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THE EFFECTS OF BIOFEEDBACK AND FOCUSED INTERVENTION
UPON STUDENT TEACHER ANXIETY AND TEACHING COMPETENCE

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THE EFFECTS OF BIOFEEDBACK AND FOCUSED INTERVENTION
UPON STUDENT TEACHER ANXIETY AND TEACHING COMPETENCE

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TO

Donna, Kristin and Joanna Yoes, who made
many more sacrifices than should have
been asked of them.

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CHAPTER I

INTRODUCTION AND PROBLEM

The practice of microteaching has become a standard feature in many teacher education programs throughout the United States. This has come about because of a concern, on the part of teacher educators, that student teachers need to gain experience in teaching and obtain accurate self knowledge about their teaching competencies and deficiencies.

One possible method for gaining this self knowledge is through controlled self observation. Typically, this self observation is controlled upon subject matter lines, as opposed to either psychological or physiological lines. A vital concern of teacher educators revolves around the question of how to maximize the positive effects of self observation while minimizing the negative aspects of the microteaching experience. The present study will propose a method of accomplishing these two goals.

The high arousal facet of microteaching is well recognized by those who have worked in this area of teacher education. Student teachers who complete the microteaching experience

almost unanimously comment about being anxious or aroused, or at least exhibit some nervous behaviors. Because of this uniform response on the part of microteachers, it may be fruitful to concentrate upon these important elements of microteaching--activation, arousal and anxiety. The effects of activation, the release of energy into internal physiological systems, upon performance is generally believed to take the form of an inverted-U. This means that at lower levels of activation, performance is improved with small increases in activation level. This relationship continues until activation level reaches an optimal level which is specific both to the task and the individual organism performing the task. After reaching the optimal level - the apex of the inverted-U - performance begins to decline and presumably would reach zero at an extremely high activation level. A loosely analogous situation at this extreme may be the person who is unable to act because he is frozen with terror.

Fiske and Maddi (1961) have formulated a conceptual framework that relates arousal level (the somatic correlates to activation) to task performance. Optimal arousal theory predicts that individual arousal level varies according to the amount of stimulus impact that is present in the organism's immediate environment, both internal and external, at any particular point in time. Impact is defined as being the intensity, meaningfulness, and variation of the stimulus situation. Individual task performance then would vary

relative to individual arousal level and the optimal arousal level for the performance of the specific task.

The author considers it important to determine the general optimal arousal level for microteaching performance. The present experimental situation will vary the impact level by selectively introducing experimental equipment, and procedures to a standard microteaching situation. In this way, it will be possible to see the effects of stimulus situation impact upon performance. The major theoretical base that will be used to guide the present investigation will be optimal arousal theory as defined by Fiske and Maddi (1961). Specifically, the fourth of eight propositions comprising this theory will be examined in light of the results. The fourth proposition is (Fiske and Maddi, 1961, p. 31):

For any given task there is a level of activation which is necessary for maximally effective performance.

Statement of the Problem and Purpose

Research Problem

Can biofeedback and focused intervention affect the anxiety level and teaching competence of student teachers during microteaching?

The following questions were generated in an attempt to examine two main concerns of the present study.

1. Can biofeedback (EMG) assist the student teacher in precisely identifying discrepant behavior in his/her microteaching lessons through the detection of physiological arousal?

2. Can focused intervention and feedback, initiated by the student teacher and as a consequence of biofeedback, enable this person to carefully examine discrepant videotaped microteaching behavior and thus set the stage for remediation?

Purpose

The purpose of this study is to investigate the relationships between selected variables that may have considerable influence upon microteaching anxiety and competence.

Hypotheses

The following hypotheses were generated by the research problem and questions.

1. Subjects receiving biofeedback will report being more anxious than subjects not receiving biofeedback.
2. Subjects receiving biofeedback will be judged to be more competent in their teaching performance than subjects not receiving biofeedback.
3. Those subjects who receive focused intervention of teaching behavior during playback, which is self or helper initiated, will report being more anxious than those who must depend solely upon self initiated focused intervention.
4. Those subjects who receive focused intervention of teaching behavior during playback, which is self or helper initiated, will be judged to be more competent in their teaching performance than those who must depend solely upon self initiated focused intervention.
5. Both factors will produce subjects who are more realistic about their teaching competence levels as evidenced

by significantly smaller differences (group means) between self and judged competency levels.

6. There will be no long term differences between groups in terms of anxiety as indicated by Form II of the Teaching Anxiety Scale.

