Effectiveness of Relaxation Therapy in Improving the Academic Performance of Test-Anxious Students

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Running head: EFFECTIVENESS OF RELAXATION THERAPY

Anxiety - General

Anxiety can be defined as an emotion characterized by feelings of anticipated danger, tension, and distress and by tendencies to avoid or escape. Fear could be defined in much the same way. To distinguish between the two, one must look at other properties. The object of anxiety is often harder to identify than the object of fear. Also, while the intensity of fear is in proportion to the magnitude of the danger, the intensity of anxiety is thought to be greater than the objective danger. The term stress refers both to conditions that arouse anxiety or fear and to the anxiety or fear aroused (Fleming et al., 1984).

Physiological Bases of Anxiety

The anxiety sequence begins with messages from the environment about danger, which are processed by the central nervous system. Circuits through the brain and spinal cords play numerous roles in anxiety. The reticular formation, a network of nerve cells in the brain stem, alerts the cortex to important sensory information. As data about potentially dangerous events filter through the

reticular system, they are singled out as important. The reticular formation, then, arouses the cortex which gives the matter its full attention.

The cerebral cortex is involved in identifying, evaluating, and making decisions about sensory data and subsequent behaviour. People often feel out of control when they feel anxious. But, the thoughts that arise in the cortex are under the individual's control; and they play a big role in maintaining or dissolving anxiety.

Upon processing information about danger, the cortex communicates with the hypothalamus. Other limbic systems, including the amygdala and the septum, work along with the hypothalamus to regulate emotions and motives. The hypothalamus is central however, as one of its chemical transmitters, a corticotropin releasing factor, is thought to play a key role in mediating and integrating the endocrine, visceral, and behavioural responses to stress by stimulating the autonomic nervous system and cortex, pituitary gland, and bodily organs (Vale et al., 1981).

During anxiety, people are often aware of

internal turmoil: pounding heart, aching stomach, rapid pulse, tense muscles, sweating and trembling.

Hans Selye, an endocrinologist, was one of the first scientists to explore the chronic effects of anxiety. Selye attempted to put the various physiological symptoms of anxiety into perspective by organizing the anxiety response of organisms into a general adaptation syndrome (GAS) model. The initial phase in the stress reaction occurs when the corticotropin releasing hormone (CRH) stimulates the pituitary gland, as mentioned earlier. This phase is known as the alarm reaction in Selye's (GAS) model, and is typically characterized by autonomic excitability, adrenaline discharge, heart rate, muscle tone and blood content changes. The second phase in Selye's syndrome is the stage of resistance during which maximum adaptation occurs. If the stressor persists and cannot be adapted to, the final phase is the exhaustion stage. At this point, the adaptive mechanisms collapse.

Selye's (GAS) concept turned out to be too neat. One source of contention is the sorts of stresses that trigger it. The (GAS) is likely to occur after

long-lasting stresses rather than brief ones (Lazarus, 1981; Lazarus & Folkman, 1984; Mahl, 1953a, 1953b). One implication of the research cited here is that there are different types of stress being dealt with by an organ- ism physiological level (Axelrod & Reisine, 1984; Davidson, 1979; Krantz & Manuck, 1984; Mason, 1975a, b). There is little doubt that the physiological consequences of anxiety can become debilitating when the organism fails to adapt. Research into the physiological consequences of unresolved anxiety is more prevalent than is the research on the cognitive consequences.

Cognitive Consequences of Anxiety

There is little question that anxiety alters information processing abilities. To find out about the general effects of anxiety on learning, psychologists worked with people who reported feeling great anxiety in academic situations. The research participants came into the laboratory and faced a variety of tasks. Curiously, anxiety did not exert a uniform impact: It actually helped if the learning task was simple; with complicated assignments, anxiety hurt (Farber & Spence, 1953; Ganzer, 1968).

Anxiety is useful during simple learning tasks because under anxiety, the aroused nervous system is using neurotransmitters such as epinephrine, norepinephrine, and vasopressin. Transmission of these substances to the brain greatly improves the retention of simple information in laboratory animals (McGaugh, 1983). Research participants with high anxiety show a number of related problems with learning that requires effort (Geen, 1980; Hamilton & Warburton, 1979; Mueller, 1980; Sarason, 1984a; Sieber et al., 1977; Wine, 1982).

Highly anxious learners have been shown to be less skillful in laboratory memory tasks (Mueller, 1980). Researchers do not understand the specifics, but they do know that these learners are unable to get to the material they encoded. Students with test anxiety say that they get choked up or block and that their minds go blank. Since encoding and retrieval of complex information - often under stressful conditions - is what school is all about, we would expect students with a lot of anxiety to show academic problems. Research suggests that they do and that students in the middle range of ability show

the most striking losses (Sarason, 1980; Spielberger, 1985).

