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Julie A. Reinlasoder '94
Illinois Wesleyan University

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A Pilot Study on the Use of Alprazolam-Assisted Exposure and
Response Prevention in Obsessive Compulsive Disorder

Julie A. Reinlasoder

Illinois Wesleyan University

University of Illinois College of Medicine at Peoria

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Abstract

Obsessive-compulsive disorder is a behavior disorder characterized by recurrent, intense thoughts and repetitive, ritualistic acts. Treatments for obsessive compulsive disorder typically consist of either exposure and response prevention or pharmacotherapy, particularly benzodiazepines. Combinations of these two types of treatment could lead to three possible outcomes. First, the combination of exposure and response prevention and benzodiazepines may show no better results than exposure and response prevention alone. Second, combination therapy may result in a better effect than exposure and response prevention alone--the drug will decrease anxiety during exposure without increasing the relapse rate after treatment. Third, combination therapy could have worse effects than exposure and response prevention alone by increasing the rate of relapse through state-dependent learning--learning occurring during the drugged state does not transfer to the non-drugged state. The purpose of this study was to assess the effects of the combination of exposure and response prevention with the benzodiazepine alprazolam using a single-subject design. This design alternated between exposure and response prevention plus alprazolam and exposure and response prevention alone. The results of this study show that the alprazolam condition did not differ from the placebo condition, suggesting that alprazolam did not function effectively to reduce the subject's anxiety.

A Pilot Study on the Use of Alprazolam-Assisted Exposure and
Response Prevention in Obsessive-Compulsive Disorder

Obsessive compulsive disorder (OCD) has a lifetime prevalence of 2-3% (Robins, Helzer, & Weissman, 1984). This estimate is much higher than previous estimates, indicating that OCD is almost three times more prevalent than schizophrenia (Greist, 1990a). As such a common disorder, it is surprising to note that until the last decade, most treatments for OCD have been largely ineffective (Jenike, 1983). OCD treatment was greatly advanced with the introduction of the behavioral technique exposure and response prevention (Boersma, Den Hengst, Dekker, & Emmelkamp, 1976; Perse, 1988; Greist, 1990a, 1990b) and various pharmacotherapy techniques, most notably clomipramine (Greist, et al., 1990; Trimble, 1990). Unfortunately, not all obsessive compulsives benefit from either of these two treatments; further research is warranted to discover a treatment method that will help all OCD patients.

Obsessive compulsive disorder affects men and women approximately equally (Jenike, 1983; Rasmussen & Tsuang, 1984) with 60-65% of patients exhibiting an onset of the disorder before age 25 (Jenike, 1983; Perse, 1988; Rasmussen & Tsuang, 1984). In about 60% of OCD cases, an identifiable precipitant has been noted; the most common of these precipitants are pregnancy and childbirth, sexual components, and death of a loved one. Although the course of the disorder was previously viewed

as chronic and deteriorating, most patients exhibit a course that is episodic with periods of remission that are not complete but that allow for normal social functioning (Rasmussen & Tsuang, 1984).

According to the Diagnostic and Statistical Manual Third Edition Revised (American Psychiatric Association, 1987), obsessive compulsive disorder is defined by the presence of recurrent, persistent thoughts or ideas, called obsessions, and by repetitive, ritualistic compulsions--acts that the person feels compelled to do, generally in response to the obsession. The person will perform the compulsion in an attempt to reduce the anxiety brought about by the obsession, but this relief is short-lived. Most people with this disorder have both obsessions and compulsions, and the DSM-III-R states that the person must be aware that his/her behaviors and thoughts are unrealistic and ego dystonic (American Psychiatric Association, 1987).

The most common types of obsessions are those that center around the fear of contamination (Rasmussen & Eisen, 1989). Understandably, the compulsion that accompanies this fear is washing. Patients will spend hours out of their day excessively washing their hands and bodies, their clothes, and their homes to remove the toxins and dirt that they believe could potentially harm themselves or their families. Other common compulsions are checking and counting. A patient who fears that she may have forgotten to lock the door when she left home will return to her home dozens of times to check the lock. Another patient may

count to a certain number in his head every time he has an obsession.

