR and the SAS-SO RCIs and cutoffs were both computed from the same normative data gathered on the SAS-SR, which was comprised of acute depressives and a community sample.

Statistical Analyses

Prior to the statistical analyses, each of the test scores (OQ-45.2, SCL-90-R, IIP-S, SAS-SR, SAS-SO, QOLI) was transformed to a $\underline{z}$-score with a cutoff score of 0 and clinically significant change score of 1. This was done by taking the score on the test, subtracting the cutoff score and dividing by the clinical change score (i.e., RCI). Transformations thereby created an average cutoff score of 0 and a clinically significant change score of 1 for each test. For convenience in interpreting the data, each score was multiplied by ten and added to 100. This created a cutoff score of 100 and a clinically significant change score of 10, allowing each of the measures to be analyzed and interpreted on the same scale.

$[(x - \underline{c})(10) / (\text{RCI})] + 100$

Intra-class correlation coefficients were calculated to estimate the reliability of measures across participants. The intra-class correlation was calculated using the formula:

$$\rho = \frac{\sigma_\tau^2}{\sigma_E^2 + \sigma_\tau^2}$$

Traditionally, coefficients higher than .70 have indicated that there is adequate inter-rater (in this case measure) reliability (Howell, 1997).

Three intra-class correlations were computed. The first two correlations estimated how highly the scores of the clients on the measures (raters) at pre- and post-test correlated. The third intra-class correlation estimated the correlation of the change scores on the different tests across clients, from pre- to post-test.

In addition to the intra-class correlation, concordance rates were calculated. Each client's score was dichotomized into a "1" or a "0" on pre-test, post-test, and with reference to clinical

significance. A "1" on pre- or post-test indicated that the client scored in the non-clinical range on the particular test, while a "0" indicated that the client scored in the clinical range. Similarly, a "1," with reference to clinical significance, indicated that the client changed in a clinically significant way (exceeded both criterion) on the test from pre- to post-test. A "0" indicated that clinical significance had not been reached. From each client's dichotomized scores on all of the tests, concordance (i.e., percent agreement) was calculated individually and collectively at pre- and post-test (in terms of whether clients were classified as resembling clinical or non-clinical populations) and based on whether clinically significant change was achieved.

Ten chi-square tests for independence were performed ($p < .05$) comparing the OQ-45.2 with each of the other individual tests at pre- and post-test. The scores at pre- and post-test were dichotomized (0 = dysfunctional range; 1 = functional range). Additionally, 5 chi-square tests for independence were conducted on the OQ-45.2 as it compared to the other tests after each client was classified as having met or not met clinical significance at post-test (1 = clinically significant change; 0 = non-clinically significant change). In cases where the cell size was less than five, the Fisher's Exact Test was calculated. A Bonferonni correction set the alpha level at $p < .01$.

A t-test was conducted to determine if individuals who achieved clinical significance on the OQ-45.2 had higher levels of client satisfaction than individuals who did not reach clinical significance. The level of client satisfaction was determined using the Client Satisfaction Questionnaire-8 (CSQ-8).

Table 1
Percent Concordance of All Measures with OQ-45.2 at Pre-test, Post-test and Clinical Significance (CS)[a].

% Agreement Level	Clients Meeting this Level			Percentage		
	Pre	Post	CS	Pre	Post	CS
100	27/86	24/56	13/34	31.4	42.9	38.2
80	28/86	12/56	6/34	32.6	21.4	17.6
75	4/86	2/56	[b]	4.7	3.6	[b]
60	14/86	8/56	3/34	16.3	14.3	8.8
50	1/86	2/56	3/34	1.2	3.6	8.8
40	6/86	4/56	1/34	7.0	7.1	2.9
25	[b]	2/56	[b]	[b]	3.6	[b]
20	4/86	2/56	5/34	4.7	3.6	20.0
0	2/86	[b]	3/34	2.3	[b]	8.8

Note. 85.0%, 82.2%, 64.6% of the time, at least 3 out of the 5 measurements agreed with the OQ-45.2 classification as clinical or non-clinical at pre-, post-test, and CS, respectively.
[a]CS = participants who met or did not meet the clinical significance criteria as defined by Jacobson and Truax (1991) by crossing the cutoff and reliably changing as defined by the RCI.
[b] = no data points for this agreement level

Results

The results are divided into three analyses. The first considers concordance rates between the OQ-45.2 and the other tests across clients. The second considers intra-class

correlations, and the third considers the chi-square analyses.

For the pre-test the mean percent concordance was found to be 75%, at post-test it was 77.5%, and for clinical significance it was determined to be 66.2%, with less than one-half (43%) of the clients being classified perfectly across all six measures at pre- and post-testing. Chance percent concordance between the OQ-45.2 and all five other measures classifying similarly would be 3% (note, that with a .5 probability for each of the other instruments to be classified the same as the OQ-45.2, chance concordance is calculated by $(.5)^5$).

Table 1 provides percent concordance levels (across measures) for the clients at pre-test, post-test, and for clinical significance. Note that at pre-test, at least three out of the five comparative measures agreed with the OQ-45.2 classification as clinical or non-clinical 85% of the time. At post-test, at least three out of the five measures agreed with the OQ-45.2 classifications in 82.2% of the cases. Additionally, 64.6% of the time, at least 3 out of the 5 measurements agreed with the OQ-45.2 classification as meeting or not meeting criteria for clinically significant change.

In terms of classification, the SCL-90-R identified the most individuals as dysfunctional at pre-test (76%), followed by the QOLI (65%), the OQ-45.2 (59%), the IIP (57%), the SAS-SR (57%), and the SAS-SO (49%). At post-test the OQ-45.2 classified the most individuals as functional (68%), followed by the SAS-SO (62%), IIP (57%), SCL-90-R (57%), SAS-SR (52%), and the QOLI (45%). The OQ-45.2 classified the most individuals as having met the criteria for clinically significant change (32%) followed by the SCL-90-R (23%), IIP (20%), QOLI (18%), SAS-SR (11%), SAS-SO (7%).

The use of the SCL-90-R as the primary instrument of comparison with reference to clinically significant change was also explored. However, the data indicated that although more individuals were classified as dysfunctional at pre-test (76% compared to 59% on the OQ-45.2), fewer individuals met criteria for clinically significant change (23% compared to 32 % on the OQ-45.2). These data suggest that the SCL-90-R may be less sensitive to the effects of psychotherapy that the OQ-45.2.

An intra-class correlation was performed on scores at pre-test, post-test and the gain scores. Results from the intra-class correlations indicated high correlations. The pre-test correlation was .835 ($n = 86$); the post-test correlation was .870 ($n = 56$) and the gain score correlation was .849 ($n = 56$). In the post-test and the gain correlations, the SAS-SO was left out to increase the n from 42 and 40 (n of post-test and gain correlations, respectively), to an n of 56. With the SAS-SO, the correlations were .867 (post-test) and .835 (gain). These high intra-class correlations offer support for the OQ-45.2's ability to classify clients (as functional or dysfunctional) and classify change (as clinically significant or non-clinically significant) in a manner fairly commensurate with the other instruments used in the study. The chi-square analyses at post-test and clinical significance suggest that the SAS-SO classified clients in a manner independent of the OQ-45.2. The chi-square analyses provided general support (i.e., significant independent tests) for the OQ-45.2, SCL-90-R, QOLI, SAS-SR, and IIP-S classifying clients similarly at pre-test (p-values ranging from .002 to >.001), post-test (p-values ranging from .001 to <.001), and for identifying clinically significant change (p-values ranging from .005 to .001).

Relationship of Satisfaction to OQ-45.2 Categorization

A two-tailed t-test was conducted comparing the means of the following two groups: Group 1 ($n = 13$) was comprised of clients' score on the Client Satisfaction Questionnaire-8 (CSQ-8) for those who met criteria for clinical significance on the OQ-45.2, while Group 2 ($n = 12$) was comprised of clients' score on the CSQ-8 who did not meet the clinical significance criteria on the OQ-45.2. Graphical evaluation (using a Q-Q plot) of the data suggested normality, and Levene's Test for Homogeneity of Variance suggested that equal variance between the two groups could be assumed ($F = .176$, $p = .679$). The t-value was 1.938 with 23 degrees of freedom, and was not significant ($p = .065$).

Discussion

The concept of clinical significance, as operationalized through the application of Jacobson and Truax's (1991) formulas, can help bridge the gap between clinical research and clinical practice by examining the importance of each individual client's treatment response (e.g., Kendall et al., 1999). Despite the intuitive appeal of this method and its frequent use in recent research (Ogles et al., 2001), little evidence exists supporting the validity of this method. The current study examined the degree to which classifications for clinical significance, based on a brief self-report scale (i.e., the OQ-45.2), would be consistent with classifications based on other frequently used outcome measures.

The results suggested that there was concordance with many clients being classified perfectly across all six measures at pre- and post-testing and even higher concordance when the standard of agreement was set at three or more of the five other measures. If one test suggests a client is in the dysfunctional range, other tests as a (group) make the same classification the majority of the time.

Findings were similar with regards to classifying client change over time. When a client: 1) begins treatment in the dysfunctional range; 2) changes by 14 or more points on the OQ-45.2; and 3) passes the OQ-45.2 cutoff score of 63, he or she is regarded as having made clinically significant change. Thirty-four of the clients were included in the percent concordance calculations for clinically significant change, given that the remaining individuals (who completed pre- and post-testing) began treatment in a functional range on the OQ-45.2. Having commenced treatment at a functional level, it was not possible for these individuals to achieve clinical significance as outlined by Jacobson and colleagues (e.g., Jacobson, Roberts, Berns, & McGlinchey, 1999). There was considerable concordance with the clients being classified as having reached clinically significant change on the OQ-45.2 when compared to the other instruments classification of clinically significant change. It was rare (in 3 out of 34 clients) to see a complete lack of agreement between the OQ-45.2 and all other measures. Similar evidence for the agreement in classification of clinical significance was found in the intraclass correlation of the gain score and the chi-square analyses. The OQ-45.2 appeared to be most similar to the SCL-90-R in classifying clinically significant change.

The above results must be interpreted in the context of factors that undoubtedly influenced the degree of concordance that could be expected. The measures were each constructed to measure different aspects of client functioning. The SCL-90-R was designed to assess client levels of symptom distress, the SAS purports to measure levels of social adjustment and role performance, the IIP-S was intended to tap interpersonal functioning, and the QOLI was constructed to measure overall client satisfaction with life quality. The OQ-45.2 was intended to tap all these domains of functioning but with fewer items devoted to assessing each domain. Concordance could only be expected to be perfect if movement on all domains occurred at similar rates across the relatively brief amount of therapy offered in the current study. Several research studies suggest that different types of problems change at different rate (e.g., Barkham et al., 1996; Hansen, Lambert, & Forman, 2001; Maling et. al, 1995). In addition, the cutoff scores for RCI and functional/dysfunctional states were derived from different samples. For example, outpatient and community/college student normative samples were used to calculate the cutoffs and RCIs of the SCL-90-R, the IIP-S, and the OQ-45.2. Norms used for the SAS were comprised of acute depressives and a community sample, while norms for the QOLI came from counseling center clients and non-client undergraduates.