Test Anxiety

Although it is well documented that anxiety often interferes with performance, the mechanisms responsible for this relationship are not yet clear. Morris et al (1981) reviewed the literature on anxiety and found that the more cognitive "worry" component of anxiety seemed to be more highly predictive of performance decrements than the "emotionality" component. Similarily, Wine (1980) suggests that anxiety interferes with performance by inducing self-focused thoughts. Information processing approaches (e.g. Benjamin et al., 1981; McKeachie, 1984) suggest that performance deficits of anxious students may result from problems in encoding the material (ie. reading the material), in organizing the material (ie. when studying or reviewing), or in retrieving the information during an exam. McKeachie et al (1985) found support for this view by demonstrating that students high in test anxiety benefited more than other students from a course on learning strategies. Paulman & Kennelly

(1984) found that test anxiety and exam-taking skills have separate and interactive effects on performance. This information processing approach incorporates the ideas from both the cognitive-attentional model (Wine, 1980) and the learning-skills deficit model (Holahan, 1980). Clearly, more research is needed on the cognitive and affective interactions among anxiety, learning strategies, and performance.

In contrast to the focus on individuals' cognitive skills or affect, other researchers have focused on the external testing, or classroom conditions that foster anxiety. Hill & Wigfield (1984) suggest a number of ways instructional practices could be changed to lessen anxiety including changing instructional procedures in testing, changing reporting styles, decreasing time pressure, and preventing continued failures by modifying test difficulty to match skill levels - all measures designed to lessen anxiety and optimize performance. These instructions parallel those of Covington's (1984) for reducing threats to a students' self-worth.

In the past twenty years there have been just

fourteen studies that the author has been able to track, that have tested the efficacy of relaxation therapy as a means of reducing anxiety in test anxious college students. For the most part these studies have been comparative, testing relaxation against other methods or anxiety-reduction strategies such as study-skills training, distraction-coping, coping skills, systematic desensitization, imagery, waitlist, self-control desensitization, hypnosis, and even rational emotive therapy. EMG biofeedback and meditation have been compared to relaxation in two doctoral dissertation studies. Most studies testing relaxation have compared it to two or more of the above approaches to measure effectiveness of relaxation as an element of other approaches to therapy. It will be the purpose of this section of the literature review to present key findings as they are related to the critical themes thus far presented.

Dendato & Diener (1986) conducted a study to measure the effectiveness of cognitive/relaxation therapy and study-skills in reducing self-reported anxiety and improving the academic performance of test-anxious students. Results indicated that

relaxation/cognitive therapy was effective in reducing anxiety but failed to improve class test scores; study-skills training had no significant effect. The combined therapy both reduced anxiety and improved performance relative to the no-treatment control condition and was significantly more effective than was either treatment alone.

It is usually assumed that test anxiety is an important cause of poor academic performance. This assumption has been supported by the finding that the performance of test-anxious subjects varies inversely with evaluation stress (e.g. Sarason, 1959, 1961; Sarason, Mandler & Craighill, 1952; Sarason & Palola, 1960). The belief that test anxiety causes impaired performance has guided attempts to improve academic performance by the direct alleviation of test anxiety. Early treatment efforts focused primarily on reducing the arousal of test-anxious subjects. Behavioural therapies, such as systematic desensitization, directed toward the reduction of autonomic arousal have been successful in self-reported anxiety (e.g. Deffenbacher, 1976; Russell & Lent, 1982; Russell, Miller & June, 1975; Snyder &

Deffenbacher, 1977) but have often failed to improve measures of performance (e.g. Finger & Galassi, 1977; Russell et al., 1975).

The failure of behavioural therapies to improve academic performance and the consistent relation between autonomic arousal and performance (e.g. Hollandsworth et al., 1979; Holroyd, Westbrook, Wolf & Badhorn, 1978; Wine, 1971) has led to greater emphasis on the cognitive components of test anxiety. According to Wine's (1971) attentional model the performance of test-anxious students is impaired by "worry", negative self-evaluative statements, and task-irrelevant ruminations that compete for attentional capacity with the task-irrelevant activity and interfere with the recall of pertinent information.