The hypotheses listed above indicate that the author believes that the biofeedback treatment will increase the intensity, complexity, and novelty of the stimulus situation, resulting in more anxiety and a better teaching performance. Similarly, the author believes that focused intervention that is self or helper initiated will result in more feedback pertinent to the teaching performance than the situation in which the subject himself must initiate the focused intervention. Additionally, the above situation will increase the intensity, complexity, and meaningfulness of the stimulus situation resulting in higher reported anxiety and judged teaching performance. The above indicates that initially the relationship between activation and performance is linear, then inverse after the optimal arousal point.

It should be carefully noted that a failure to achieve significance with respect to hypotheses two and four is interpretable as being consistent with optimal arousal theory because of the curvilinear relationship between activation and performance. Specifically, it could be said that the stimulus situation was so highly activating that performance decreased.

Definition of Terms

For the purpose of this study the following definitions and explanations are given.

Activation: The release of energy into internal physiological systems in preparation for overt activity.

Anxiety: A feeling of uneasiness which is closely related to activation and goal directed behavior.

Arousal: The bodily correlates to activation, which include muscle tension.

Biofeedback: Self knowledge relating to the momentary state of various physiological subsystems.

Electromyograph: A biofeedback device used to monitor the level of one's muscle tension at a given moment.

Electromyogram: A record of the electrical activity which accompanies muscle tension.

Focused Intervention: A stopping and replaying of the microteaching videotape playback in order to focus attention upon specific behavior.

Microteaching: A miniature teaching lesson given with specific internal and external goals. Commonly videotaped for later playback and analysis.

Limitations

The study was limited by certain parameters listed below:

The subject sample was limited to 64 undergraduate students enrolled in the teacher certification program at the University of Oklahoma. Of these 64 subjects, 48 were

females and 16 were males. The preponderance of female subjects is not considered a severe limitation due to the overrepresentation of females within the teaching profession at this time.

Significance of the Study

In determining the significance of the immediate investigation, it may be fruitful to examine the effects of teacher anxiety upon students and instruction. This specific question should be adequately addressed in order to ascertain the significance of this, or any similar, investigation.

The specific effects of teacher anxiety upon the classroom environment in general, and student behavior in particular, have been generally negative. Koon (1971) found that high anxiety teachers displayed less task oriented behavior with students they expected to be competent than with students they expected to be less competent. Mattson (1974) noted that students tended to rate low anxiety teachers as being more competent in the classroom than high anxiety teachers. A study by Petrusich (1966) produced results which indicated that high anxiety student teachers tended to be more active in the classroom and this has both positive and negative consequences. These student teachers were more likely to be more affectionate in their speech toward students but gave less ongoing verbal support. They also spent more time structuring activities and spent less time chattering but more

time in hostile speech and behavior. From the above, it can be concluded that high anxiety among teachers is not necessarily bad, and bad only when anxiety becomes excessive. However, it is generally clear that measures should be taken to insure that anxiety toward teaching on the part of teachers does not become excessive. It is also clear that measures should be taken to reduce excessive initial teaching anxiety among student teachers. A review of the subject of teacher anxiety by Coates and Thorensen (1976) prompted these authors to advocate the use of relaxation training techniques combined with instruction in specific, observable, teaching skills through microteaching. Peck (1976) has observed that young women who start into practice teaching with a high anxiety level but who actively seek and use feedback end up being judged effective teachers. However, those who are defensive and deny their problems, are judged ineffective by the end of student teaching.

The author believes that both biofeedback and focused intervention in combination will enable student teachers to precisely identify their personal goal discrepancies during microteaching, and provide adequate focusing on the identified microteaching performance problems.

CHAPTER II

REVIEW OF RELATED LITERATURE

Videotape Playback in Microteaching

Videotape playback in microteaching is one application of self confrontation. The act of confronting one's self essentially involves seeing yourself as others see you in a particular situation. Most people find few opportunities to confront themselves and are usually aroused and anxious in such situations (Alkire, 1969; Archer, et al., 1972; Bahnson, 1969; Fuller and Manning, 1972).

Self confrontation entails the examination of behavior which has become "automatic" to the individual. Some behaviors of the individual are compatible with effective teaching, and some are not. Microteaching affords the student teacher the opportunity to examine his or her ability to effectively teach with reference to both internal and external criteria of teaching excellence.

The endorsement of the videotaped microteaching experience by both educators and student teachers may be somewhat undeserved, at least from an empirical standpoint. Many studies have compared the effects of videotape playback vs. other forms of feedback in microteaching. Results of these

studies appear to as often refute the need for videotape playback as confirm it (Allen, 1975; Bierschenk, 1972; Borg, 1969; Gall, et al., 1972; Kelly and Walter, 1971; Ragan, 1970). These results are not surprising when considering the fact that the efficacy of microteaching itself has been seriously questioned with mixed results (Bredange and Tingsell, 1974; Casteel, 1975; Copeland, 1975; Dillon and Peterson, 1971; Perlberg, et al., 1974; Raymond, 1972; Reed, et al., 1970; Shea, 1974; Young and Young, 1969). However, the authors of these studies almost unanimously endorse both microteaching itself, and the videotape playback technique as being highly beneficial teacher training tools. On this point, Fuller and Manning (1972) believe that:

Even when no significant differences are found between playback and control groups, the use of playback may be recommended not only for the population which demonstrated no significant improvement, but for other groups as well . . . Self confrontation seems to capture the imagination of investigators even in the face of contrary evidence (Fuller and Manning, 1972, p. 470).