Exposure and response prevention in the treatment of obsessive compulsive disorder has been shown to have success rates of up to 80% (of patients showing marked improvement of symptoms) when the patients comply with the program (Perse, 1988). Exposure and response prevention are often preferred over the pharmacological treatment clomipramine, a serotonin re-uptake inhibiting medication which has recently been approved for the treatment of OCD. Approximately 24% of patients relapse after exposure and response prevention (Greist, 1990b), while approximately 90% of patients relapse after the discontinuation of clomipramine (Greist, et al., 1990). Further, a number of patients are unable to tolerate the large side effect profile which accompanies the use of clomipramine (Trimble, 1990; Tollefson, 1985).

Exposure and response prevention can be assisted by a therapist or can be done by the patient alone (possibly as a homework assignment given by the therapist). Exposure can be conducted either in vivo, where the patient actually comes into contact with the feared stimulus, or in imagination when the stimulus is too frightening or dangerous. Exposure to each stimulus is continued until the patient's anxiety has decreased substantially. Greist (1990a) recommends that an exposure session last at least 30-45 minutes, but longer sessions may be necessary for anxiety to decrease. Response prevention requires

the patient to refrain from the anxiety-reducing compulsion for increasingly longer periods of time.

As noted above, exposure and response prevention is the treatment of choice for some researchers and therapists because of its high success rates and low rates of relapse. However, up to 25% of patients will not comply with the anxiety-provoking, rigorous treatment style of the behavior therapy (Greist, 1990a). In order to reduce the anxiety brought about by behavior therapy, some researchers have proposed the combination of benzodiazepines and exposure and response prevention (Kamano, 1972; Marks and Swinson, 1990; Marks, Viswanathan, Lipsedge, & Gardner, 1972). This combination could lead to three possible outcomes. First, the combination may yield no better effect than behavior therapy alone; in which case, the combination therapy would be of no clinical value. Second, the combination may facilitate exposure and response prevention by generating higher success rates than behavior therapy alone. If this is the case, the combination therapy would be of great clinical value--patients would not experience intense discomfort during the treatment, and thus, more patients would comply with the therapy. Further, with higher success rates, more patients would be helped. The last possible outcome of the combination therapy is the occurrence of state-dependent learning. State-dependent learning is the phenomenon in which learning that takes place while under the influence of a drug, such as alcohol, does not transfer to the non-drugged state. Thus, learning is dependent

upon the patient's drug state (Overton, 1964). State-dependent learning is very detrimental because it results in high rates of relapse after treatment and requires a re-learning of the information previously learned while in the drugged state.

Several studies have been conducted to investigate state-dependent learning. Patel, Ciofalo, and Iorio (1979) found that mice administered one of four benzodiazepines before the training of a passive-avoidance task did not exhibit the avoidance task in the next day's non-drugged training session. Similarly, Bouton, Kenney, and Rosengard (1990) found the acquisition of fear extinction in benzodiazepine-drugged mice to be state-dependent. The authors suggest that if state-dependent learning occurs in humans undergoing combination therapy relapse rates will be quite high after the drug is discontinued.

A few studies on the effects of combined treatment in humans have been conducted and have found quite different results from the previously mentioned studies. Wardle (1990) reviewed six studies in which exposure plus an anxiolytic was compared to exposure plus placebo in the treatment of phobics. In all but one of these trials, acute benzodiazepine treatment was employed; this means that the drug was given either during or before the exposure sessions, never between the sessions. Wardle found that four of the six trials had better results with the combined treatment.

Another study by Marks et al. (1972) performed using diazepam suggested that the drug most facilitated behavior

therapy with phobics when the drug was administered so that its effect was decreasing during the exposure sessions. It is hypothesized that state-dependent learning is more likely to occur when the drug is having its peak effect than when the drug's effects are waning. Neither of these studies reported patient relapse when the drug was discontinued.

The above research was conducted using the drug diazepam, but one study (Marks & Swinson, 1990) was carried out combining the benzodiazepine alprazolam and behavior therapy in the treatment of agoraphobics, with much different results. The subjects in this study were placed on alprazolam for eight weeks, with an average final dose of 5 mg/day. After the drug was discontinued, a high number of the subjects relapsed, suggesting that state-dependent learning occurred. However, the studies by Wardle (1990) and Marks et al. (1972) suggest that the manner in which alprazolam was employed in this study may actually have created a conducive environment for relapse. For example, the trials reviewed by Wardle (1990) and Marks et al. (1972) incorporated acute benzodiazepine treatment and found evidence for the efficacy of combined treatment, while Marks and Swinson (1990) used continuous benzodiazepine treatment and found a high relapse rate. Unless other research is performed to study the effects of alprazolam assisted exposure and response prevention, incorporating the use of alprazolam in the manner implicated by Wardle (1990) and Marks et al. (1972), the efficacy of that combination may go undiscovered.