Cognitive therapies directed toward reduction of the worry component of test anxiety have been successful in reducing self-reported anxiety (D'Alelio & Murray, 1981; Goldfried, Linehan & Smith, 1978; Holroyd, 1976; Meichenbaum, 1972). Cognitive therapies have been successful sometimes in improving the academic performance of test-anxious students

(e.g. Holroyd, 1976; Meichenbaum, 1972). However, success in improving academic performance has been by no means universal (e.g. D'Alelio & Murray, 1981; Finger & Galassi, 1977; McCordick, Kaplan, Finn & Smith, 1979).

The relatively poor record of both behavioural and cognitive therapies in improving academic performance, despite the fact that both reduce anxiety, calls into question the idea that test anxiety is a major cause of poor academic performance. Culler & Holahan (1980) have offered an alternative view of the relationship between test anxiety and poor academic performance. According to these authors, test-anxious students have poor study habits, resulting in failure to learn the required material. Test anxiety is largely the result of past failures and the student's knowledge that he or she is unprepared for the current examination. This preparation-deficit model has both intuitive appeal and empirical support. It has been shown that highly test-anxious students have less effective study habits than do their low-anxiety counterparts.

Dendato & Diener (1986) effectively proved in

their study that effective treatment of test-anxious students must include the combined therapies of relaxation training and study-skills.

Himle et al. (1984) conducted much of the research in the field of autonomic arousal and cognitive components of test anxiety in an attempt to more clearly identify how combined therapies better address the emotionality and cognitive components. They determined that the emotionality component was consistently responsible for anxiety while the worry component was consistently responsible for performance decrements in test anxious college students. These findings supported those by other researchers (Allen, 1972; Gonzalez, 1976; Sarason, 1972; Morris & Liebert, 1970). After administering a program of relaxation training, cognitive restructuring, and systematic desensitization to fourteen subjects, the results of a one-year follow-up study indicated that maintenance of decreased levels of test anxiety continued past the one year mark, and subsequently, test performance improved. The rationale for the improved test performance comes from base research conducted by Sarason (1975) that

demonstrated that test anxious students become pre-occupied with the worry responses that are attentionally demanding and distracting from the task at hand during test-taking situations, which results in an impairment in performance.

Wine's (1970, 1971) attentional theory of test anxiety attributes the performance decrements seen in test anxious students to an internal focus of self-evaluative and deprecatory self-statements and perception of autonomic arousal. Accordingly, Wine (1971) suggests that effective intervention for test anxiety would consist of intensive practice in dealing with tests, coupled with specific instructions and practice in focusing on task relevant variables and inhibiting self-evaluative statements.

In research conducted by Thyer et al. (1981) test anxious college students were treated effectively (lowered anxiety) through therapy involving relaxation therapy and thermal biofeedback. In this study, no concern was given to academic performance as a function of autonomic arousal.

Based on the premise that high and low test

anxiety students were similar in terms of their physiological arousal, Kirkland & Hollandsworth (1980) conducted a comparative study of skills-acquisition versus anxiety-reduction techniques to determine which had more efficacy in effective test-taking. Again, Wine's (1972) attentional model was cited as being of fundamental importance to the rationale behind the study, and poor academic performance was interpreted differently as a skills-deficit disorder rather than an anxiety-related disorder. Test anxiety was proven in this study to be a skills-deficit disorder as skills training alone improved academic performance and subsequently improved attentional concentration.

In four of the most relevant pieces of literature on relaxation as an anxiety-reduction strategy that impacts upon academic performance, two have taken the view that the cognitive worry component should be addressed by centering on autonomic arousal, while the other two studies have specified the skills deficit as being the fundamental concern in developing proficiency in test-taking, and in attentional concentration.

Comer (1977) and Thyer et al. (1981) applied relaxation therapy to address the worry component at the cognitive level. Kirkland & Hollandsworth (1980) and Dendato & Diener (1986) demonstrated that high levels of physiological arousal aren't always related to less effective test-taking behaviours.

Conclusions

Although it is widely accepted that test anxiety has a physiological base to it, and that a high level of autonomic arousal tends to coincide with test anxiety, and that at least an element of relaxation therapy should be employed to condition the subject for restructuring of this nature, it is quickly becoming a facet of all treatments of test anxiety to involve study-skills training in therapy.

While it has been firmly established that a combination approach to dealing with test anxiety (relaxation training and study-skills), will yield both improvement in performance and lowered anxiety, even after one year follow-up, it has not been clearly demonstrated whether or not relaxation training alone will improve academic performance.

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Abstract

The differences in academic performance among highly test-anxious students with two weeks of either relaxation therapy or study-skills training were investigated. The results (statistically non-significant) indicated that on a less difficult measure of performance both treatment groups scored higher than their population, on a difficult measure both groups scored slightly lower than their population, on a mean of the two measures scored better than their population, and that the relaxation therapy group outperformed the study-skills group on all three measures. The findings, though statistically non-significant, are congruent with Dendato & Diener's (1986) research conclusion that an element of relaxation is essential to bring about change in levels of anxiety and subsequently academic performance in test anxious students.