The conflicting results of microteaching studies seem to indicate there is a problem in obtaining accurate and precise feedback in the identification of goal discrepancies during playback. Perlberg (1968) has identified several important issues in this area and states that:

The modification of teacher behavior in the classroom depends on various determinants such as motivation for change, goals to be achieved by change, adequate feedback of the teacher's present behavior and its relationship

to desired goals The problem of adequate feedback seems to be a key factor to some of the other mentioned determinants (p. 3).

The importance of feedback in guiding a learner toward a goal is obvious, but the relationship between feedback and dissonance may not be. Hoehn (1969) has carefully considered the importance of feedback in microteaching performance, and self analysis of the dissonance between goals and practice. He considers the importance of feedback to be its capacity to produce "conflict or dissonance which in turn is necessary for improvement." Hoehn further states that "few human beings are likely to change in an improved direction unless they see dissonance or conflict between what they are doing and what they think they are doing (Hoehn, 1969, p. 3)."

Klingstedt (1974) compared three modes of feedback in a microteaching experiment. All of the modes used in this comparison were rich in terms of amount and no significant differences were found among them. However, Klingstedt observed that the critical element in the success of the microteaching approach was the "effectiveness of the feedback procedure used (Klingstedt, 1974, p. 12)."

Both Karasar (1970) and Ensey (1971) examined the benefit of videotape feedback in microteaching. Karasar viewed video recordings from the data bank generated by previous studies at Ohio State University to determine the impact of video feedback upon teachers' eye contact mannerisms. He found

that video feedback did not affect this criterion variable. Ensey compared the influence of video feedback upon teaching skill ("pedagogical moves in teaching"). The findings of this second study indicated that video feedback had no significant influence upon teaching skill in the particular setting studied. However, in this second study, the videotape recordings were compared to typewritten transcripts of these same recordings. Gall, et al. (1972) conducted essentially the same study and obtained similar results. These three studies would indicate that videotape feedback may be of little added value in and of itself. Gall did note that the written transcripts were developed directly from videotapes, and as a result, probably had greater realism and interest than if composed by a writer who had created the classroom dialogue.

Focused Feedback

A number of studies concerning the effects of videotape recording or playback have indicated that this mode of feedback can have significant and beneficial influence on performance outcomes. Young (1969) found that supervisor comments were facilitated when combined with "contingent focusing" upon the behavior in question through videotape playback. Perlberg, et al. (1968) found that the videotaping of microteaching lessons increased the amount of feedback potential for the learner. Dillon and Peterson (1971) compared videotape feedback with more limited forms of

feedback and found that "videotape has an influence on improving student teacher relationships in the classroom (p. 65)." Alkire (1969) reviewed the use of videotape playback in the fields of education and mental health, and found that videotape playback was a valuable asset in providing large quantities of valuable information to subjects across studies that were reviewed. Geertsma and Reivich (1965) in a psychotherapeutic situation, found videotape playback to be a "powerful stimulus" of great value in provoking "strong affect" on the part of the subject. Finally, Olivero (1966) found that video plus verbal feedback produced more changes in behavior than verbal feedback alone.

Focused feedback appears to increase the effectiveness of microteaching and other forms of self confrontation. Fuller and Manning (1973) stress the importance of focusing and note that self confrontation studies which observe behavioral changes in "desired directions" seem to include components in addition to video playback, "particularly goal setting or focus (p. 480)." A reasonable rationale for focusing is presented by Stoller (1968). He believes that videotape playback furnishes the subject too much information and without some plan for selectively attending to the material, the subject will be overwhelmed. A review of several studies indicates that feedback that is not accompanied by some form of focusing results in little behavior change, if at all (Geertsma and Reivich, 1965; Karasar, 1970; Ragan, 1970; Staines, 1969; Stoller, 1968; Young, 1968).

The absence of instructions to focus upon teaching behavior will usually result in the naive subject immediately and completely becoming emersed in self or body focus. Bahnson (1969) observed this among both adult and child hemophilic subjects. The preoccupation with the voice and body is one of the more predictable aspects of self confrontation. Young's (1969) experiment concerning contingent focusing resulted in this technique being recognized as the most advantageous procedure. This study directly compared contingent focusing to noncontingent focusing. Perlberg (1974) used an elaborate focusing scheme when he compared micro-teaching alone with microteaching plus a category observation system as a training method. Results indicated that the focusing system significantly improved teaching performance.