These differences likely resulted in differences in some of the cutoffs and RCIs being more or less conservative. The current study could not sort out the contribution of different content areas verses sample characteristics that may affect cut scores. For example, the OQ-45.2 and SCL-90-R differed in percent of clients who were classified as functional and dysfunctional at pre-test, with the SCL-90-R identifying more persons in the dysfunctional range. The SAS-SO, in contrast, classified the fewest individuals as dysfunctional at pre-test. At post-test, the QOLI identified the most individuals as being dysfunctional, compared to the other measures used in the study. Additionally, the SAS-SO and SAS-SR had the fewest persons identified as having met clinically significant change from pre- to post-test, while the OQ-45.2 identified the most cases

as experiencing clinically significant change. These noteworthy differences of the specific measures for classifying clients and assessing change should be pursued in future research.

Concordance rates were probably raised by the preponderance of self-report measures. Future research could better follow the "tripartite" model for assessing client change (Strupp & Hadley, 1977) by more effectively taking the significant other perspective into account than was done in the present study, as well as including the therapist perspective in evaluating client functioning. It is anticipated that concordance rates between measures which more extensively evaluate the significant other perspective and that consider therapist and expert judge evaluations could be lower than those based on self report as found in the present study.

Based on the present results, researchers and clinicians who employ the measures used in the present study can expect differences in the degree to which outcomes will vary as a function of instrument choice. The cutoff scores on the OQ-45.2 found 32% of patients meeting criteria for clinically significant change while the other measures ranged from 7% to 23%. This suggests that the OQ-45.2 is likely to provide relatively high estimates of change. Whether this is due to item content, cut scores, or actual increased sensitivity to the effects of treatment could not be determined. If these results hold up across replications it would suggest that, at least with low treatment doses, the OQ-45.2 would be the preferred measure since it attempts to measure domains common across all of the other measures. The SAS measures would be least preferred since they classify a similar number of patients dysfunctional at pre-test but classify very few patients as achieving clinically significant change at termination. The failure of significant other ratings of the client to correspond better with self-report ratings is not uncommon (e.g., Lunnen & Ogles, 1998). It supports the need to include additional sources for evaluating clinically significant change in future research.

There was a lack of concordance between satisfaction and clinically significant change as measured by the OQ-45.2 (i.e., there was not a significant difference between the means of those clients who met clinical significance criteria on the OQ-45.2 and those who did not). This finding is consistent with other findings that suggest a tendency for high satisfaction ratings despite therapy outcome (Lunnen & Ogles, 1998; Pekarik & Wolff, 1996). This tendency may be a result of demand characteristics, or a lack of "appropriate range of items reporting dissatisfaction" (Lunnen & Ogles, p. 407).

The concept of clinically significant change is important in bridging the gap between research and clinical practice by helping turn attention from group averages back to the individual client. While promising, much more research on the validity of methods for classifying clinically meaningful change is needed before confidence can be placed in these methods.

References

Anderson, E. M., & Lambert, M. J. (2001). A survival analysis of clinically significant change in outpatient psychotherapy. *Journal of Clinical Psychology, 57,* 875-888.

Ankuta, G. Y., & Ables, N. (1993). Client satisfaction, clinical significance, and meaningful change in psychotherapy. *Professional Psychology Research and Practice, 24*, 70-74.

Barkham, M., Rees, A., Stiles, W. B., Shapiro, D. A., Hardy, G. E., & Reynolds, S. (1996). Dose- effect relations in time-limited psychotherapy for depression. *Journal of Consulting and Clinical Psychology, 64,* 927-935.

Barlow, D. H. (1981). On the relation of clinical research to clinical practice: Current issues, new directions. *Journal of Consulting and Clinical Psychology, 49,* 147-155.

Baum, A., Gatchel, R. J., & Schaeffer, M. A. (1983). Emotional, behavioral, physiological effects of chronic stress at Three Mile Island. *Journal of Consulting and Clinical Psychology, 51,* 565-572.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 561-571.

Christensen, L., & Mendoza, J. L. (1986). A method of assessing change in a single client: An alteration of the RC index. *Behavior Therapy, 17*, 305-308.

Derogatis , L. R. (1983). *The SCL-90-R: Administration, Scoring and Procedures Manual-II.* Towson, MD: Clinical Psychometric Research.

Derogatis, L. R., Rickels, K., & Rock, A. (1976). The SCL-90 and the MMPI: A step in the validation of a new self-report scale. *British Journal of Psychiatry, 128,* 280-289.

Edwards, D. W., Yarvis, R. M., Mueller, D. P., Zingale, H. C., & Wagman, W. J. (1978). Test- taking and the stability of adjustment sales: Can we assess patient deterioration? *Evaluation Quarterly, 2,* 275-292.

Fischer, J., & Corcoran, K. (1994). *Measures for Clinical Practice* (Vol. 2). NY: Free Press. Frisch, B. M. (1988). Quality of Life Inventory. Unpublished manuscript. Frisch, B. M., Cornell, J., Villanueva, M., & Retzlaff, P. J. (1992). Clinical validation of the Quality of Life Inventory: A measure of life satisfaction for use in treatment planning and outcome assessment. *Psychological Assessment, 4,* 92-101.

Froyd, J. E., Lambert, M. J., & Froyd, J. D. (1996). A review of practices of psychotherapy outcome measurement. *Journal of Mental Health, 5,* 11-15.

Gladis, M. M., Gosch, E. A., Dishuk, N. M., & Crits-Christoph, P. 1999). Quality of life: Expanding the scope of clinical significance. *Journal of Consulting and Clinical Psychology, 67,* 320-331.

Hansen, N. B., Lambert, M. J., & Forman, E. M. (2001). Comparisons of clinically significant change in clinical trials and naturalistic settings: *Clinical Psychology: Science and Practice,*

Hansen, N. B., Umphress, V., & Lambert, M. J. (1998). The reliability and validity of a short form of the Inventory of Interpersonal Problems. *Journal of Psychoeducational Assessment, 16,* 201-214.

Horowitz, L.M., Rosenberg, S.E., Baer, B.A., Ureno, G., & Villasenor, V.S. (1988). Inventory of Interpersonal Problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology, 57,* 599-606.

Howell, D. C. (1997). *Statistical methods for psychology* (4th Ed.). Boston, MA: Duxbury Press.

Hsu, L. M. (1989). Reliable changes in psychotherapy: Taking into account regression toward the mean. *Behavioral Assessment, 11,* 459-467.

Hugdahl, K., & Öst, L. (1981). On the difference between statistical and clinical significance. *Behavioral Assessment, 3,* 289-295.

Jacobson, N. S., Follette, W. C., & Revenstorf, D. (1984). Psychotherapy outcome research: Methods for reporting variability and evaluating clinical significance. *Behavior Therapy, 15,* 336-352.

Jacobson, N. S., Roberts, L. J., Berns, S. B., & McGlinchey, J. B. (1999). Methods for defining and determining the clinical significance of treatment effects: Description, application, and alternatives. *Journal of Consulting and Clinical Psychology, 67,* 300-307.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59,* 12-19.

Kendall, P. C. (1999). Clinical significance. *Journal of Consulting and Clinical Psychology, 67*, 383-384.

Kendall, P. C., & Grove, W. M. (1988). Normative comparisons in therapy outcome. *Behavioral Assessment, 10,* 147-158.

Kendall, P. C., Marrs-Garcia, A., Nath, S. R., & Sheldrick, R. C. (1999). Normative comparisons for the evaluation of clinical significance. *Journal of Consulting and Clinical Psychology, 67,* 285-299.

Kordy, H., Hannover, W., & Richard, M. (2001). Computer-assisted feedback-driven quality management for psychotherapy: The Stuttgart-Heidelberg model. *Journal of Consulting and Clinical Psychology, 69,* 173-183.

Lambert, M. J., & Finch, A. E. (1999). The Outcome Questionnaire. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment* (2nd ed., pp. 831-869). Mahwah, NJ: Erlbaum.

Lambert, M. J., Hansen, N. B., & Finch, A. E. (2001). Patient-focused research: Using patient outcome data to enhance treatment effects. *Journal of Consulting and Clinical Psychology, 69,* 159-172 .

Lambert, M. J., Hansen, N. B., Umphress, V., Lunnen, K., Okiishi, J., Burlingame, G. M., & Reisenger, C. W. (1996). *Administration and Scoring Manual for the OQ-45.2.*

Stevenson, MD: American Professional Credentialing Services LLC.

Lambert, M. J., Whipple, J. L., Smart, D. W., Vermeersch, D. A., Nielsen, S. L.,& Hawkins, E. J.(2001). The effects of providing therapists with feedback on patient progress during

psychotherapy: Are outcomes enhanced? *Psychotherapy Research, 11(1),* 49-68.

Lambert, M. J., Whipple, J. L., Bishop, M. J., Vermeersch, D. A., Gray, G.V., & Finch, A. E. (2002). Comparison of empirically derived and rationally derived methods for identifying patients at risk for treatment failure. *Clinical Psychology and Psychotherapy ,9*, 149-164.

Lambert, M. J., Whipple, J.L., Vermeersch, D. A., Smart, D. W., Hawkins, E. J., Nielsen, S. L., & Goates, M. (2002). Providing Therapists with feedback on patient progress as a method of enhancing psychotherapy outcomes: A replication. *Clinical Psychology and Psychotherapy,9, 91-103.*

Larson, D. L., Attkisson, C. C., Hargreaves, W. A., & Nguyen, T. D. (1979). Assessment of client/patient satisfaction in human service programs: Development of a general scale. *Evaluation and Program Planning, 2,* 197-207.

Lueger, R. J., Howard, K. I., Martinovitch, Z., Lutz, W., Anderson, E. E.,& Grissom, G. (2001). Assessing treatment progress of individual patients using expected treatment response models. *Journal of Consulting and Clinical Psychology,69,* 150-158.

Lunnen, K. M., & Ogles, B. A. (1998). A multiperspective, multivariable evaluation of reliable change. *Journal of Consulting and Clinical Psychology, 66,* 400-410.

Maling, M. S., Gurtman, M. B., & Howard, K. I. (1995). The response of interpersonal problems to varying doses of psychotherapy. *Psychotherapy Research, 5,* 63-75.

Nunnally, J. C., & Kotsch, W. E. (1983). Studies of individual subjects: Logic and methods of analysis. *British Journal of Clinical Psychology, 22,* 83-93.

Ogles, B.M., Lambert, M. J., & Masters, K.S. (1996). *Assessing outcome in clinical practice.* Boston: Allyn & Bacon.

Ogles, B. M., Lunnen, K. M., & Bonesteel, K. (2001). Clinical significance: History, definitions and applications. *Clinical Psychology Review, 21,* 421-446.

Pekarik, G., & Wolff, C. B. (1996). Relationship of satisfaction to symptom change, follow-up adjustment, and clinical significance. *Professional Psychology: Research and Practice, 27,* 202-208.

Pelz, M., & Merskey, H. (1982). A description of the psychological effects of chronic painful lesions. *Pain, 14,* 293-301.

Peveler, R. C., & Fairburn, C. G. (1990). Measurement of neurotic symptoms by self-report questionnaire: Validity of the SCL-90-R. *Psychological Medicine, 20,* 873-879.