Effectiveness of Relaxation Therapy in Improving the Academic Performance of Test-Anxious Students

A growing body of research has indicated a trend in the way that researchers are treating the phenomenon of test anxiety. Early treatment efforts focused primarily

on reducing the arousal of test-anxious students. Behavioural therapies, such as systematic desensitization, directed toward the reduction of autonomic arousal have been successful in self-reported anxiety (e.g. Deffenbacher, 1976; Russell & Lent, 1982; Russell, Miller & June, 1975; Snyder & Deffenbacher, 1977) but have often failed to improve measures of performance (e.g. Finger & Galassi, 1977; Russell et al., 1975).

The failure of behavioural therapies to improve academic performance and the consistent relation between autonomic arousal and performance (e.g. Hollandsworth et al., 1979; Holroyd, Westbrook, Wolf & Badhorn, 1978; Wine, 1971) has led to greater emphasis on the cognitive components of test anxiety. According to Wine's (1971) attentional model the performance of test anxious students is impaired by "worry", negative self-ruminations that compete for attentional capacity with the task-irrelevant activity and interfere with the recall of pertinent information.

Cognitive therapies directed toward reduction of the worry component of test anxiety have been successful in reducing self-reported anxiety (D'Alelio & Murray,

1981; Goldfried, Linehan & Smith, 1978; Holroyd, 1976; Meichenbaum, 1972). Cognitive therapies have even had success in improving the academic performance of test-anxious students (e.g. Holroyd, 1976; Meichenbaum, 1972). However, success in improving academic performance has been by no means universal (e.g. D'Alelio & Murray, 1981; Finger & Galassi, 1977; McCordick, Kaplan, Finn & Smith, 1979).

The relatively poor record of both behavioural and cognitive therapies in improving academic performance, despite the fact that both reduce anxiety, calls into question the idea that test anxiety is a major cause of poor academic performance. Culler & Holahan (1980) have offered an alternative view of the relationship between test anxiety and poor academic performance. According to these authors, test-anxious students have poor study habits, resulting in failure to learn the required material. Test anxiety is largely the result of past failures and the student's knowledge that he or she is unprepared for the current examination. This preparation-deficit model has both intuitive appeal and empirical support. It has been shown that highly test-anxious students have less effective study habits than

do their low-anxiety counterparts.

The trend that research is taking in this field accounts for test anxiety's physiological base and the high level of autonomic arousal that coincides, however, it is quickly becoming a facet of all treatments of test anxiety to involve study-skills training as a means of addressing the cognitive component.

While it has been firmly established that a combination approach to dealing with test anxiety (relaxation training and study-skills) will yield both improvement in performance and lowered anxiety, even after a one-year follow-up, it has not been clearly demonstrated that relaxation training alone will improve academic performance.

Method

Subjects

Eighteen undergraduate university students from two introductory psychology classes served as voluntary participants. All participants identified themselves as being highly test anxious. This was also confirmed by a questionnaire that the experimenter prepared and administered prior to treatment. Sixteen of the participants were female, while two were male.

Volunteers were treated in accordance with the "Ethical Principles of Psychologists" (American Psychological Association, 1981).

Design and Procedure

The subjects' scores on the first twelve regularly scheduled class quizzes were collected as a measure of academic performance. In both classes the quizzes consisted 10 multiple choice questions selected from a standard publisher's item file. For purposes of analysis the quiz scores were standardized relative to the entire introductory psychology class norms for the respective quizzes. Thus, the performance data consisted of z scores representing each student's relative standing on each test. The use of z scores was necessary both to combine scores from different classes and to allow the comparison of pretreatment and posttreatment performance.

A questionnaire prepared by the experimenter was used as a measure of test anxiety. The questionnaire consists of three items and uses a Likert scale response format. Pretreatment measures were collected immediately after the subjects finished the twelfth weekly quiz. Posttreatment measures were collected

immediately following the last class quiz (during the last week of class sessions).

Subjects were assigned by matched-pairs design to the two treatment groups. The author served as therapist for both treatment groups. The treatment groups received four half-hour sessions scheduled twice a week. Subjects were allowed to miss one group session but were required to schedule an individual make-up session. All subjects completed the treatment sessions.

Two treatment techniques were utilized in the study: (a) deep muscle relaxation, and (b) study-skills training.