If subjects are not helped to focus upon important aspects of behavior, they focus upon themselves (Fuller and Manning, 1973). Typical comments detail how subjects were surprised by how they looked and sounded on videotape. Extreme comments proceed along the lines of "I was horrified the first time I saw myself on videotape (Teaching Teachers, 1969, p. 30)." Such comments are not rare.

Aside from the general rationale previously given for behavioral focusing, another very good reason for focusing involves the presence of dissonant feedback. Dissonant feedback is defined as being feedback which makes it obvious to the subject that his or her performance level is different from the desired goal performance level. It is possible that

low dissonance feedback rewards existing behavior so that behavior does not change (Fuller and Manning, 1973). When there is focus, reinforcement of the focus may operate to select certain behaviors for repetition and analysis, whereas others drop out. After this, behavior does change. Focusing specifies what is wanted, and what will be rewarded, and guides the subject to the direction he or she should take in order to obtain the reward. The act of focusing thus disrupts our propensity to shut out discrepant feedback in order to maintain our present self concept. The self concept resists change because we all adjust to it, even if it is negative. By doing this, the equilibrium of the present self concept is maintained (McCandless, 1970).

The helping person or supervisor that is mediating the microteaching experience should concentrate the focusing upon behaviors that are amenable to change in that setting (Fuller and Manning, 1973). The main area to be focused upon should be teaching behaviors that are considered to be consistent with effective teaching. Typically, some instrument is used to help assess teaching performance in an objective fashion. Other minor behavioral aspects of the student teacher's lesson should be dealt with, but things such as nervous ticks should not be dealt with unless the helping person is competent in this area. It is both inefficient and cruel to attempt to deal with rather severe nervous mannerisms in the typical microteaching setting.

Focusing emphasis should be placed upon moderately dissonant or discrepant feedback by a person who is very familiar with the videotape being examined (Fuller and Manning, 1973). These authors believe that the helper or supervisor should be present during the actual taping so that the many subtle variances encountered are common knowledge to all concerned. Many minor occurrences can have real impact on the final product and the helper should have first hand knowledge of these seemingly insignificant events. The matter of depth of focus should be carefully considered because of the potential for harm in this area. Deep focus would involve the examination of very personal or sensitive behavior, while light or superficial focusing examines trivial behaviors. Deep focus can often cause a great deal of activation, arousal, and anxiety. If the helper probes too deeply, the subject may react by withdrawing. Highly discrepant feedback from focusing should be dealt with in a delicate manner, and along the lines of behavioral shaping (Rimm and Masters, 1974). Superficial focusing adds little to the situation. Moderate levels of focus and interpretation seem to be the most effective (Hoehn, 1969; Stoller, 1968).

Personality Factors in Microteaching

Several research efforts have dealt with the subject of personality correlates to microteaching outcomes, and the level of ego involvement has emerged as a primary consideration in this area. Davis (1971) identified some personality

correlates of situational anxiety in student teachers in microteaching. She found that self esteem as a microteacher and the distance from and drive toward one's goal of being a successful microteacher were significantly correlated to situational anxiety on two independent measures of anxiety. Level of uncertainty with regard to goal attainment was correlated with one of the measures. Men reported lower levels of anxiety on both measures. Austad and Emmer (1970) determined that none of the ten personality variables examined in their study was related to microteaching performance. A similar study by Chavers (1971) obtained consistent results. Fuller and Manning (1973) have observed that attempts to relate personality characteristics to microteaching performance have "not been fruitful (p. 484)." However, it appears that some aspects of the personality have surfaced as being important to microteaching performance. The subject variables of attitudes about the self, anxiety, body image, and capacity to change appear to be important (Fuller and Manning, 1973).

Subjects with a low self concept appear to lack the capacity to detect sufficient dissonance between anticipated and actual performance to facilitate significant behavioral change. These people apparently are unable to afford the psychological luxury of indulging in self criticism. This is unfortunate because without this capacity, change is unlikely. Winter, Griffith and Kolb (1968) found that subjects who were successful in attaining self directed

behavior change goals were more able to recognize that there was a discrepancy between performance and goal than unsuccessful subjects. Thus, the ability to see dissonance may proceed from the condition of self concept. Solomon and McDonald (1970) interviewed each of their subjects after microteaching but before playback in order to measure the degree of satisfaction felt by each subject. They then compared these findings to subject satisfaction after playback and found that final satisfaction was largely determined by the subject's predispositions. Those who rated themselves high before viewing tended to rate themselves as being professionally competent after viewing. However, those who rated themselves low initially tended to "devalue the institution of teacher education, to maintain their self perception." These negative subjects also tended to "notice mainly physical cues", while teachers who were more positive about their performance "attended mainly to cues related to teaching behavior (p. 280)."