Saunders, S. M., Howard, K. I., & Newman, F. L. (1988). Evaluating the clinical significance of treatment effects: Norms and normality. *Behavioral Assessment, 10,* 207-218.

Speer, D. C., & Greenbaum, P. (1995). Five methods for computing significant individual client change and improvement rates: Support for an individual growth curve

approach. *Journal of Consulting and Clinical Psychology, 63,* 1044-1048.

Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory STAI (Form Y).* Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *The State-Trait Anxiety Inventory Self Evaluation Questionnaire.* Palo Alto, CA: Consulting Psychologists Press.

Strupp, H. H., & Hadley, S. W. (1977). A tripartite model of mental health and therapeutic outcome: With special reference to negative effects in psychotherapy. *American Psychologist, 32,* 187-196.

Taylor, J. A. (1953). A personality scale of manifest anxiety. *Journal of Abnormal and Social Psychology, 48,* 285-290.

Tingey, R. C., Lambert, M. J., Burlingame, G. M., & Hansen, N. B. (1996). Assessing clinical significance: Proposed extensions to method. *Psychotherapy Research, 6,* 109-123.

Vermeersch, D. A., Lambert, M. J., & Burlingame, G. M. (2000). Outcome Questionnaire: Item sensitivity to change. *Journal of Personality Assessment, 74,* 242-261.

Weissman, M. M., & Bothwell, S. (1976). The assessment of social adjustment by patients self- report. *Archives of General Psychiatry, 33,* 1111-1115.

Weissman, M. M., Prusoff, B., Thompson, D., Harding, P., & Myers, J. (1978). Social adjustment by self-report in a community sample and in psychiatric outpatients. *Journal of Nervous and Mental Disease, 166,* 317-326.

Zung, W. W. K. (1965). A self-rating depression scale. *Archives of General Psychiatry, 12,* 63-70.

Zung, W. W. K. (1971). A rating instrument for anxiety disorders.Psychosomatics, 12, 371-379.

A HISTORY OF REINFORCEMENT: THE ROLE OF REINFORCEMENT SCHEDULES IN BEHAVIOR PHARMACOLOGY

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Operant behavior maintained by schedules of intermittent reinforcement has been extensively used for the investigation of the behavioral effects of drugs that affect the central nervous system. While the primary purpose of such research has been the screening of novel compounds in the search for clinically effective drugs, much else has been discovered about drug action and behavioral processes. Current research focuses on problems of social and clinical importance, such as cocaine abuse, and involves the development of novel and modified reinforcement schedules to address problems thrown up by research involving drugs. There are also new challenges posed in studying the behavior of transgenic knock-out mice. After more than 40 years, reinforcement schedules continue to be significant research techniques in behavior pharmacology. It is important that researchers are fully trained in behavior analysis in order to contribute to this rapidly developing area of behavioral neuroscience.

In parallel with the development of scientific approaches to psychology, there were massive developments in our knowledge and understanding of the brain and central nervous system in the twentieth century and this progress has accelerated in recent years. Practitioners of both disciplines are aware that each discipline needs the other to provide a more complete account of human psychology and behavior. However, there is a tendency to regard brain processes as more "basic" in some sense, and to expect that psychological or behavioral processes will, in the end, be explained by brain processes. Whether or not one accepts this "reductionist" philosophical position, scientific and practical considerations show that it is necessary to investigate both behavioral processes and brain processes, and the interaction between the two.

From a scientific perspective, behavioral processes are interesting in their own right, and knowledge of them and their applications can be developed without necessarily knowing about the correlated brain processes. However, scientific curiosity would lead us to investigate, where possible, the brain processes that go in parallel with behavioral or psychological phenomena. From the perspective of neuroscience the argument is even more compelling: we hardly ever investigate a process in the brain or central nervous without a parallel interest in its relationship to psychological functioning. As soon as we ask, "How does this brain process affect behavior?" we require an adequate account of behavioral processes to which we can relate our study of brain function.

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In broad terms, behavioral neuroscience is the interdisciplinary field of study that seeks to use behavioral techniques to understand brain function, and to use techniques of neuroscience to elucidate behavioral processes. Psychology and neuroscience come together in various areas of this interdisciplinary field, and to date behavior pharmacology has been one of the most productive of these areas.

The last 50 years have seen the development of the modern pharmaceutical industry, which has the capacity to synthesize new chemical compounds that may be useful in treating human diseases and ameliorating psychological distress of one kind or another. A major section of the industry is concerned with agents that may alter the functioning of the human central nervous system. In the development of a new drug that affects the human central nervous system many practical, legal and scientific issues must be addressed. As well as safety issues (the drug may be toxic to many species, or especially to humans, or it may damage certain types of tissues or impair certain physiological functions, etc.), the drug must pass various positive tests as well. Even if it is chemically similar to a compound already in use

for the treatment of anxiety, for example, it may not itself be effective. If it is effective, how should it be administered, and on what type of dosing regime?

Most of these questions cannot be addressed, in the first instance, by giving the new drug to human volunteers or patients suffering from the disorder that the drug may ameliorate. This is ethically unacceptable, because of the risks to the people concerned, and is consequently illegal in most jurisdictions. Fortunately, techniques for investigation of behavioral processes in non-human animals developed at roughly the same the time as a demand emerged for techniques to assess the nature of drug effects on central nervous system functions. Behavioral experiments with other species have turned out be an extremely useful way of characterizing the effects of a drug prior to assessing its effects with a human clinical population.

Many of the studies in behavior pharmacology have used operant behavior maintained by intermittent positive reinforcement as a baseline to assess the effects of drugs administered to laboratory animals (such as pigeons, rats, etc.). The central purpose of this paper is to trace the uses to which this research strategy has been put over the past 40 or 50 years, and to illustrate how it continues to be used and developed.

The various ways in which reinforcement can be arranged to produce long-term patterns of behavior are called schedules of intermittent reinforcement. Each such schedule of reinforcement specifies the particular condition or set of conditions that must be met before the next operant response is reinforced. The classic set of studies in this field was that of Ferster and Skinner (1957), and more recent reviews or summaries are available (see, for example, Catania, 1998, Chapters 10 & 11; Leslie, 1996, Chapter 4; Zeiler, 1977). For readers unfamiliar with these, a brief introduction is provided here.

Although it is true that the acquisition of "new" behavior usually proceeds most smoothly when each and every instance of an operant response is reinforced, intermittent reinforcement procedures produce reliable and distinctive patterns of behavior. Studies in the experimental analysis of behavior show that intermittent reinforcement procedures have great utility for generating stable, long-term baselines of learned behavior against which the effects of drugs can be assessed.

If we consider the relatively simple situation where only one operant response is to be examined and the antecedent stimulus conditions are constant, there are at least two things we may specify: the number of responses that must occur, and the time that must elapse before a reinforcing stimulus is presented contingent upon the next instance of the operant response. Schedules involving a required number of operant responses are called ratio schedules (referring to the ratio of responses to reinforcers); and schedules specifying a period of time are called interval schedules (referring to the imposed intervals of time between reinforcements). Schedules can also be either fixed (where every reinforcer is delivered after the same ratio or interval requirement has been fulfilled), or variable (where the ratios and intervals can vary within the schedule).

Although the procedures require a complicated verbal description, each of the four schedules we have briefly defined generates a characteristic performance, or behavioral steady state. For example, on a fixed ratio schedule, the pattern of behavior is characterized by a period of not-responding following reinforcer delivery (this is called the “post-reinforcement pause”) followed by an uninterrupted burst of responding at high rate until the next reinforcer is delivered. If the ratio value (the number of responses required for reinforcement) is increased, the length of the pause increases. Significantly, the performance patterns characteristic of the different schedules have been produced in many species, and with a variety of operant responses. Once operant behavior on a schedule reaches a steady state, it will not change significantly with extended further exposure to the same conditions. It is then that schedule-controlled behavior can be used as a baseline for investigating the effects of drugs or other interventions in the central nervous system.

Let us consider further a behavioral account of this simple behavior pharmacology experiment, in terms of antecedents, behavior, consequences, history of reinforcement, and establishing operations.

Antecedents: Because of its great utility, the situation in which the experiment is conducted is most often a standard operant test chamber, or Skinner box, suitable for the species being used. This situation may include an additional stimulus, termed the discriminative stimulus, which signals when the reinforcement contingency is in effect. While stimuli external to the experimental participant, such as lights or sounds, have often been used as discriminative stimuli, it turns out that administration of a drug generates internal stimuli that can also be used as discriminative stimuli.

Behavior: An operant response class will be used that is specified by the responses available to be reinforced in the Skinner box. The form of the response will vary with the species, and would typically be a key pecking response for pigeons, a lever press for rats etc. As in other areas of the experimental analysis of behavior, the form of the response has rarely been found to be a significant variable in interpreting the results of behavior pharmacology studies.

Consequences: Again, the reinforcing consequence will be the one typically used with this species and apparatus. In most case the establishing operation (see below) of food deprivation has been used, and delivery of small amounts of palatable food have been used as the response-contingent reinforcing stimulus. However, water or other liquid reinforcers can be used followed appropriate deprivation, and reinforcing brain stimulation can be used. Drug administration itself can be used as a reinforcing stimulus. As will be discussed later, this in itself is a major strand in behavior pharmacology research because the reinforcing effects of drugs are of great importance.

History of reinforcement: Once the antecedents, behavior and consequences have been specified, a history of reinforcement for the experimental participant can be established. Classic studies in behavior pharmacology used one of the reinforcement schedules described earlier and continued training until behavior showed a high level of stability from session to session. This might have taken 20 to 30 daily experimental sessions with rats, pigeons or monkeys as experimental participants, for example. Once each participant in the experiment was showing the same stable pattern of behavior, the drug treatment was introduced. This enabled the effects of the drug to be assessed in each individual organism in terms of the effects on the previously established pattern of behavior (for example, the pattern of a post-reinforcement pause followed by responding at a sustained high rate that is typical of a fixed-ratio schedule) which had been established through a history of reinforcement on that schedule. General findings were that if exposure to the schedule was continued for long enough prior to the beginning of the drug administration phase of the experiment, this history of reinforcement ensured that the same behavioral effects of the drug were recorded in each experimental participant. This reliability of data across experimental participants showed that a similar rigorous degree of experimental control could be obtained in behavior pharmacology studies as in other areas of the experimental analysis of behavior.

Establishing operations: While the three-term relationship (or reinforcement contingency) between antecedents, behavior and consequence is the key explanatory principle in behavior analysis, it has been increasingly acknowledged that many other conditions have to be identified to facilitate change in behavior through the operation of that three-term relationship. In an experimental context, most of the reinforcement contingencies in routine use depend on a deprivation operation (such as restricted access to food over the period before the experimental session) to establish the value of the reinforcer to that organism at that time. In an applied context, change in an establishing operation may be sufficient to produce a rapid and desired change in behavior. Substantial sleep deprivation, for example, may render ineffective the events used routinely as reinforcers in educational contexts. The value of those reinforcers may be re-established by simply removing the sleep deprivation. Many important establishing operations affect biological variables, and the administration of drugs that change operant behavior maintained

by a schedule can be placed in this category. While the antecedents, behavior, and consequence have, through a history of reinforcement, set up various relationships between the current environment and aspects of the operant behavior, administration of a drug which affects the central nervous system can often be seen as an establishing operation that changes some of these relationships.