Relaxation Therapy. Subjects (8 women and 1 man) in the relaxation group received 20 min of deep muscle relaxation training and a five minute long explanation of the rationale for learning relaxation during each of the four sessions. Deep muscle relaxation, adapted from Martin (1983; following Jacobson, 1938), involved having the subjects tense, then relax, various muscle groups while observing the differences between tension and relaxation. Subjects were instructed to practice the technique at home and to use the technique to relax themselves when they were feeling uptight.

Study-Skills Training. The study-skills group (8 women and 1 man) completed four sessions of study-skills training, modeled after procedures developed by Talley and Henning (1981) and Langan (1978). A lecture format of presentation was used, and group discussion was encouraged. Strategies for improving study habits and academic performance were presented, including four major topics: SQ3R system, time management, studying and strategies for test-taking, and goal setting.

At the end of the last session, the two treatment groups were interviewed by the author. The evaluative interview consisted of 4 items designed to measure the perceived effectiveness of the treatments.

Results

Eighteen subjects (9 from the relaxation group, and 9 from the study-skills group) were included in the analyses. Because the two groups were paired based on academic performance, there were no significant pretreatment differences.

Relaxation Data

The posttreatment measures of academic performance were analyzed with a one-way analysis of variance (ANOVA). Both analyses using standardized scores (z

scores) and raw scores were statistically non-significant.

Study-Skills Data

The posttreatment measures of academic performance were analyzed with a one-way analysis of variance (ANOVA). Both analyses using standardized scores (z scores) and raw scores were statistically non-significant.

Responses to the posttreatment perceived effectiveness interview were informal, and as such, could not be analyzed for differences among the treatment groups.

Insert Figures 1 - 4 about here

Although the statistical results are nonsignificant, there exists a trend that seems to indicate improvement in academic performance in the relaxation group relative to both the study-skills group and the population of introductory psychology students.

Discussion

The major findings of this study were that neither treatment was effective in improving academic

performance. A trend, though statistically non-significant, indicates that results are consistent with the findings of previously reported research.

The first posttreatment measure was a relatively easy quiz by the year's standards, and both treatment groups outperformed the population, while on the second posttreatment measure (said to have been more difficult by the year's standards) both treatment groups were outperformed by the population.

In an interview with treatment subjects immediately following their completion of posttreatment performance measures, nearly all participants indicated that as the last measure was also the last quiz of the year, and at a time when they had other assignments due, they failed to treat it seriously and many came unprepared.

It should also be indicated here that this study was low power by nature. The effect that was expected was small and the number of subjects participating could not have facilitated statistically significant results.

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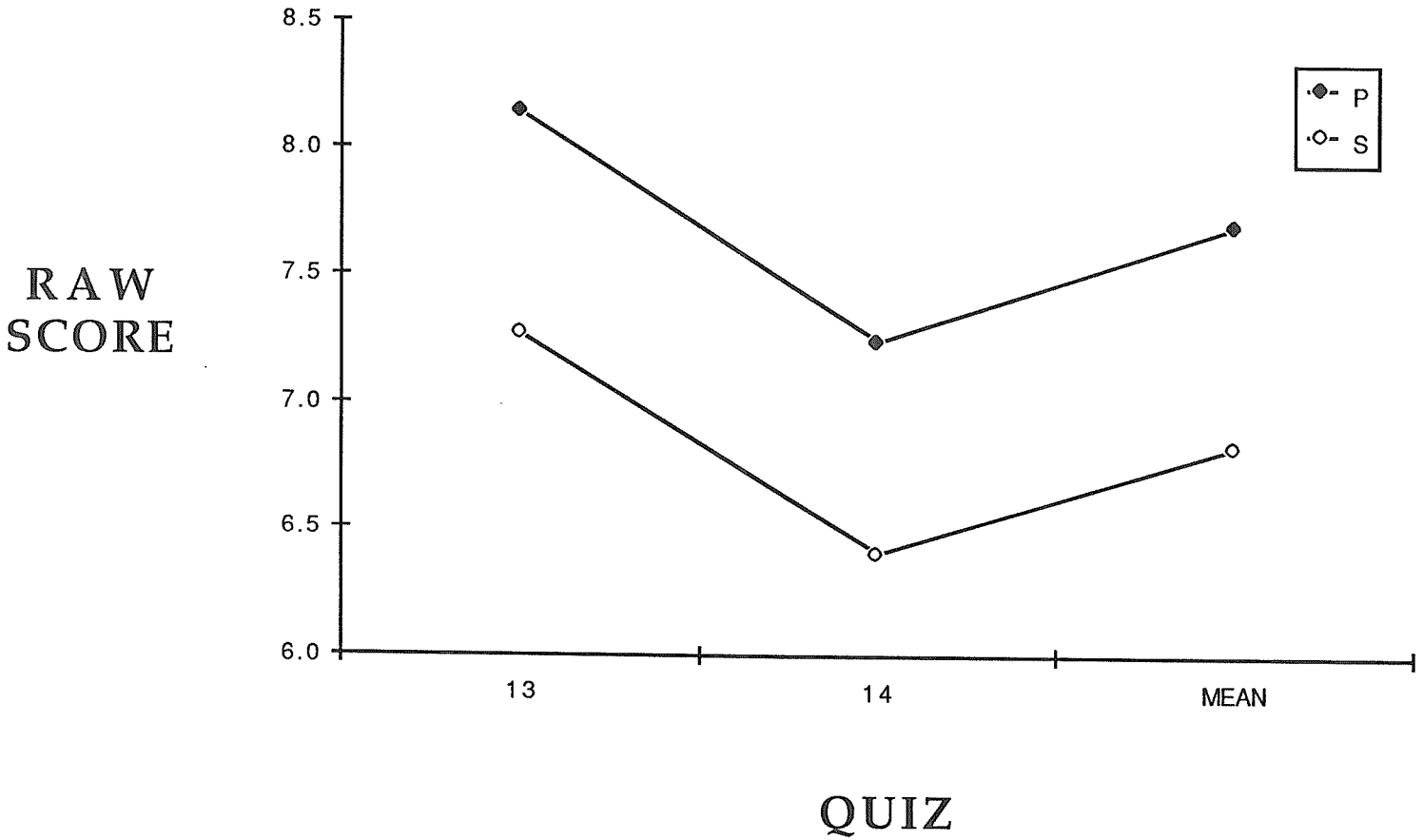
Figure Captions