Response Habituation

The problem of the subject focusing upon nonteaching aspects of microteaching, primarily body focusing, decreases over a series of microteaching experiences (Fuller and Manning, 1973). It would appear that focusing upon teaching behavior is not really a problem, but when one considers the resources that must be expended for one ten minute microteaching lesson, it becomes apparent that few teacher education institutions can afford to allow each

student to teach a lengthy series of lessons. The reasonable alternative may be to maximize the positive behavioral effects of the single exposure microteaching experience. The most adequate explanation for the natural attenuation of body focusing appears to be with the phenomenon of response habituation (Weinberger and Lindsley, 1964).

Thompson and Spencer (1966) have reviewed response habituation and have formulated three general principles of habituation which have some bearing on the subject at hand. Thompson and Spencer offer a definition in the form of: "Given that [a] particular stimulus elicits a response, repeated applications of the stimulus result in decreased response (habituation) (p. 18)." The first principle with relative importance is that, "the more rapid the frequency of stimulation, the more rapid and/or more pronounced is habituation (p. 18)." It is thus reasonable to assume that with each successive microteaching experience there is a decreasing of all associated responses, including situational anxiety. However, another principle of habituation indicates that "The weaker the stimulus, the more rapid and/or more pronounced is habituation. Strong stimuli may yield no significant habituation (p. 19)." This principle would indicate that student teachers who perceive the microteaching situation as particularly threatening, may never experience a decline in situational anxiety without some form of desensitization. These subjects may be so self involved

that task oriented behaviors are not possible without some provision for deactivation. Finally, the last principle to be reviewed involves response generalization and says that "Habituation of response to a given stimulus exhibits stimulus generalization to other stimuli (p. 19)." This being the case, if habituation of the situational anxiety response could be accomplished, this positive feeling could generalize to other aspects of student teacher teaching behavior not directly being considered by the microteaching supervisor. A key step here might be the addition of a device which would facilitate the habituation of the anxiety response. Some form of biofeedback could help accomplish this goal.

Feedback and Behavior Change

There is some reason to believe that less competent subjects benefit more from combinations of feedback modes. Taylor (1971) found in a motor skills situation that the least skilled group needed both verbal and video playback, while those who were moderately skilled did better with verbal feedback whether or not they had video feedback. Finally, the most skilled did as well with either form of feedback. It seems reasonable to believe that those who expect to succeed are able to focus their attention on task relevant responses and will need less feedback.

The effects of modeling on subject performance is a well researched area that indicates that modeling does facilitate performance in a wide range of activities (Bandura, 1965;

Bandura and Kupers, 1964; Bandura and Menlove, 1968; Bandura and Perloff, 1967; Bandura, et al., 1963; Bandura and Whalen, 1966).

Carus (1969) found that subjects experienced greater physiological activation (GSR) and were more able to fix their attention when observing themselves on videotape. These same results occurred when subjects heard, but did not consciously recognize their own voices. This would indicate that subjects are more interested in seeing and hearing themselves on videotape than other individuals (Fuller and Manning, 1973). Hosford (1972; 1974) has used this finding to help justify a modeling procedure that utilizes the "Self-As-A-Model (Hosford, 1972)." Hosford's reasoning is this: Behavioral learning is facilitated by viewing the self, so as a consequence, the self-as-a-model approach maximizes the chances for behavioral change. It is implicit here that behavior shaping will probably be needed (Kazdin, 1975). The changing of behavioral patterns is difficult because many behaviors are "automatic", meaning not under conscious control or spontaneous (Holzman, 1969). In order to change such automatic behavior, it must first be disrupted. The microteaching experience accomplishes this by forcing the subject to focus his or her attention on specific behaviors to be changed. This process is called "deautomatization (Fuller and Manning, 1973)." Deautomatization momentarily disrupts "one's view of one's self and hence stimulates recall, broadens associational realms about one's self and

also provokes a defensive stance. It is not surprising, therefore, that many people are astonished, shocked, and even frightened by the self confrontation experience (Holzman, 1969, pp. 207-208)." Fuller and Manning (1973) observe that "perhaps changes in entrenched spontaneous behaviors do not persist over time unless deautomatization takes place (p. 483)." Many aspects of the individual's personal behavior, such as expression of purposes and attitudes, will not be disrupted or changed simply because they are not precisely specifiable, however, voluntary specifiable behavior is changed through deautomatization.

Activation, Arousal, and Anxiety

Perhaps the most persistent specific comment about videotaped self confrontation concerns the high arousal facet of the experience. Seeing one's self on film or videotape is reported to be almost uniformly activating, with the accompanying affects of arousal and anxiety (Bahnsen, 1969; Geertsma and Reivich, 1965; Kagan, 1972; and Solomon and McDonald, 1970). The three terms: activation, arousal, and anxiety are often used interchangeably, but there are important distinctions to be made among them.