One such study was conducted by Bruce, Spiegel, and McGrath (1993) to examine the effects of alprazolam-assisted exposure and response prevention in a social phobic. This study consisted of six units of exposure to six different tasks, with three units employing a placebo pill and the other three employing 0.5 mg of alprazolam. The results clearly showed that alprazolam functioned effectively to reduce the subject's anxiety, but they also indicated that some state-dependent learning may have occurred. The researchers found that learning taking place during alprazolam-assisted exposure did not transfer as well as learning taking place during the placebo condition, but it was not entirely clear whether this was the result of state-dependent learning or of some subject-related factor.

Research on combined therapy using acute treatment of diazepam and alprazolam suggests excellent success rates with little or no state-dependent learning in the treatment of phobics. However, no published studies on the use of combined therapy and obsessive compulsive disorder exist. Therefore, the following study is proposed to test the efficacy of combined therapy on OCD. Following the previous research on acute benzodiazepine treatment in phobics, it is predicted that combining the short-acting benzodiazepine, alprazolam, and exposure and response prevention in obsessive compulsive disorder will facilitate the behavior therapy without resulting in the occurrence of state-dependent learning. If the prediction is upheld by the results of this study, further research in this

area will be warranted to determine if combined treatment for obsessive compulsive disorder may be superior to exposure and response prevention alone.

Method

Subject

The subject was a fifteen year old male with a primary DSM-III-R Axis I diagnosis of obsessive-compulsive disorder. His disorder centered around his obsessions of contamination. The subject's method of coping with the contamination was through excessive washing. His score on the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) was 33, which indicated a severe, although self-reported, level of OCD. The subject had been on no medications for his disorder and had not participated in any other form of treatment for it. He came to the University of Illinois College of Medicine at Peoria in 1993 for the treatment of his disorder and agreed to participate in this study.

Apparatus and Materials

The subject was monitored using the Vitalog 5000--a portable device designed to measure heart rate and to maintain a computerized account of all data. (Kozak, Foa, & Steketee (1988) showed that heart rate measures are highly correlated with anxiety). Further, subjective ratings of anxiety (Subjective Units of Distress or SUDS) and the urge to wash were taken approximately every five minutes during each 60 minute therapist-directed exposure session. These ratings were taken on a 0-100 scale. Finally, before each session the subject was asked to

report (on a 0-100 scale) his anticipatory anxiety, his confidence level, and his belief that doing the upcoming exposure task would make the next exposure task easier. He was also asked to estimate his current heart rate and his maximum heart rate during the upcoming exposure. After each session, he was asked to report (on a 0-100 scale) his concentration level during the previous exposure task, the degree to which he was distracted during the task, his feeling of success for the task, his confidence level for future tasks, his belief that having done the task would make the next task easier, and his current anxiety, contamination level, and urge to wash. He was also asked to estimate his maximum heart rate during the previous exposure task. Finally, at the end of each day, the subject was asked to report whether he believed that he was given the alprazolam. If the subject was able to correctly report this, this confounding variable would have to be taken into consideration during data analysis.

Procedure

This study ran for 12 consecutive days, during which time, the subject was exposed to a series of four tasks. Exposure to each of the four tasks occurred in the natural environment, either at the clinic, the subject's home, or a local hospital. Each series required three days to complete--an active day, a washout day, and a state-dependent day. The active days consisted of four 60-minute exposure sessions, while the state-dependent day consisted of three. No exposure sessions occurred

on the washout day. Once each series was complete, a new series of exposures began, utilizing a task which was about equal to the first in the amount of anxiety that was provoked. This cycle continued until four series had been completed. The response prevention rules across the entire sequence were identical. The subject was not allowed to wash during the exposure session or before eating or to change his clothes during the day.

On the morning of the first day, the subject was familiarized with the Vitalog 5000 and to the subjective measures which were used during the exposure sessions. Once the orientation was complete, the series of exposure sessions began.