Figure 1. Quiz performance after treatment.

Figure 2. Z scores before and one quiz after treatment.

Figure 3. Z scores before and two quizzes after treatment.

Figure 4. Change scores after treatment.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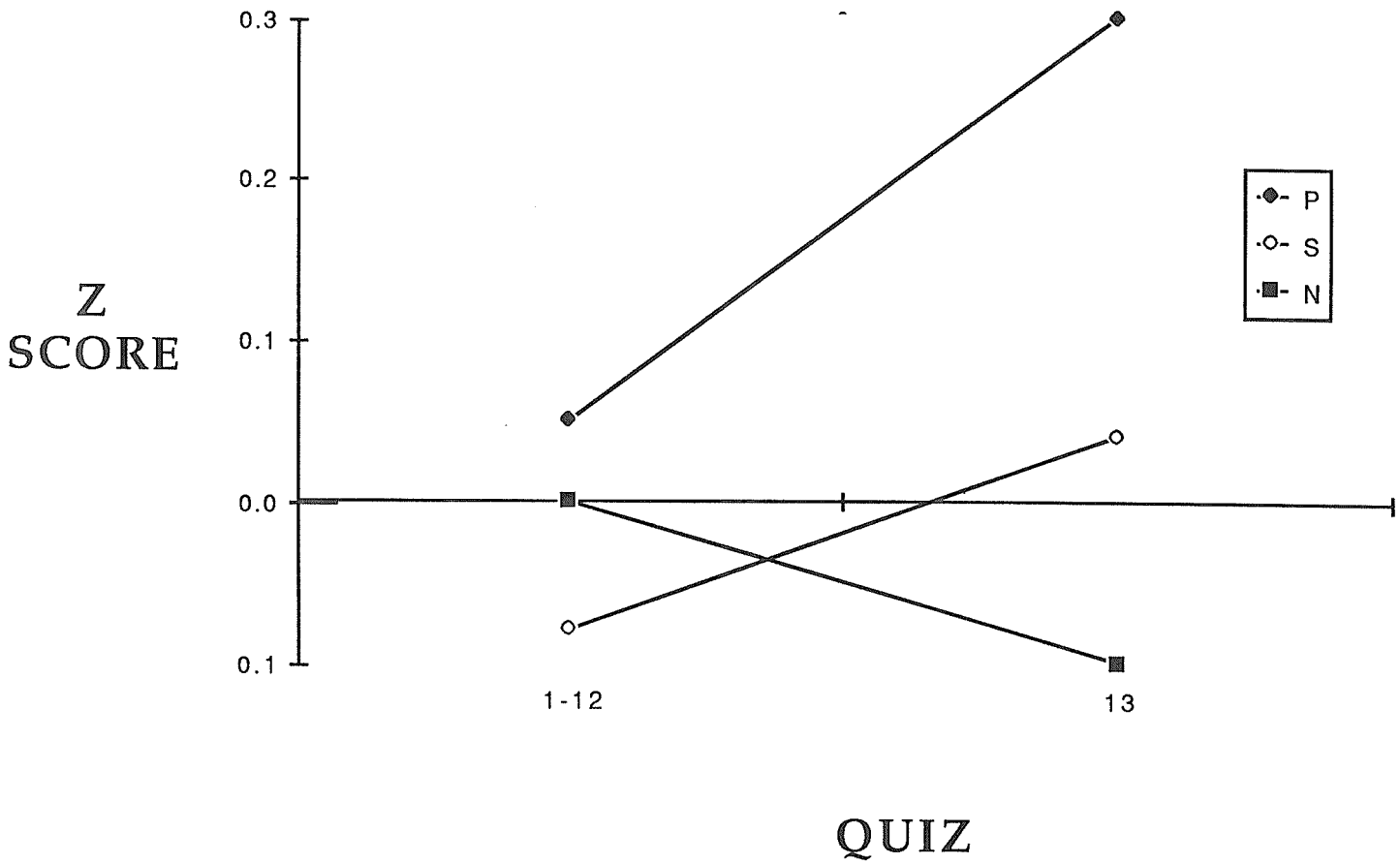
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