Activation is generally held to be a predictable neurological phenomenon which is closely related to the stimulus situation in which a person finds himself. The Reticular Activation System (RAS) is believed to be the initiator of activation, and ultimately providing the potential for goal directed behavior related to the stimulus situation. The RAS

itself is an activating system existing in the core of the brain stem. The RAS is actually a subsystem of a supersystem called the spinothalamic system. As the axons of the spinothalamic system travel through the brain stem toward the thalamus, they give off collateral fibers which connect to the RAS. These collateral fibers are able to activate the RAS which in turn activates large areas of the cerebral cortex. It is believed that "much of the arousal value of all different kinds of sensory stimulation, therefore, come from the ability to interact with and activate the RAS (Issacson, et al., 1971)." Activation, then refers to the potential to effect a behavior, not overt behavior itself. Duffy gives an excellent definition in that:

Activation refers not to the overt activity of the organism but to the release of energy into various internal physiological systems, in preparation for overt activity. The overt activity need never occur; if it does, activation is its constant accompaniment and sustainer Since situations vary, the patterning of activation must necessarily vary to adjust to the particular conditions of the moment (Duffy, 1972, p. 588).

The distinction between activation and arousal is a subtle one, and probably open to debate because of prior usage. However, a distinction is possible, and has been made. Fiske and Maddi believe that the term arousal refers to " . . . the somatic correlates of activation, to its effects on the circulatory system, the muscular system, etc. These effects in turn produce stimulation with impact that sustains activation (Fiske and Maddi, 1961)." From the above, it

seems safe to say that arousal is a bodily manifestation of activation, with all of its necessary accompaniments.

Anxiety may be an even more nebulous term than arousal. Grossly defined, anxiety appears to be the cognition that closely follows activation. Anxiety is generally held to be closely related to goal discrepancy during goal directed behavior. If an organism is frustrated in its attempts to reach a goal, anxiety is likely to ensue. Duffy believes that anxiety is associated with " . . . a high degree of activation with overt or symbolic responses directed away from something, whether it be an undesirable event or barriers to the occurrence of a desirable event (Duffy, p. 612)." Heilizer and Cutter (1971) present evidence of the momentary convergence between the concepts of anxiety and nonphysiological arousal.

Regardless of the problem being explored, film or videotape feedback can be a stressful, anxiety producing experience. It is interesting to note that only one study reports a decrease in anxiety as a result of videotape playback. However, the authors of this study defined anxiety only as being manifested in "nonfluencies in speech (Breen and Diehl, 1970)." The intense focusing upon the self, seeing yourself as others see you, appears to be a very predictable outcome of self confrontation experience.

Effects of Activation Upon Performance

The effects of activation, arousal, and anxiety upon performance in various situations is a well researched area

of study. Some of the more important aspects of activation and performance include the contributing effects of:

(1) feedback, (2) locus of control of feedback, (3) achievement motivation, (4) degree of ego involvement, (5) task and stress relatedness, and (6) response specificity.

Feedback. The facilitating effects of feedback upon performance have been touched upon but the effects of feedback upon subject anxiety level have not. The available research indicates that both positive and negative feedback can facilitate performance, although negative feedback does not consistently improve performance and rarely lowers subject anxiety level as it relates to task performance. Hollingsworth (1975) found that as performance level increased, anxiety state (A-state) level tended to decrease in a motor task situation. Snyder and Katahn (1970) found that positive feedback was associated with better performance and positive feeling while negative feedback was associated with poorer performance and negative affect. Additionally, higher anxiety was associated with poorer performance. A study by Acheson (1964) determined that videotape feedback improved teaching performance as did the addition of "conferences". The findings of O'Neil (1972) indicate that negative feedback initially increased state anxiety (A-state) among high trait anxiety (A-trait) subjects in a high stress task condition but this level gradually decreased and eventually equaled that of similar subjects in a low stress task condition. O'Neil interpreted his findings as an indication that the

stress (negative feedback) condition was more threatening to A-state subjects because of a presumed threat to the subject's self esteem. Surprisingly, he found that high A-trait subjects showed more adaptability to anxiety than low A-trait subjects. Freemont (1970) explored the effects performance feedback had upon the anxiety level of both introverts and extroverts. He found that: negative feedback produced significantly greater mean anxiety than either positive or no feedback; introverts had a higher anxiety level than extroverts; introverts given negative feedback had higher anxiety scores than extroverts given identical feedback; and there was no difference between the anxiety levels of extroverts and introverts under positive and no feedback conditions. A study that compared the effects of relaxation treatments (both biofeedback and verbal relaxation training) and focused attention produced findings that indicated that the focused attention and biofeedback (heart rate signaling device) were equally efficacious in producing more heart rate reduction than the verbal relaxation treatment (Barrick, 1973). Finally, studies by Lerner (1972) and Klingstedt (1970) indicated that the feedback mode utilized to reduce subject anxiety made no difference.