The Current Use of Schedules of Reinforcement in Behavior Pharmacology

The potential value of steady-state operant behavior generated by schedules of reinforcement to measure the effects of psychoactive drugs was recognized as early as the late 1950's (Brady, 1959; Sidman, 1959). The notion of a behavioral baseline against which effects of drugs could be assessed was central to this early research, and to the research tradition that is traced in this paper. It was found that such a stable baseline allowed investigation of many issues that are important in characterizing the effect of a drug. These include:

1. monitoring the time course of the behavioral effect of a drug;
2. establishing the dose-effect curve (or dose-response relationship) of the effect on behavior;
3. identifying the most effective route of administration of the drug to achieve behavioral change;
4. comparing the behavioral effects of novel compounds with those of drugs with established clinical effects;
5. classifying drugs according to their behavioral effects within the controlled environment of an operant conditioning procedure;
6. establishing whether a class of drugs with similar clinical effects has a consistent profile of effects in operant conditioning procedures.

As noted earlier, it is the fact that a characteristic pattern of behavior can be maintained over long periods of time in each individual experimental participant that makes it possible to address these many objectives through training on reinforcement schedules. By the 1970's, it was argued in an authoritative review that "operant behavioral pharmacology has, by and large, succeeded in satisfying the two major requisites of a scientific domain concerned with the analysis of drug actions on behavior: (1) The provision of sensitive and reliable behavioral procedures; and (2) the provision of an objective, operationally based conceptual framework with which to interpret the results of experiments on the behavioral actions of drugs." (Thompson & Boren, 1977).

Operant conditioning has continued to play a significant role in behavior pharmacology. Indeed, the financial power of pharmaceutical companies, along with the decline in interest in "animal research" in university psychology departments, has meant that a large amount of all the laboratory research on operant conditioning using non-human animals has been conducted by those companies. While much of the work has consequently been concerned with screening novel compounds for their similarity of action of existing clinically effective agents, much of the other research agenda outlined above has also continued to develop. Some recent research using reinforcement schedules will be briefly reviewed next to illustrate some of the main themes that are being addressed with these techniques. A number of the examples given below come some from work with cocaine, and substances being developed to reduce the abuse of cocaine. This strategy enables the links between different recent research studies to be indicated. It also serves to emphasize the fact that at any one time research in behavior pharmacology is driven by current social and medical concerns.

Drugs as Reinforcers: The Use of Schedules in the Measurement of Reinforcing Value of Drugs

One of the most familiar assumptions about operant conditioning is that it provides a direct measure of reinforcing value or effectiveness. That is, the current significance

of an event, or activity, for an individual organism will be reflected in whether, and to what extent, that event will act as a reinforcer for a lower-frequency behavior in an operant-conditioning procedure. It is this idea which is embedded in the "Premack principle" (Premack, 1965, 1971), which states that access to a currently more probable activity will reinforce (that is, increase the frequency of) a less probable activity. It is also incorporated in the response deprivation principle of reinforcement, which has greater explanatory power than the Premack principle (Timberlake & Allison, 1974; see Leslie, 1996, Chapter 4 for a brief introduction to these ideas).

It has long been recognized that the use of operant conditioning to measure reinforcing value has great potential in understanding drug effects, particularly the effects of drugs with abuse potential, such as heroin and cocaine. If operant conditioning provides a valid model of the behavioral effects of such drugs, it may be possible through experimental analysis both to understand better the effects of the drugs and to investigate ways of reducing drug abuse.

One approach to this issue is the use of a progressive ratio schedule of reinforcement. On such a schedule, the number of responses required before the next reinforcer is delivered increases steadily according to some mathematical rule. The number (or ratio) might for example be 10, and then 20, and then 40, and so on indefinitely (or the sequence could be 10, 20, 30, 40 etc.). The originator of research with this type of schedule (Hodos, 1961) suggested that the "break point", the largest ratio that the experimental participant is prepared to complete for the reinforcer, may be a useful measure of reinforcing value. (Note that any definition of break point will itself embody an arbitrary criterion; it might, for example, be defined as the first occasion when the next ratio requirement is not completed within 20 minutes.) Hodos showed that the break point increased with increases in either the concentration or volume of sweetened milk used as a reinforcer for the operant behavior of lever pressing by rats. These findings, and those of many other studies, have validated the use of the break point as a measure of reinforcing value.

Many studies have investigated this procedure using drugs as reinforcers. With a number of drugs, including heroin, cocaine and codeine, it has been found that the break point increases with increasing drug dose (Stafford, LeSage, & Glowa, 1998), and that heroin and cocaine generally maintain higher break points that a range of other drugs (Stafford et al., 1998). A number of studies have used cocaine-maintained progressive ratio schedule behavior as a baseline, and then administered another drug or range of drugs. The main purpose of these studies has been to investigate the mechanism by which cocaine has its reinforcing effects, and a typical finding has been that the break point under cocaine reinforcement is reduced by prior administration of a dopamine agonist (Stafford et al., 1998).

It has sometimes been found that, while the reinforcing value of the drug increases over a range of drug concentrations, the reinforcing value (as indexed by the break point) appears to decline at yet higher concentrations. One likely reason for this lies in the direct behavioral effects of the drug being administered, such as cocaine. At a high dose, these effects may be incompatible with continuing to complete the operant response. This would mean that once a single reinforcer, or a few reinforcers in a short time, had been delivered, the tendency to respond would be greatly reduced for a time even though the reinforcing value of the drug was high.

One way of avoiding this problem is to use a procedure which enables "drug seeking" behavior and "drug taking" behavior (Everitt & Robbins, 2000) to be measured separately. In cases of human drug abuse, we would be more concerned to modify the drug seeking behavior, which is usually an essential precursor of drug taking. Two ways of using schedules of reinforcement to distinguish between drug seeking and drug taking behavior will be briefly described. These are second-order schedules and chain schedules.

A second-order schedule is one in which completion of a component schedule requirement is in turn reinforced according to an overall schedule. For example, if the component schedule is the completion of 10 operant responses (FR 10), and the overall schedule is a

fixed interval of 20 minutes (FI 20 minutes), this will mean that each time 10 responses is completed a brief stimulus (e.g., a light) will be presented that has previously been followed by the reinforcer. Only when the 20-minute requirement has also been met, will the reinforcer also be presented. Such a procedure allows for the examination of behavior under the component schedule on those occasions when the reinforcer has not been recently presented. This is not the case on the simpler reinforcement schedules described earlier, where every instance of performance of the schedule requirement is immediately preceded by a reinforcer delivery.

Although second-order schedules are usually used in procedures where the overall schedule is presented a number of times in each session, this type of schedule has the special feature that the behavior maintained by the component schedule can be examined a number of times in each session before the drug is delivered at all. This is particularly useful in drug reinforcement studies, and Everitt and Robbins (2000) describe this as "drug seeking behavior in the drug-free state". Behavior maintained by second-order schedules of reinforcement has been successfully generated in monkeys and in rats, and has been used to examine the effects of morphine (Goldberg & Tang, 1977), cocaine (Arroyo, Markou, Robbins, & Everitt, 1998), and heroin (Alderson, Robbins, & Everitt, 2000). These studies have generally produced a monotonic does-response relationship in the first drug-free interval, without a decline at higher concentrations, and the procedure generates a number of other behavioral measures. It is not known whether this complex procedure can maintain operant behavior with mice (Everitt & Robbins, 2000). The significance of operant studies with mice will be discussed later.

An alternative method of distinguishing between drug-seeking and drug-taking behavior is provided by a chain schedule of reinforcement where two distinct responses are used. Olmstead, Parkinson, Miles, Everitt, and Dickinson (2000) trained rats to make one response on the "seeking lever." This lever was withdrawn when pressed and the "taking lever" was presented. This remained available until a press on that lever was reinforced with an infusion of cocaine after a randomly varying interval (mean=30 seconds). Following this, the seeking lever was presented again. When used as described, there was a negative relationship between the drug-seeking response rate and the concentration of the cocaine delivered. However, when a 12-minute delay (or "timeout") occurred after each drug delivery prior to the next presentation of the seeking lever, there was a positive relationship between the drug-seeking response rate and the concentration of the cocaine delivered. This is further evidence that in procedures that distinguish between drug seeking and the direct effects of cocaine, at least, a positive relationship between strength of operant behavior and drug concentration will be obtained.

Studies of the type described here show that schedules of reinforcement provide an effective technique within which the reinforcing effects of drugs can be assessed. Further, drugs of abuse such as cocaine, have particular effects not seen with conventional reinforcers (e.g., food) and schedules can be modified in ways that take account of these effects and provide valid measures of reinforcing value.

Discriminative Stimulus Properties of Drugs

Since the 1970's it has been recognized that the drugged state may well have discriminative stimulus properties. That is, operant behavior may come under the control of internal cues generated by prior administration of a drug. This phenomenon is the basis of the drug discrimination procedure. A classic study was conducted by Schuster and Brady (1964). Rhesus monkeys were infused with various doses of epinephrine, and while in the drugged state lever pressing was reinforced with food on an FR schedule. When saline had been injected instead, however, lever pressing had no consequences. Over a number of trials, a good discrimination was established: there was now a high level of lever pressing in the presence of the drug, and virtually none when saline had been administered.

Drug discrimination studies with non-human animals are conducted for a number of reasons. One is that the perceptual effects of drugs in these studies may correspond to their

subjective (and sometimes, euphoric) effects in humans, and these subjective effects are related to abuse potential. Another reason is that training one drug as a discriminative stimulus (for example, a drug with abuse potential) provides the possibility of testing other drugs or combinations of drugs. These substitutes can then be assessed for whether they are functionally similar and control the same behavior as the trained drug or, in the case of combinations, whether the added drug is antagonistic and removes the discriminative control of the trained drug.

The dopaminergic theory of cocaine abuse-- the notion that enhanced dopaminergic neurotransmission plays a crucial role in the reinforcing and subjective effects of cocaine-- has been further examined using this technique. Two recent studies will be outlined as examples. In one of these, Chausmer and Katz (2002) trained rats on an operant food-reinforced task. An FR20 schedule of reinforcement was in effect for pressing on one lever (e.g., the right lever) on those sessions that had been preceded by a cocaine injection, and the same schedule was in effect for pressing the other lever (e.g., the left lever) on those sessions that had been preceded by a saline injection. Sessions continued for 15 minutes, or until 20 reinforcers had been obtained. Once accurate operant responding had been established, there were test sessions prior to which various doses of cocaine were administered along with one of several dopamine D_1-like receptor agonists. One of three agonists (A-77636) consistently attenuated the effects of cocaine, suggesting that this substance might useful as a therapy for cocaine abuse.

The possibility that other effects of cocaine are important, along with those on dopaminergic transmission, was investigated in a drug discrimination study by Tella and Goldberg (2001). One group of rats was trained to discriminate cocaine from saline, using a procedure very similar to the one in the previously described study. Another group, however, was trained to discriminate the same dose of cocaine from both saline and GBR-12909, a dopamine-selective uptake inhibitor. This training strategy allowed a wide range of drugs to be tested as substitutes for the training drug, cocaine, including sodium-channel blockers such as dimethocaine. Comparison of the test data across the two groups of rats, showed that cocaine has some stimulus properties in common with sodium channel-blocking agents. This suggests that possible therapeutic agents for cocaine abuse should have sodium channel binding affinity as well as dopamine transport affinity.