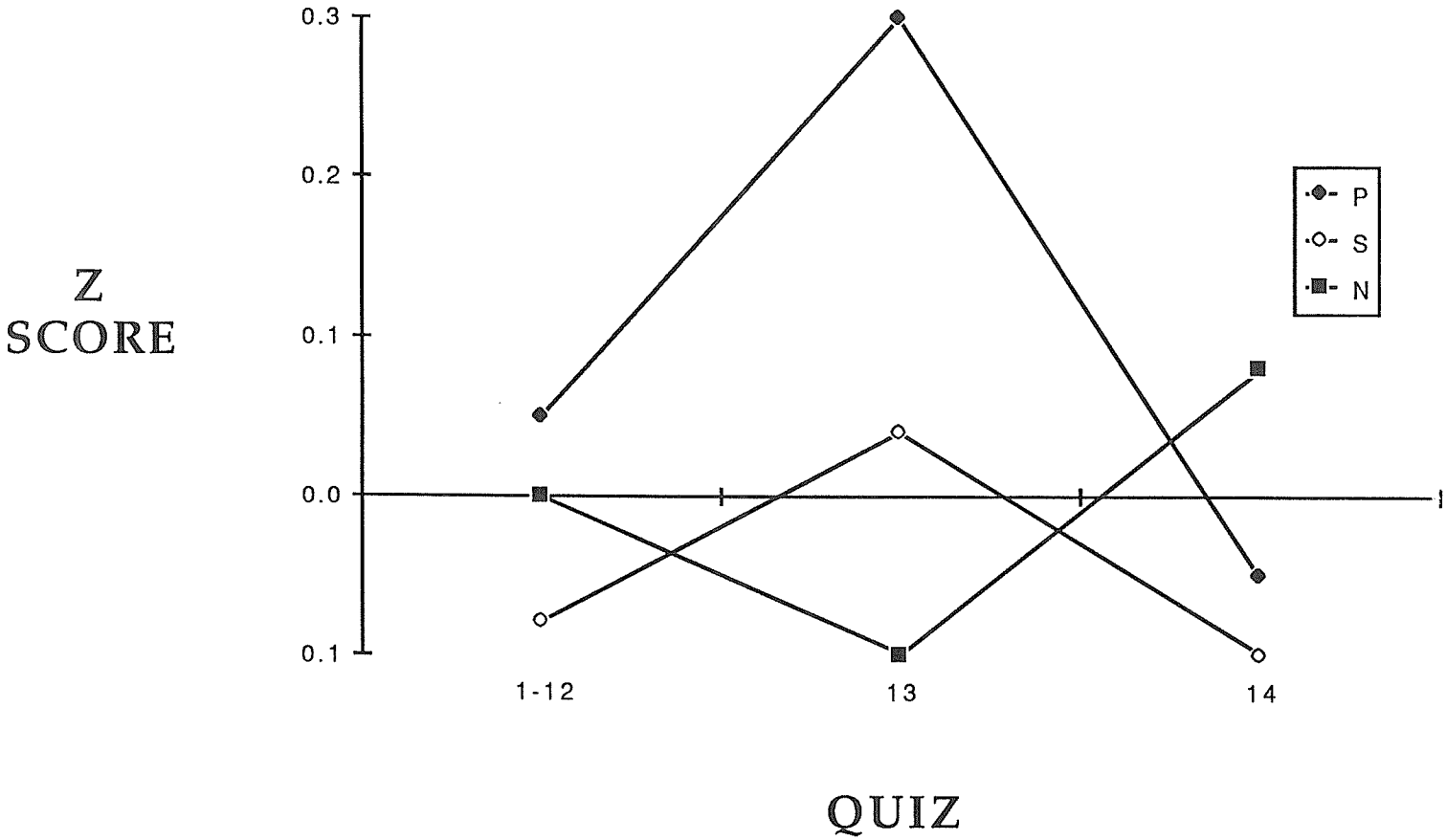
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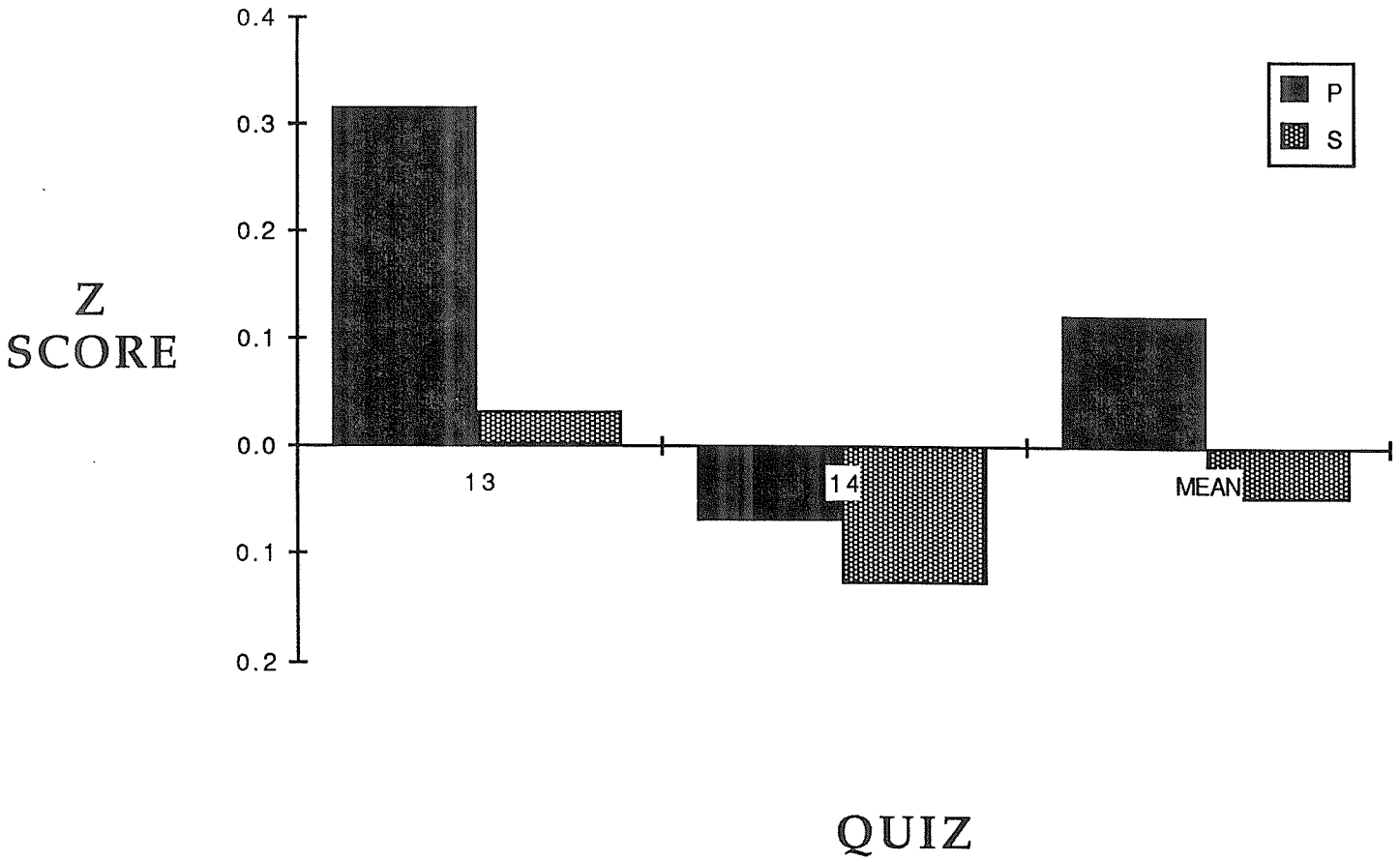
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