Locus of Control and Feedback. An associated area of particular interest concerns the locus of control of feedback and its effects upon subject performance and anxiety within microteaching and other similar situations. Generally, available research indicates that subject controlled feedback

decreases anxiety and facilitates performance. Hansen (1974) found that "learner controlled feedback subjects decreased more in A-state than did [externally controlled] feedback subjects (p. 247)." Also, high A-state subjects made more errors (CAI task) under a feedback condition than under a no feedback condition. Subjects within the no feedback condition maintained a high level of A-state throughout the task, while the externally controlled feedback group did manage a decrease ($p < .01$), but not as much as the learner controlled feedback group ($p < .01$). Hansen concluded that learner controlled feedback "seems to offer definite advantages both in terms of anxiety reduction and performance (p. 253)." Allen, et al (1974) reports similar findings in that, internal locus of control subjects performed better and reported less state anxiety. In addition, a stepwise linear regression analysis was performed on the data which resulted in the finding that, "locus of control accounted for the greatest amount of variance, and GPA was the only other variable (among six) which significantly augmented predictive accuracy by raising R from .46 to .57 (p. 973)." Finally, Houston (1972) indicates that an external locus of control increased anxiety and reduced performance but, contrary to prediction, resulted in less physiological arousal (heart rate) than an internal locus of control. It appears that an internal locus of control of feedback improves performance and results in less reported anxiety.

Achievement Motivation. Achievement motivation, anxiety, and performance appear to possess common inter-relationships. Kestenbaum and Weiner (1970) found that for both male and female subjects, performance (reading) was positively related to achievement motivation and negatively related to test anxiety. Weiner (1970) had previously demonstrated that individuals high in achievement motivation and low in anxiety voluntarily approach achievement related activities and tend to persist in the face of failure. Kestenbaum and Weiner speculate that over time these individuals might be expected to develop better skills and a higher level of competence than subjects who possess the opposite characteristics (1970). Andy Kukla (1974) believes that "resultant achievement motivation" is the result of achievement need minus anxiety (p. 374). Kukla used this construct in formulating an attributional theory of performance based upon the idea of "perceived ability" on the part of the learner. Kukla has found that high and low resultant achievers tend to perform a task at a level consistent with the individually perceived difficulty of the task. When a task is perceived to be easy, high resultant achievers, who believe their ability to be relatively high, will decide that little effort is needed to succeed. Low resultant achievers, though, having a lower estimation of their "ability" (resultant motivation) will expect that a much larger amount of effort is necessary for success. If the average abilities of these groups are, in fact, equal, the

result will be that the low resultant achieving group will perform better than the high resultant group in the more simple task situation. When, however, the task is perceived to be more difficult, high resultant achievers will expend a substantial amount of effort in order to achieve success, whereas the low resultant achievers will conclude that success is beyond their capacity and will not bother to try very hard. If the actual ability is equal for the two groups, the high motive group will perform better than the low motive group. In sum, Kukla's theory predicts that high resultant achievers will do better than low resultant achievers when the task is perceived to be difficult, but worse when the task is perceived as easy (Kukla, 1972). Empirical evidence of this relationship has been presented (Kukla, 1974). Stennett (1957) has presented evidence that would suggest that the level of electromyographic activity (muscle tension) is a function of the incentive level of the subject while performing a task.

Ego Involvement. It has been suggested that two gross categories of personality orientation are involved in the microteaching experience. The first type of student teacher may be described as being open to suggestions and, in fact, seeking help to improve teaching competence. This type of person is psychologically secure enough to solicit advice concerning teaching behavior improvement. The second type of person is not task oriented, but rather ego oriented. This latter type is not open to suggestions for change. He tries

only to maintain his psychological equilibrium by closing out any suggestion of his inability to accomplish either an external or internal goal (Fuller and Manning, 1973).

The degree of the subject's ego involvement in a self confrontation situation can affect both performance and anxiety levels. Several investigations into the effects of ego involving instructions upon subject anxiety and performance have apparently succeeded in establishing the influence of ego involvement in an experimental situation. Meyers and Martin (1974) found that high ego involving instructions increased A-state and decreased task performance. Only the successful completion of the task resulted in a lowering of anxiety. Low ego involving instructions "consistently eliminated the effects of task on state anxiety (p. 34)." Results of a study by Tobias, et al (1974) produced similar results. Sarason (1974) found that achievement oriented instructions produced less A-state and better performance among low test anxious subjects as compared to neutral instructions. Sarason (1972) had previously established that high test anxious persons are deleteriously affected by personal evaluative threats such as those posed by achievement orienting conditions. In the absence of these threats, their performance levels improved significantly. All of the above cited authors, including Wine (1971) interpret performance decrements in relation to attentional blocks which result from the subject dividing his performance time between both task relevant and ego relevant stimuli. This matter will be dealt with in depth later.