Studies of the type described here provide plenty of evidence of the validity of the notion that drugs can be important antecedents of behavior. They also show how experimental investigations can be devised that enhance our understanding of the neurochemical effects of drugs of abuse, and thereby suggest how effective therapeutic strategies can be devised.

The New Genetics and Mouse Operant Behavior

The ubiquity of performances generated by schedules of reinforcement has long been a cause of interest and comment. Provocatively, Skinner (1959) published some cumulative records of operant behavior maintained by a multiple FI FR schedule of reinforcement. (On a multiple schedule, two schedules are alternately in effect with a discriminative stimulus signaling the current schedule.) Three records were published, and each of the records showed the same pattern of behavior, with different characteristics for each of the two schedules (the figure is reproduced in Leslie, 1996, p. 312). The interesting fact was that the three records each came from an individual of three different species (rat, monkey, and pigeon). They were also making operant responses that differed in form, and receiving different types of reinforcement. Nonetheless, the behavior presented in this way looked the same for each species.

The generality of schedule performances has led researchers in behavior pharmacology to speculate that similar schedule performances in different species may be affected in the same ways by drug treatments. This has often been the case, even when the species concerned are highly unrelated (such as a species of pigeon and a species of monkey). However, such generality cannot be assumed. It must be established through empirical investigation and, where necessary, procedures must be devised for use with additional species. Once the behavioral

baseline has been generated with that species, using appropriate apparatus, then drug effects can be examined.

This issue has come to the fore in recent years, because there has been renewed interest in mouse behavior. The 1990's were the decade in which the developments in the molecular biology of genetics began to affect and interact with many disciplines, included behavioral neuroscience. We could be said to be dealing with the new field of "behavioral genomics" (Sanger, Willner, & Young, 2001). Early developments in this field were strongly linked to the use of inbred strains of mice, and currently the most powerful technique is the transgenic "knock-out mouse". One version of the technology for producing a knock out proceeds as follows: a gene is identified which has a specific role in central nervous system development (e.g., it leads to the production of a neurotransmitter receptor subtype); DNA that has been engineered to contain a mutant (non-functional) copy of that gene is introduced into special embryonic stem cells (ES cells) that were grown in tissue culture; cells that take up the DNA are then tested to find those in which the mutant copy has replaced one good copy of the gene; next, cells with one mutant copy are introduced into an early embryo (blastocyst) that will take up these cells; then mice that are born from this manipulation (and contain the one mutant copy in their germ cells) are mated to each other. Consequently, one in four mice from this mating will contain two mutant copies of the gene. These are the knock-out mice, and their behavior can be compared with that of "wild-type" (normal) littermates. Although there are number of developmental issues to be taken into account, this technique in broad terms allows for the behavioral (and other) effects of specific genes to be identified.

As soon as knock-out mice had been developed, researchers in behavioral neuroscience began to use them to carry out conditioning and learning studies, as well as studies of unconditioned behavior, which paralleled many years of previous work with other species. Some problems were encountered, however. Some of these relate to the use of in-bred strains of laboratory mice as opposed to the out-bred strains of species of various other animals referred to earlier in this paper. While all the members of an in-bred strain are genetically identical to each other, they are genetically quite different from the members of another strain. A large number of in-bred mouse strains have been developed for laboratory work, but they were not developed for behavioral studies, and so the behavior of any particular strain is not well known and there may be marked strain differences. It may also be the case that it is much easier to carry out successful behavioral studies, which tend to be long-term, with some strains than others. Finally, it is important to obtain behavioral data on those strains that are typically used as the genetic background for the knock-out mice that are developed. All these issues were reviewed, along with available data by Crawley et al. (1997; see also Crawley & Paylor, 1997), who were able to make recommendations about good practice in further research.

The simple fact is that while there many published studies that systematically investigate reinforcement schedules and the other phenomena of operant conditioning in other species, there are few published studies on mice, of any strain. There has been a lot of catching up required so that the effects of knock-outs, and other genetic interventions, in mice can be assessed. A recent study (Baron & Meltzer, 2001) simply examined the acquisition of an operant nose-poke response, reinforced with evaporated milk, in eight strains of mice. Interestingly, a cross-bred strain and an out-bred strain acquired the operant response faster than six in-bred strains (four of which were significantly slower in acquisition). As noted, by Crawley and Paylor (1997), motor and perceptual differences between strains will influence performance in such a task, as well as differences in "learning abilities".

Simple operant techniques have been applied to the analysis of the reinforcing effects of cocaine in various strains of mice. Using a procedure where mice were initially trained to lever press for food and then transferred to an FR2 schedule of cocaine infusion, Rocha et al. (1998b) found that mice from the DBA/2J strain showed more rapid acquisition of this behavior than C57/BL/6J mice. They interpret this as evidence for genetic factors in susceptibility to cocaine use or abuse. Using an FR3 schedule of delivery of cocaine infusion, David et al. (2001)

showed that pre-treatment with diazepam led to maintenance of cocaine-reinforced behavior in BALB/cByJ mice, a strain with high emotionality which had previously been found not to persist in cocaine self-administration. They interpret this finding in terms of the secondary anxiogenic effects of long-term cocaine use, and suggest that emotionality can act as a protective mechanism against abuse of this type of drugs.

The studies just described used schedules that were likely to produce a high rate of drug delivery, and authors note that this may result in suppression or cessation of operant behavior. As discussed earlier, exactly this problem has been addressed in rat studies by altering the nature of the schedule of reinforcement. Further evidence of the problem of using high-density reinforcement schedules with mice comes from a study by Rocha et al. (1998a). Surprisingly, they found that a dopamine-transporter knock-out mouse showed apparently similar effects of cocaine reinforcement as wild-type litter mates. This would appear to be inconsistent with the dopaminergic theory of cocaine abuse, discussed earlier, but a subsequent study (Rocha , 1999) with direct monitoring of activity levels showed that a high frequency of cocaine deliveries on an FR2 schedule generated a high level general activity which may have confounded the findings of the earlier study.

Mice of at least some strains can readily be maintained on schedules with lower frequencies of reinforcement. With Swiss-Webster mice, Cook, Aceto, Coop, and Beardsley (2002) used a baseline schedule of FR10 reinforcement of lever pressing with sweetened milk to assess the effects of gammahydroxybutyrate, an endogenous chemical. With C57/BL/6 mice in our own laboratory we have observed vigorous behavior under an FR20 schedule of reinforcement of lever pressing with 25 mg. food pellets. Using the same apparatus and reinforcer, we have conducted a series of studies using a discrete-trial FR5 schedule, where there is a one-minute intertrial interval. Behavior can be maintained on this schedule, and is highly resistant to extinction. This has enabled us to evaluate the effects of GABAergic anxiolytic drugs on the extinction process (Leslie & McCabe, 2002; McCabe, Leslie, Reynolds, Dawson, & Shaw, 2002; see also Leslie, 2002, Chapter 5). Importantly, both Swiss-Webster and C57/BL6 mice are extensively used as the background strains from which transgenic knock-out mice are derived.

In summary, mouse operant behavior has become very important through the development of transgenic techniques. A sound database of information is required, and this need is extended and complicated by the existence of a range of behaviorally different in-bred strains of mice. However, the developing literature is rapidly establishing that, while there are significant strain differences, most operant techniques "work" with mice. What is required is the development of schedule-based techniques that are specific to particular problems, as has occurred with other species.

Overview

The second half of the twentieth century saw very rapid growth in the pharmaceutical industry, and a corresponding need to assess the behavioral effects of new compounds. Along with this came the extensive use of schedules of reinforcement in the allied discipline of behavior pharmacology. There are a number of simple schedules of intermittent reinforcement, among them the fixed-ratio, fixed-interval, variable-ratio, and variable-interval schedules, that each produces a distinctive and reliable pattern of operant behavior. A long history of research has shown that these are useful behavioral baselines for assessing the effects of drugs that modify central nervous system activity. A particularly important feature is the long periods over which consistent patterns of operant behavior can be seen in each experimental participant, following an extended history of reinforcement with one of a variety of schedules. Many effects of the drugs can be described within the three-term relationship of antecedents, behavior and consequences that characterizes behavior analysis. Other effects may be classed as establishing operations.

The brief review of recent studies presented here has been intended to give the reader an understanding of why operant conditioning techniques, and reinforcement schedules in particular, are crucial tools for

behavior pharmacology. As indicated, the use of these techniques continues to be innovative and effective. Any review of major journals in behavior pharmacology will also show that they are used very extensively.

It is important that the universities and the pharmaceutical industry continue to combine to generate researchers with a sound background in behavior analysis and extensive experience in carrying out laboratory research in behavior pharmacology. These researchers will continue to make major contributions to the increasingly widely based multidisciplinary teams that are pushing back the frontiers of behavioral neuroscience.

References

Alderson, H. L., Robbins, T.W., & Everitt, B. J. (2000). Heroin self-administration under a second- order schedule of reinforcement: acquisition and maintenance of heroin-seeking behaviour in rats. *Psychopharmacology, 153*, 120-133.

Arroyo, M., Markou, A., Robbins, T. W., & Everitt, B. J. (1998). Acquisition, maintenance and reinstatement of intravenous cocaine self-administration under a second-order schedule of reinforcement in rats: effects of conditioned cues and continuous access to cocaine. *Psychopharmacology, 140,* 331-344.

Brady, J. V. (1959). Comparative psychopharmacology: Animal experimental studies on the effects of drugs on behavior. In J. Cole & R. Gerard (Eds.), Psychopharmacology: Problems in evaluation. Publication 583, National Academy of Sciences, National Research Council.

Catania, A. C. (1998). Learning (4th ed.). Upper Saddle River, New Jersey: Prentice-Hall.

Chausmer, A. L., & Katz, J. L. (2002). Comparison of interactions of D-1-like agonists, SKF 81297, SKF 82958 and A-77636, with cocaine: locomotor activity and drug discrimination studies in rodents. *Psychopharmacology, 159,* 145-153.

Cook, C. D., Aceto, M. D., Coop, A., & Beardsley, P. M. (2002). Effects of the putative antagonist NCS382 on the behavioral pharmacological actions of gammahydroxybutyrate in mice. *Psychopharmacology, 160,* 99-106.

Crawley, J. N., Belknap, J.K., Collins, A., Crabbe, J. C., Frankel, W., Henderson, N., Hitzemann, R. J., Maxson, S. C., Miner, L. L., Silva, A. J., Wehner, J. M., Wynshaw-Boris, A., & Paylor, R. (1997). Behavioral phenotypes of inbred mouse strains: implications and recommendations for molecular studies. *Psychopharmacology, 132,* 107-124.

Crawley, J. N., & Paylor, R. (1997). A proposed test battery and constellations of specific behavioral paradigms to investigate the behavioral phenotypes of transgenic and knockout mice. *Hormones and Behavior, 31,* 197-211.

David, V., Gold, L. H., Koob, G. F., Cazala, P. (2001). Anxiogenic-like effects limit rewarding effects of cocaine in BALB/cByJ mice. *Neuropsychopharmacology, 24,* 300-318.