On the first day, which was called the active day, the subject was given a baseline exposure task (Task A), such as placing his hand on a contaminated doorknob. Each exposure session, including the baseline task, lasted for 60 minutes. The baseline task allowed for the measurement of the initial values of the heart rate, anxiety, and urge to wash while the subject was in the non-drug state.

After the baseline task, the subject was given a glass of orange juice which contained either 0.5 mg of alprazolam or no drug at all. The determination of 0.5 mg follows the study by Bruce, Spiegel, and McGrath (1993) and is suggested by Gitlin (1990) as the optimal starting dose for the treatment of acute or situational anxiety. The administration of the drug or the placebo was conducted in a double-blind fashion. An independent person determined on which two active days the drug would be

present and on which two the placebo would be present through a random lottery procedure. This person also prepared the drugged or non-drugged juice to insure blindness on the part of the therapists. To insure that the subject was completely unaware of when he was receiving the drug, a glass of non-drugged orange juice was given before each baseline task and before and after each post-drug exposure session.

Beginning roughly one hour later, Task A was repeated, with three more 60-minute exposure sessions occurring. On the days when alprazolam was ingested, this time lapse allowed alprazolam to be at its peak of action during the first post-drug exposure session and gradually decreasing in effect over the next two.

On the second day, called the washout day, the subject did not visit the therapist and was instructed not to practice the exposure techniques that he had learned. For the active days in which alprazolam was received, the washout day allowed time for most of the drug to be removed from the blood stream.

The third day was called the state-dependent day. On this day, the schedule followed quite closely with that of the active day. Orange juice was still given at the same times as the active day (to insure the subject was blind to the administration of the drug), except that no drug was ever given on state-dependent day. Task A was repeated, but only three 60 minute exposure sessions were given. Additionally, if the subjective ratings were less than or equal to 10 for 5 consecutive ratings (or 20 minutes), the session was terminated.

State-dependent day tested for the occurrence of state dependent learning, since the drug had enough time to be removed from the blood stream. If the gains made during the exposure sessions aided by alprazolam showed state dependency, then the objective (heart rate) and subjective (anxiety and urge to wash) measures on this day would be near those of the active day baseline. If no state-dependency occurred, the learning from the active day's exposure sessions would be evidenced by much lower objective and subjective measures on state-dependent day than those of the active day baseline.

Proposed Design

This study incorporated an alternating treatments design (ATD). This is the design of choice in studies such as this, because it allows the researcher to alternate between two or more treatment conditions fairly rapidly and to easily discriminate differences between the conditions. The treatment design was excellent for this study because it allowed for the determination of whether alprazolam effectively aided exposure and response prevention without causing state dependent learning.

Results

When asked after the last trial of the active days and the last trial of the state-dependent days if he believed that he had ingested alprazolam that day, the subject reported affirmatively 63% of the time (or five out of eight times). Of these affirmative reports, 40% (two out of five) were correct--he correctly reported that he had been given the drug on two out of

the two alprazolam-assisted active days. When asked to rate on a 0-100 scale the degree to which his success was a result of the drug, the subject's average response from the two days in which alprazolam was ingested was 25. His average response from all five days in which he believed he had been given the drug was 24.5.

The subject was also asked to rate himself on a number of items before and after each exposure session. Before each session, the subject was asked to rate his anxiety about the upcoming exposure task and to estimate his highest heart rate for the upcoming task, and the results for both measures show an overall decrease across trials. He also reported his confidence level and his belief that doing the upcoming task would make the next task easier. Both ratings showed an overall increase across trials. Finally, the subject was asked to report his current heart rate before each task. This measure remained virtually unchanged across trials.

After each session, the subject was asked to rate his concentration level and distraction level for the preceding exposure session. The subject's average concentration level across trials was 70.45 (out of 100), while his average distraction level was 19.73 (out of 100). The subject's rating of success for the preceding task and his confidence in his ability to do future tasks showed no obvious increases or decreases. The subject's average rating of success across trials was 76.43 (out of 100), while his average confidence level was

64.46 (out of 100). The subject also estimated his highest heart rate for the preceding trial, and this rating showed an obvious decline across trials, with an average rating of 87.57. The subject's rating that doing the previous task would make the next task easier showed no obvious trend. Finally, the subject's average ratings (across trials) of his anxiety, urge to wash, and contamination after the exposure task were all quite low--2.48, 4.21, and 3.57 (out of 100), respectively.