Everitt, B.J., & Robbins, T. W. (2000). Second-order schedules of drug reinforcement in rats and monkeys: measurement of reinforcing efficacy and drug-seeking behaviour. *Psychopharmacology 153,* 17-30.

Ferster, C. B., Skinner, B. F. (1957). *Schedules of reinforcement.* Englewood Cliffs, New Jersey: Prentice-Hall.

Goldberg, S. R., & Tang, A. H. (1977). Behavior maintained under second-order schedules of intravenous morphine injection in squirrel and rhesus monkeys. *Psychopharmacology 51,*235-242.

Hodos, W. (1961). Progressive ratio as a measure of reward strength. *Science, 134,* 943-944.

Leslie, J. C. (1996). *Principles of behavioral analysis* (3rd ed.). Amsterdam: Harwood Academic.

Leslie, J. C. (2002). *Essential behaviour analysis.* London: Edward Arnold.

Leslie, J. C., & McCabe, C. (2002, March*). Effects of anxiolytic and novel drugs on extinction of operant behaviour in mice.* Paper presented at Annual Meeting of the Experimental Analysis of Behaviour Group, London, England.

McCabe, C., Leslie, J. C., Reynolds, D., Dawson, G.R., & Shaw, D. (2002*). Effects of anxiolytic drugs on the extinction of mouse operant behavior.* Manuscript submitted for publication.

Olmstead, M.C., Parkinson, J. A., Miles, F. J., Everitt, B.J., & Dickinson, A. (2000). Cocaine-seeking by rats: regulation, reinforcement and activation. *Psychopharmacology, 152*, 123-131.

Premack, D. (1965). Reinforcement theory. In D. Levine (Ed.), *Nebraska symposium on motivation*. Lincoln, Nebraska: University of Nebraska Press.

Premack, D. (1971). Catching-up on commonsense, or two sides of a generalization: Reinforcement and punishment. In R. Glaser (Ed.), *On the nature of reinforcement.* New York: Academic Press.

Rocha, B. A., Fumagalli, F., Gainetdinov, R. R., Jones, S. R., Ator, R., Giros, B., Miller, G. W., & Caron, M. G. (1998a). Cocaine self-administration in dopamine-transporter knockout mice. *Nature Neuroscience, 1,* 132-137.

Rocha, B. A., Odom, L. A., Barron, B. A., Ator, R., Wild, S. A., & Forster, M. J. (1998b). Differential responsiveness to cocaine in C57BL/6J and DBA/2J mice. *Psychopharmacology, 138,* 82-88.

Rocha, B. A. (1999). Methodology for analyzing the parallel between cocaine psychomotor stimulant and reinforcing effects in mice. *Psychopharmacology, 147,* 27-29.

Sanger, D., Willner, P., & Young, A. (2001). Behavioural genomics. *Behavioural Pharmacology,12,* 377-379.

Schuster, C. R., & Brady, J. V. (1964). The discriminative control of a food-reinforced operant by interoceptive stimulation. *Pavlov Journal of Higher Nervous Activity, 14,* 448-458.

Sidman, M. (1959). Behavior pharmacology. *Psychopharmacologia, 1,* 1-19.

Skinner, B. F. (1959). A case history in scientific method. In S. Koch (Ed.), *Psychology: A study of a science* (Vol. 2). New York: McGraw-Hill.

Stafford, D., LeSage, M. G., & Glowa, J. R. (1998). Progressive-ratio schedules of drug delivery in the analysis of drug self-

administration: a review. *Psychopharmacology, 139,* 169-184.

Tella, S. R., & Goldberg, S. R. (2001). Subtle differences in the discriminative stimulus effects of cocaine and GBR-12909. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 25,* 639-656.

Timberlake, W., & Allison, J. (1974). Response deprivation: An empirical approach to instrumental performance. P*sychological Review, 81,* 146-164.

Thompson, T., & Boren J.J. (1977). Operant behavioral pharmacology. In W. K. Honig & J. E. R. Staddon (Eds.), *Handbook of operant behavior.* Englewood Cliffs, New Jersey: Prentice-Hall.

Zeiler, M.D. (1977). Schedules of reinforcement: the controlling variables. In W. K. Honig & J. E. R. Staddon (Eds.), *Handbook of operant behavior.* Englewood Cliffs, New Jersey: Prentice-Hall.

LOGICAL FALLACIES: A BEHAVIORAL APPROACH TO REASONING

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Important phenomena in the area of judgment and decision making may be profitably studied with behavior-analytical techniques. We discuss three examples of such research: base-rate neglect, in which people ignore critical background information in favor of less reliable case-specific information; the conjunction fallacy, in which people report that the conjunction of two events is more likely to have occurred than one of the events alone; and the sunk-cost effect, in which people are unwilling to abandon a course of action which has already incurred substantial cost.

When the area of human decision making (or judgment or choice) is mentioned, most psychologists assume that the reference is to the large body of work produced by cognitive and social psychologists. Since behavior analysis has long focused on choice (though most often in non-human subjects) it should have much to contribute to the discussion and analysis of human decisions. For example, the most recent Subject Index for the *Journal of the Experimental Analysis of Behavior (*November 2002, for volumes 61 through 78) has far more citations to "choice" than to any other content area. Most of these studies involve non-human subjects. Perhaps some behavior analysts understandably prefer the orderly functional relations produced by pigeons and other non-human subjects to the chaos and variability that often plagues research with humans. One reason for the variability, of course, is the difficulty in gaining precise environmental and historical control of human behavior (one of several gallant exceptions is the research of Bernstein & Ebbesen, 1978). But ostensibly aberrant human behavior can be a rich source for appreciating the dynamics of choice if we are able to pinpoint its determinants. Moreover, a comparison of human and non-human behavior in comparable settings can also prove illuminating. In this short paper we review some of the areas in which we are trying to better understand nonoptimal (and often irrational or illogical) human behavior. In so doing we will briefly review the status of several important phenomena that have been uncovered and largely monopolized by cognitive and social psychologists. We attempt to show that behavior analysis can contribute clarity to judgment and decision making.

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Our laboratory is currently exploring at least the following seven research areas involving human decisions: (1) probability matching (also probability learning) or the tendency, in a binary decision task, for humans to match their choices to the probabilities of the payoffs rather than maximizing reward by always choosing the more likely payoff (e.g., Fantino & Esfandiari, 2002); (2) "information avoidance" or the tendency of humans and non-humans to prefer "no news" to "bad news" (e.g., Fantino & Case, 1983; Case, Ploog, & Fantino, 1990); (3) self-control as assessed in variants of the classic Prisoner's Dilemma Game, in which subjects maximize short-term gains at the expense of larger delayed payoffs (developed by Brown & Rachlin, 1999); (4) the effects of learning problems (including analogy and algebra problems) with and without rules (both induced and instructed rules) on transfer to different problems (e.g., Glaz, Stolarz-Fantino, and Fantino, 2001); (5) base-rate neglect in which people (but not pigeons) often ignore critical background information in favor of less reliable case-specific information, when assessing the probability of a future event (e.g., Goodie & Fantino, 1995, 1996, 1999; Kahneman & Tversky, 1973); (6) the conjunction fallacy, in which humans report that the conjunction of two events is more rather than less likely to have occurred than one of the events alone (e.g., Tversky & Kahneman, 1983; Stolarz-Fantino, Fantino, & Kulik, 1996; Stolarz-Fantino, Fantino, Zizzo, and Wen, 2003); (7) the sunk-cost effect, in which humans

are unwilling to abandon a course of action which has already involved substantial cost (e.g., Arkes & Blumer, 1985; Goltz, 1993, 1999).

In this paper we will briefly review our research in areas (5) through (7) above, namely base-rate neglect, the conjunction fallacy, and the sunk-cost effect.

Base-Rate Neglect

Our research on observing, cited above, shows that special care must be taken if information that is critical to a decision at hand is not to be avoided. We are adroit at avoiding information about aversive events. The literature on base-rate neglect suggests that even when potentially useful information is not aversive we manage to neglect it, instead overemphasizing case-specific information. For example, consider the well-known "taxi-cab problem", modified from that created by Tversky and Kahneman (1982):

> A cab was involved in a hit and run accident at night. Two cab companies, the Green and the Blue, operate in the city. You are given the following data: (a) 67% of the cabs in the city are Blue and 33% are Green. (b) a witness identified the cab as Green. The court tested the reliability of the witness under the same circumstances that existed on the night of the accident and concluded that the witness correctly identified each one of the two colors 50% of the time and failed 50% of the time. What is the probability that the cab involved in the accident was Green rather than Blue?

The example provides two sources of information: the base rates of the two types of cabs in the city and the reliability of the witness who identified the cab as Green. Thus, base-rate neglect problems may be thought of as problems involving multiple stimulus control. In the example the information provided by the witness is worthless (his ability to identify cab color is at chance level). Thus, the witness statement should exert no control and subjects should rely exclusively on the second source of information, the base rates. The appropriate answer is that the probability that the cab involved in the accident was Green is 33% (the base rate of Green cabs in the city). In fact, however, subjects ignore the base-rate information and judge the likelihood that the cab is green around 50%, or equal to the accuracy of the witness. Adam Goodie (now at the University of Georgia) and I wondered about the robustness of base-rate neglect. The many studies reporting base-rate neglect typically did so with a single "paper-and-pencil" question. Generally the studies were carried out in large classrooms with no special care taken to foster motivated and attentive students. Based on our own experiences collecting data in large classroom settings, we wondered if base-rate neglect would still occur in a behavioral task where we could better insure subjects' attention and motivation and where we could conduct repeated trials, thus assessing the durability of base-rate neglect. In an earlier paper (Stolarz-Fantino and Fantino, 1990) we had proposed the use of a matching-to-sample (MTS) procedure to assess base-rate neglect in a behavioral setting. In an MTS procedure a sample stimulus is presented followed by two comparison stimuli, one of which typically is the same as ("matches") the sample. The MTS procedure involves multiple stimulus control: control by the sample cue and control by the base rates (or probabilities of reinforcement for choosing either alternative, independent of the sample cue). The MTS procedure permits us to manipulate these two sources of control separately with repeated trials in a behavioral setting. The sample corresponds to the witness in the taxicab problem (or, more generally to the case-specific information in base-rate problems); the probabilities of reinforcement for selecting the comparison stimuli correspond to the incidence of taxicab types (or, more generally, the base rates of the relevant events).

In one condition of Goodie & Fantino (1995) the sample in the MTS task was either a green or blue light. After the sample was terminated, green and blue lights appeared as the comparison stimuli. UCSD students were instructed to choose either. Students were presented with repeated trials rapidly (from 150 to 400 trials per 1-hr session, depending on the experiment). Consider the condition corresponding to the taxicab problem above. Following a green sample, selection of the green comparison stimulus was reinforced on 33% of the trials and selection of the blue comparison was reinforced on 67% of the trials. Following a blue sample, the same contingencies were in effect: selection of the green comparison

stimulus was reinforced on 33% of the trials; selection of the blue comparison stimulus was reinforced on 67% of the trials. In other words, in this condition, as in the taxicab example above, the sample had no discriminative (or predictive) function. Only the base rates were relevant: selection of blue was reinforced twice as often as selection of green, no matter what sample preceded the choice. Thus, if our subjects selected optimally they should have come to choose the blue comparison stimulus on every trial, thereby obtaining reward (either points or points backed by money depending on the experiment) on 67% of the trials. They should never choose green. However, a rich literature on probability matching (e.g., Fantino & Esfandieri, 2002; Humphreys, 1939) shows that when humans are presented with repeated and identical binary choices, they match their choices to the arranged probabilities instead of maximizing their payoff by always selecting the stimulus with the higher probability of reinforcement. If our students displayed probability matching they should have chosen green on 33% of the trials instead of the optimal 0%. But if our students displayed base-rate neglect they should respond even less optimally: They should be sensitive to sample accuracy and match the sample 50% of the time, corresponding to the responses of students in the paper-and-pencil taxicab problem. In fact subjects chose the green comparison stimulus 56% of the time following a green sample. These data and others from Goodie & Fantino (1995) reveal strong base-rate neglect, demonstrating that such neglect occurs in a behavioral task and that it persists over several hundred trials.

Hartl & Fantino (1996) conducted the same experiment with pigeons. In a comparable MTS task pigeons displayed neither base-rate neglect nor even probability matching. They behaved optimally attending to the base rates and ignoring the sample in a condition comparable to the one presented above, and showing control by the sample, while ignoring base rates, in a condition where the sample and not the base rates was more predictive of reinforcement. Perhaps this stark difference in the behavior of pigeons and college students can instruct us on the cause of base-rate neglect. We speculated that humans have acquired strategies for dealing with matching problems that are misapplied in our MTS analog (e.g., Stolarz-Fantino & Fantino, 1995). For example, from early childhood humans learn to match like colors and shapes at home, at play, and at school (e.g., in playing with blocks and puzzles and in reading picture books with their parents). Pigeons, on the other hand, have not experienced a rich history of matching. Thus, they should not have developed a tendency to match. The argument for human subjects has applicability to the results from the paper-and-pencil demonstrations of base-rate neglect as well. These examples usually involve a witness (as in the taxicab problem) or other case-specific cues such as a expert's diagnosis or the results of a medical test. In each case we have learned to expect that this case-specific information is generally accurate. Adam Goodie and I explored this possibility that base-rate neglect is a learned phenomenon. If it is, we should be able to eliminate base-rate neglect by having the sample stimulus be physically unrelated to the comparison stimuli. Hence, in our next series of experiments (Goodie & Fantino. 1996), we employed an MTS procedure in which the sample and comparison stimuli were unrelated: the sample stimuli were line orientations while the comparison stimuli were again the colors green and blue. This change in procedure eliminated base-rate neglect, thus supporting the learning hypothesis. Instead, our UCSD students' responses were well described by probability matching. We next introduced a condition in which the sample and comparison stimuli were physically different but were related by an extensive history: The samples were the words "blue" and "green"; the comparison stimuli were again the colors blue and green. A robust base-rate neglect was again obtained. These and additional experiments led us to conclude with confidence that base-rate neglect results from preexisting associations between stimuli. What of the pigeon's optimal behavior in our base-rate analog?

Ongoing research in our laboratory suggests that when pigeons are given a sufficient history of matching and are then tested in our MTS base-rate analog that they too succumb to base-rate neglect. On the other hand, human subjects may be sensitized to the importance of base rates by giving them training in which there is no case-specific information (e.g., no sample), only experience with base rates. Base-rate neglect is minimal in these subjects when they are then studied in the MTS procedure (Case,

Fantino, & Goodie, 1999). Thus, all of these results suggest that base-rate neglect is a learned phenomenon and that more optimal decision making may be facilitated with appropriate training and by appropriate presentation of the problem. While base-rate neglect is a robust phenomenon, occurring in both behavioral and paper-and-pencil questionnaires, the degree of neglect may be reduced, or eliminated, by training and presentation that allows undivided attention to base-rate information.

Conjunction Fallacy

The conjunction fallacy, or conjunction effect, has been demonstrated to occur in highly educated human participants in a wide variety of contexts, including when participants were given repeated trials with immediate monetary reward for logically correct answers (Stolarz-Fantino et al, 2003). Tversky and Kahneman (1983) reported a rate of 36% of participants committing the fallacy among a group of graduate students who had completed statistics courses; this is low for one of their studies but still substantial. They also reported that a group of physicians participating in a medical judgment study committed the fallacy in 60 of 62 cases. According to Tversky and Kahneman, when the physicians' logical inconsistency was pointed out to them, most "appeared surprised and dismayed to have made an elementary error of reasoning" (p. 302). In a similar vein, Stolarz-Fantino, Fantino, and Kulik (1996) found that 43% of students they tested at the end of a 10-week logic course answered a conjunction question by judging the conjunction as more likely to occur than at least one of the component statements. Thus, it is unlikely that college students or professionals commit the conjunction fallacy out of ignorance of the rules governing simple probabilities or class inclusion; it seems more likely that they do so because they do not recognize the task as calling for application of these principles. As one of Tversky and Kahneman's participants said, "I thought you only asked for my opinion" (1983, p. 300).

Two Repeated-Trials Studies of the Conjunction Effect

What factors could induce students to treat the conjunction task as one requiring the application of principles of probability and/or class inclusion? We reasoned that a change in methodology would help. First, instead of giving students one or several conjunction questions in a large classroom setting, we brought them individually into the laboratory and presented a series of questions by computer. Second, the questions did not include "framing descriptions," personality sketches that, in conjunction questions, may serve to distract participants from the underlying logical structure of the task. Instead, questions included a minimally informative sentence about the hypothetical person whose activities were being rated, for example: "Julia is 20 years old and is a student at a college in Massachusetts." Third, we provided participants with the likelihoods of the component activities of the conjunctions, thus increasing the chance that they would understand these numbers to be relevant to their estimates of the likelihood of the conjunctions. Fourth, 50% of the questions were worded in a frequency rather than likelihood format. According to Hertwig and Gigerenzer (1999), wording questions in terms of frequency greatly reduces or eliminates errors on the conjunction task. Examples of likelihood and frequency questions appear in Table 1. Finally, participants were randomly assigned either to receive feedback as to the correctness of each of their responses or to receive no feedback.

Participants

Participants were 37 undergraduate students, 20 male and 17 female, enrolled in psychology classes at the University of California, San Diego (UCSD). They participated in order to fulfill course requirements or to receive extra credit.

Procedure

The conjunction questions were presented one at a time; students typed in a number between 0 and 100 to indicated the likelihood (or frequency) judgment for each question, then hit the "enter" key to submit the answer. For students in the feedback condition, the next screen contained one of two messages: for correct answers, "Your answer is in the range that is considered correct;" for incorrect answers (that is, for answers higher than the likelihood or frequency of at least one of the component statements of the conjunction), "Your answer is too high to be in the range that is considered correct." Each participant judged 26

Table 1

Examples of Conjunction Questions in Likelihood and Frequency Formats

Likelihood Format:

Krista is 20 years old and is a student at a small, liberal arts college.
On a scale from 0 to 100, there is a likelihood of 20 that Krista is majoring in education, a likelihood of 70 that she walks for exercise, and a likelihood of 30 that she plays in a campus musical group. Please indicate the likelihood of the statement about Krista that appears below by entering a number from 0 to 100 to represent likelihood—for example, "0" would be virtually impossible, and "100" virtually certain.

What is the likelihood that Krista is an education major and also plays in a campus musical group?

Frequency Format:

Eric is 23 years old and is a student at a university in North Carolina.
Out of 100 people like Eric, 30 are majoring in biology, 70 play intramural sports, and 20 do volunteer work with children. Out of these 100 people, to how many would the statement below apply? Indicate your answer by entering a number from 0 to 100.

Out of 100 people like Eric, how many do all three of the following: major in biology, play intramural sports and do volunteer work with children?

conjunctions, 13 in the likelihood format and 13 in the frequency format that were presented in one of three pre-selected random orders.

Results

The mean numbers of conjunction questions correctly answered in each condition appear in Table 2. These results represent a rate of the conjunction effect that is much reduced compared with many previous studies: 16% averaged over all conditions and participants. In previous work in our own laboratory using paper-and-pencil tasks it was quite rare to obtain error rates of less than 30%. An analysis of variance (ANOVA) on number of questions correct showed a statistically significant effect of feedback [$F(1, 35) = 10.025$, $p < .01$] and a significant interaction of feedback by format (likelihood/frequency) [$F(1, 35) = 5.60$, $p < .05$] but no significant main effect of format [$F(1, 35) = 1.17$, $p > .1$]. In order to more closely examine the role of feedback, the number correct out of the first 5 questions and the last 5 questions were compared using paired sign tests. Among participants in the no feedback condition, 7 improved, 5 performed less well, and 6 stayed the same from the first 5 to the last 5 questions ($p = .77$). Among participants in the feedback condition, 10 improved, 1 performed less well, and 8 stayed the same ($p = .01$).

A puzzling result of this study was the failure to find an effect of the frequency format in improving participants' scores. One possible reason for this was that, since participants performed so much better than in previous studies, there was no room for a difference between likelihood and frequency presentations formats. However, it was also possible that the mixed presentation of likelihood and frequency questions might have caused carryover across trials that would wash out any effect that might otherwise be seen. In order to investigate this possibility, a follow-up study was conducted.

Participants

Seventy-three students in a UCSD summer school introductory learning course served as participants.

Procedure

As in the study described above, a repeated-trials design was used, and conjunction questions were presented by computer. Each participant answered 40 questions like those in Table 1, 20 in a likelihood format and 20 in a frequency format. Three presentation conditions were tested: 1. Likelihood questions first; 2. Frequency questions first; and 3. Mixed presentation of likelihood and frequency questions. Within each presentation condition, participants either received feedback on their answers or did not receive feedback, as described earlier. Students were randomly assigned to presentation and feedback conditions.

Table 2

First Experiment: Mean Number of Questions Correct for Each Condition

Question Presentation Format	n	Feedback	Mean (out of 13)	SEM
Likelihood	19	yes	12.21	.22
Likelihood	19	no	9.0	.99
Frequency	18	yes	11.63	.24
Frequency	18	no	10.56	.55

Results

The mean number of questions answered correctly in each condition appear in Table 3. Separate analyses were conducted for Phase 1 (the first 20 questions) and Phase 2 (the second 20 questions). In Phase 1, students who received feedback answered significantly more questions correctly than those who did not receive feedback [$F(1,67) = 9.87$, $p < .01$]. There was also a statistically significant effect of presentation format [$F(2, 67) = 3.15$, $p < .05$]. Students who received frequency questions scored higher than those who received likelihood questions, as confirmed by Fisher's PLSD test. Most importantly, mean scores in the mixed presentation condition were nearly the same as those in the frequency condition and were significantly higher than those in the likelihood condition, supporting the possibility that carryover from questions in frequency format can help improve performance on questions worded in likelihood format.

Consistent with this, in Phase 2,there were no longer differences among presentation conditions, although students receiving feedback continued to answer correctly on more questions [$F(1,67) = 12.57$, $p < .01$].