The subject's Y-BOCS scores were also of interest. The subject's initial Y-BOCS total score was 33 before treatment; this indicates a severe level of OCD. After treatment, the subject's score had decreased to 2. At the five month follow-up, the subject's score was 8.

In order to determine if a difference existed between the alprazolam-assisted exposure sessions and the placebo exposure sessions, all data were collapsed, and a 2 X 3 factorial design (drug X condition) was done. The 2 X 3 ANOVA revealed a non-significant main effect of drug, $F(1, 31) = 2.77$, $p > .01$ and a non-significant main effect of condition, $F(2, 31) = 3.15$, $p > .01$. Figures 1 and 2 illustrate the results of this analysis--the two graphs show very little difference between them, suggesting that the drug did not exhibit an anxiolytic effect in the patient. For an anxiolytic effect to be present, a much greater reduction in D1 (the average SUDS of the first trials from the drug days) from baseline as compared to the placebo condition must be evident, and it is not.

S1 (the average SUDS of trials one from the state dependent days following alprazolam ingestion) showed no rebounding effect, the major test for the occurrence of state-dependent learning (See Figure 1). If state-dependent learning had occurred, it would have been evidenced by mean SUDS scores on S1 approximately equal to those of the active day baseline.

Insert Figures 1 and 2 about here

Since similar trends were found in the urge to wash, these graphs are not included. Also not included is the objective heart rate data. It was hoped that this data could be used to verify the subjective ratings of anxiety. Unfortunately, the Vitalog-5000, which is a portable device designed to monitor heart rate, malfunctioned early in the study, and thus, the desired objective data could not be obtained.

Discussion

Based on the results of this study, the hypothesis that combining the short-acting benzodiazepine alprazolam with exposure and response prevention would facilitate the behavior therapy without resulting in the occurrence of state-dependent learning was not upheld. No significant differences in the SUDS scores between the alprazolam-assisted exposure sessions and the placebo exposure sessions existed, suggesting that alprazolam did not function effectively to reduce the subject's anxiety. The mean SUDS scores on the state-dependent day following the

alprazolam-assisted active day showed no rebounding towards the active day baseline. This indicates that state-dependent learning did not occur. Since the drug showed no anxiolytic effect on the patient, it is not surprising that state-dependent learning did not occur. Thus, the combination therapy showed no better effect than exposure and response prevention alone.

The most probable explanation of these results is that the dose of the drug was not high enough to result in an anxiety-reducing effect in the subject. In addition, the subject was unusual in that OCD patients generally do not exhibit such immediate, marked, and generalizing relief in their symptoms as occurred with this subject. Also, the subject was young, had the disorder for only a short time, and had an unusually high initial Y-BOCS score. Taken together, these facts indicate that the results of this study are not generalizable. More research in the area is necessary to obtain more generalizable results and thus, better knowledge about the hypothesis.

Before concluding, a discussion of the internal and external validity of the study is necessary. The internal validity of the study is strong in that the tests administered to the subject (namely, the SUDS, the urge to wash, and the Y-BOCS) have been used in a number of studies and have been shown to be valid. The major threat to internal validity is that the experiment was not conducted in a tightly-controlled laboratory setting. Instead, the exposure sessions took place in the natural environment (i.e., in the clinic, in the patient's home, and at a local hospital),

possibly allowing for the influence of extraneous variables. Although this impinges on the internal validity of the study, it strengthens the generality of the findings and thus, the external validity. The main threat to external validity is the use of the single subject design, because the subject chosen was not entirely representative of all OCD patients. However, since the experiment was meant only as a first-phase pilot study to indicate the necessity of future studies in the area, the design seems appropriate. Overall, the study provides a good balance between internal and external validity by incorporating standardized testing scales and a naturalistic environment for exposure.

Although the hypothesis was not upheld by the results of this study, future studies in the area are necessary to determine if combined treatment for obsessive-compulsive disorder (as well as other anxiety disorders) is a viable alternative to exposure and response prevention alone. Future studies must employ more than one subject as well as subjects of differing ages, treatment histories, and OCD severities. It might also be necessary to experiment with varying doses of the drug and the times at which the drug is administered. Hopefully, such experiments will discover a method of combining benzodiazepines such as alprazolam with exposure and response prevention which will effectively alleviate the subject's anxiety without resulting in the occurrence of state-dependent learning. Such a method would provide relief to the many obsessive-compulsive disorder

sufferers who have failed to benefit from either pharmacotherapy alone or exposure and response prevention alone.

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Figure Caption

Figure 1. Mean S.U.D.S. scores as a function of trials during the drug condition. Each bar represents the ten minute means from the average of the two drug conditions. Each line represents the standard error of the mean. BL is the baseline, D1-3 are the three trials of the drug days, and S1-3 are the three trials of the state-dependent days.

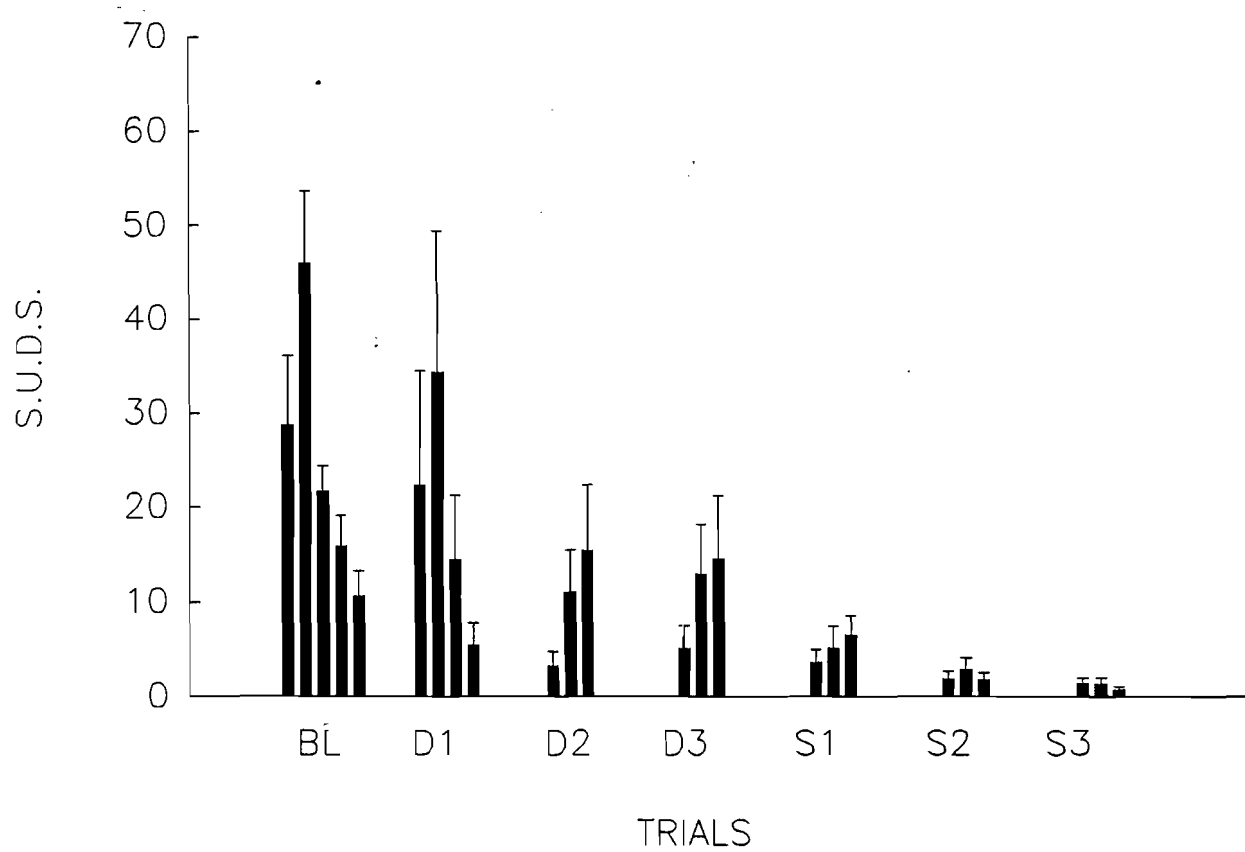


Figure Caption

Figure 2. Mean S.U.D.S. scores as a function of trials during the placebo condition. Each bar represents the ten minute means from the average of the two placebo conditions. Each line represents the standard error of the mean. BL is the baseline, P1-3 are the three trials of the placebo days, and S1-3 are the three trials of the state-dependent days.