The Sunk-Cost Effect

The sunk-cost effect literature has focused on two distinct variations of the phenomenon: resource-allocation and continuing-to-invest. A good example of the resource-allocation version is that of Arkes & Blumer (1985):

> Assume that you have spent $100 on a ticket for a weekend ski trip to Michigan. Several weeks later you buy a $50 ticket for a weekend ski trip to Wisconsin. You think you will enjoy the Wisconsin ski trip more than the Michigan ski trip. As you are putting your just

Table 3

Second Experiment: Mean Score (out of 20) for Each Condition in Phase 1 and Phase 2

		Phase 1		Phase 2		Total	
Condition	n	Mean	SEM	Mean	SEM	Mean	SEM
With Feedback							
Likelihood First[1]	13	17.23	.73	18.31	.36	35.54	1.02
Frequency First[2]	12	18.75	.22	18.33	.48	37.08	.63
Mixed Presentation	12	18.58	1.59	19.00	.60	32.67	.36
Total	37	18.16	.30	18.54	.21	36.70	.44
Without Feedback							
Likelihood First	13	12.46	1.97	16.46	1.18	28.92	.63
Frequency First	11	16.18	1.35	14.00	1.62	30.18	2.72
Mixed Presentation	12	16.42	1.59	16.25	1.49	32.67	3.06
Total	36	14.92	1.00	15.64	.82	30.56	1.57
Overall	73	16.56	.55	17.11	.45	33.67	.88

[1]Likelihood presentation in Phase 1; Frequency presentation in Phase 2
[2]Frequency presentation in Phase 1; Likelihood presentation in Phase 2

> purchased Wisconsin ski trip ticket in your wallet you notice that the Michigan ski trip and the Wisconsin ski trip are for the same weekend! It's too late to sell either ticket, and you cannot return either one. Which ski trip will you go on?

Most subjects select the Michigan trip even though they expect to enjoy it less, since they have invested more in it.

An example of the continuing-to-invest version of the effect also comes from Arkes & Blumer (1985). Subjects read one of two investment decisions scenarios:

Scenario A. As the president of an airline company, you have invested $10 million of the Company's money into a research project. The purpose was to build a plane that would not be detected by conventional radar, in other words, a radar-blank plane. When the project is 90 percent completed, another firm begins marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company is building. The question is: should you invest the last 10 percent of the research funds to finish your radar-blank plane?

Yes 41

No 7

Scenario B. as a president of an airline company, you have received a suggestion from one of your employees. The suggestion is to use the last $1 million of your research funds to develop a plane that would not be detected by conventional radar, in other words, a radar-blank plane. However, another firm has just begun marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company could build. The question is: should you invest the last million dollars of your research funds to build the radar-blank plane proposed by your employee?

Yes 10

No 50

When the sunk cost was high, most subjects chose to continue investing, whereas when the sunk cost was absent, most subjects chose not to invest.

The continuing-to-invest and the resource-allocation variations of the sunk-cost effect differ primarily in methodology. Resource-allocation experiments require persistence behavior that is different in nature from the initial investment. In the ski-trip example from above, the initial investment consists of money while the persisting behavior consists of all the behaviors particular to a ski-trip (e.g. travel, hotel stay, skiing). Research by Heath (1995) suggests that this method heightens persistence compared to using investment and persistence behaviors are the same in nature. Resource-allocation experiments also involve a choice between two options that can not be compared quantitatively. Although subjects in the ski-trip experiment are told which trip they will enjoy more, they are unable to weigh precisely the enjoyment of each trip against the cost. The continuing-to-invest variation, on the other hand, uses investment and persistence behaviors that are identical in nature and that can be compared quantitatively. Our research is more directly concerned with this variation of the sunk-cost effect.

In our basic procedure, human subjects with the goal of earning money use keys on a computer keyboard as operants. They are instructed, truthfully, that for 30 minutes they will face unlimited trials in which they must press a "reward" key an undetermined number of times until the screen flashes a 1 dollar reward. They are also instructed that at any time they can press an "escape" key once to cancel the current trial and initiate a new one. Thus a new trial begins either after a reinforcer or after one press to the escape key. Designed to model an investment that goes bad, the reward key has an operant schedule that creates a diminishing chance of reinforcement as responses increment. In our basic condition, for example, every trial has one of four fixed-ratios, with each ratio having a different probability of occurrence: FR 10 (50% probability), FR 40 (25% probability), FR 80 (12.5% probability), and FR 160 (12.5% probability). With these values, the expected ratio for each trial rises from 45 at the beginning of the trial, to 70 after the 10th reward key response (if no reinforcement occurs), to 80 after the 40th and 80th reward key responses (if no reinforcement occurs). As subjects respond without incurring reinforcement, the amount of work remaining for reinforcement becomes increasingly large. A subject' s optimal strategy, therefore, is to press the escape key after 10 responses to the reward key, which reduces the expected ratio from 70 to 45. After 10 responses to the reward key, subjects face a situation

similar to that of subjects in the radar-blank plane experiment: they have made an investment, and must choose whether to continue with investment and keep responding on the reward key or to abandon the investment and press the escape key. We are also studying the comparable problem in an analogous set of conditions with pigeons as subjects.

We hope to accomplish several goals with this procedure. First, we are attempting to quantify the degree to which environmental contingencies affect persistence in an endeavor. Manipulation of fixed-ratio sizes and probabilities and use of variable-ratio or other schedules, and manipulation of the stimuli associated with the schedules may shed light on this issue. Research by Garland and Newport (1991) suggests that sunk cost size relative to total investment size can affect persistence -- in their experiment with humans only relative, not absolute, sunk cost mattered. Our procedure may shed light on this issue. Second, we are exploring whether reinforcement history plays a role in persisting. Goltz's research (e.g., 1993, 1999) shows that people playing an investment game can be tenacious in persisting with a losing strategy if they have a reinforcement history for persisting (as most of us have). In our research, subjects beginning the experiment with the basic procedure outlined above are being compared with subjects who first perform a session in which the escape key is not an option. These "no-escape" subjects must respond only on the reward key until they are reinforced, developing a reinforcement history for persisting. They will then be placed in the regular procedure with the escape key and their data will be compared to those of subjects with no reinforcement history. Third, the results of our two sets of studies should permit us to compare the susceptibility of humans and pigeons to the sunk-cost effect and to assess the conditions under which each species is most susceptible. Our procedure also relates to the literature on choice in a situation of diminishing returns. For example, studies including those of Hackenberg and Hineline (1992) and Hackenberg and Axtell (1993) have raised the possibility that humans may be more likely to attend to molar consequences while pigeons may be more likely to attend to the next several reinforcers from a single choice point. We hope to contribute to this issue.

Final Comment

Behavior analysis has much to offer the study of phenomena normally dominated by cognitive and social psychologists. We hope that successful application of behavioral theory and methodology will not only shed light on central problems in judgment and choice but will also generate greater appreciation of the behavioral approach.

References

Arkes, H.R. & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior & Human Decision Processes*, *35*, 124-140.

Bernstein, D. J. & Ebbesen, E. B. (1978). Reinforcement and substitution in humans: a multiple- response analysis. *Journal of the Experimental Analysis of Behavior*, *30*, 243-253.

Brown, J., & Rachlin, H. (1999). Self-control and social cooperation. *Behavioural Processes*, *47*, 65-72.

Case, D.A., Fantino, E. & Goodie, A.S. (1999). Baserate-training without case cues reduces base-rate neglect. *Psychonomic Bulletin & Review*, *6*, 319-327.

Case, D.A., Ploog, B.O., & Fantino, E. (1990). Observing behavior in a computer game. *Journal of the Experimental Analysis of Behavior*, *54*, 185-199.

Fantino, E. & Esfandiari, A. (2002). Probability matching: Encouraging optimal responding in humans. *Canadian Journal of Experimental Psychology*, *56:1*, 58-63.

Garland, H., & Newport, S. (1991). Effects of absolute and relative sunk costs on the decision to persist with a course of action. *Organizational Behavior and Human Decision Processes*, 48, 55-69.

Glaz, I., Stolarz-Fantino, S. and Fantino, E. (2001). Solving math problems: Does rule use allow flexibility? Poster presented at the Biennial Meeting of the Society for Research in Child Development, Minneapolis, Minnesota, April, 2001.

Goltz, S.M. (1993). Examining the joint roles of responsibility and reinforcement history in recommitment. *Decision Sciences*, *24*, 977-994.

Goltz, S.M. (1999). Can't stop on a dime: The roles of matching and momentum in persistence of commitment. *Journal of Organizational Behavior Management*, *19*, 37-63.

Goodie, A.S. & Fantino, E. (1995). An experientially derived base-rate error in humans. *Psychological Science*, *6*, 101-106.

Goodie, A.S. & Fantino, E. (1996). Learning to commit or avoid the base-rate error. *Nature*, *380*, 247-249.

Goodie, A.S. & Fantino, E. (1999). What does and does not alleviate base-rate neglect under direct experience. *Journal of Behavioral Decision Making*, *12*, 307-335.

Hackenberg, T.D. & Axtell, A.M. (1993). Humans' choices in situations of time-based diminishing returns. *Journal of the Experimental Analysis of Behavior*, *59*, 445-470.

Hackenberg, T.D. & Hineline, P.N. (1992). Choice in situations of time-based diminishing returns: Immediate versus delayed consequences of action. *Journal of the Experimental Analysis of Behavior*, *57*, 67-80.

Hartl, J.A. & Fantino, E. (1996). Choice as a function of reinforcement rates in delayed matching to sample. *Journal of the Experimental Analysis of Behavior*, *66*, 11-27.

Heath, C. (1995). Escalation and De-escalation of commitment in response to sunk-costs: The role of budgeting in mental accounting. *Organizational Behavior and Human Decision Processes*, 62, 38-54.

Hertwig, R. & Gigerenzer, G. (1999). The 'Conjunction Fallacy' revisited: How intelligent inferences look like reasoning errors. *Journal of Behavioral Decision Making*, *12*, 275-305.

Humphreys, L.G. (1939). Acquisition and extinction of verbal expectations in a situation analogous to conditioning. *Journal of Experimental Psychology*, *25*, 294-301.

Kahneman, D. & Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, *80*, 237-251.

Stolarz-Fantino, S. & Fantino, E. (1990). Cognition and behavior analysis: A review of Rachlin's *Judgment, decision and choice*. *Journal of the Experimental Analysis of Behavior*, *54*, 317-322.

Stolarz-Fantino, S. and Fantino, E. (1995). The experimental analysis of reasoning: A review of Gilovich's *How We Know What Isn't So*. *Journal of the Experimental Analysis of Behavior*, *64*, 111-116.

Stolarz-Fantino, S., Fantino, E., & Kulik, J. (1996). The conjunction fallacy: Differential incidence as a function of descriptive frames and educational context. *Contemporary Educational Psychology*, *21*, 208-218.

Stolarz-Fantino, S. Fantino, E., Zizzo, D. and Wen, J. (2003). The conjunction effect: New evidence for robustness. *American Journal of Psychology*, in press.

Tversky, A. & Kahneman, D. (1982). Judgments of and by representativeness. In D. Kahneman, P. Slovic, & A. Tversky (Eds.) *Judgment under uncertainty: Heuristics and biases*. Cambridge, U.K.: Cambridge University Press.

Tversky, A. & Kahneman, D. (1983). Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment. *Psychological Review*, *90*, 293-315.