Because of this tendency to be less threatened through ego involvement, the open person is rather easy to help and may actually provide a continuing impetus for change in the self confrontation situation, while the closed person will do little to facilitate such change. This open person will likely benefit from the microteaching experience by gladly identifying his discrepancies and seeking help, if needed, to eliminate them. This is not the case with the closed person. He is likely to suppress discrepant feedback and shun outside attempts to help him improve his potential performance. The key to helping this closed person may lie in the objective, precise, and obvious identification of the goal discrepancies of this closed person. A paramount question is, how to accomplish this goal discrepancy identification? A possible solution to this problem may reside in the fact that a goal discrepancy is generally believed to be activating and closely followed by arousal and anxiety.

While activation and anxiety are intervening variables and not amenable to direct measurement, arousal is not. Arousal, manifested by muscle tension, among other indexes, is directly measurable through the use of the electromyograph. This being the case, it would be possible to detect goal discrepancies in the closed person, through the use of such a machine. This involuntary contribution of information concerning goal discrepancies would place both the open and closed person on near equal footing in the video playback

situation. This general procedure was used by Archer to help detect goal discrepancies in a behavior therapy situation with positive results (Archer, et al., 1971).

Through the addition of some form of biofeedback, such as the electromyograph, to the traditional microteaching situation, it may be possible for student teachers to accomplish two important goals. These goals are " . . . changing entrenched behaviors and putting the change process into the hands of the learners themselves (Fuller and Manning, 1973, p. 508)."

Stress Relatedness. The source of stress felt by a person can affect the level of perceived anxiety. Experiments which have sought to increase arousal and measure the effects of stress on muscle tension have commonly used one of the following sources of stress: induced muscle tension by squeezing and dynamometer; psychological stress through ego involving instructions and failure experience; and environmental stressors such as noxious stimuli (Martens and Landers, 1970). The results of these studies have been somewhat variable, but generally have produced consistent findings with respect to activation and performance. One study that sought to compare the affects of "task related and task unrelated" stress found that low task related stress produced fewer performance errors. It is especially interesting to note that low task related stress was superior to a no stress condition in terms of performance (Jacobs and Kirk, 1969). Munz, et al. (1971) report very similar but

nonsignificant results; however, they did reach significance in finding that negative feelings or affect is associated with task unrelated stress. Jacobs and Kirk interpreted their results as an indication of a "protective-adaptive" response by subjects and, "This mechanism assumes that the organism is protected by adaptive responses in those situations where performance changes serve to avoid or alleviate the effects of the stressor If subjects viewed the stressor as task unrelated, no change or possibly a decrement in performance could occur since avoidance of the stressor serves no adaptive purpose, and its presence may actually be distracting (p. 820)." It follows that if subjects viewed the stressor as task related, better performance and lower arousal would be expected since this performance increment serves to avoid or alleviate the stress condition. The "protective-adaptive stress response" concept may begin to explain why the precise identification and resolution of goal discrepancies results in lowered arousal and anxiety. There may be some overlap between the concepts of "protective-adaptive stress response" and habituation. Houston (1971) found that the affects of "defensiveness" (verbal denial of anxiety and anxiety reducing maneuvers) upon performance could be controlled by adjusting Manifest Anxiety Scale scores with MMPI Denial Scale scores. In a nonstress condition, adjusting MAS scores improved the correlation with the WAIS digits - backward performance from $-.14$ to $-.39$.

Response Specificity. A common criticism of activation research concerns the low inter-individual correlation coefficients that typically arise when the physiological responses of a group, to a common stimulus, are compared at the exact same instant. Duffy (1957), Malmo (1959) and Schnore (1959) insist that individual response specificity (IRS) is better measured by looking at intra-individual correlation coefficients, which are much higher. Engel (1972) has examined the area of response specificity and has determined that there are actually two categories of this phenomenon. He notes that, " . . . stimulus (SR) specificity refers to the tendency that a stimulus or situation has to evoke characteristic responses from most subjects. Individual (IR) specificity refers to the tendency that an individual has to emit characteristic responses to most stimuli (p. 572)." The essential point to be made is that some stimuli are generally activating but the exact nature of the response of the individual subject is highly idiosyncratic. In a classic study, Lacey (1949) found that when comparing ranked profiles of somatic reactions to stress, two general kinds of differences among individuals were apparent. One form of patterning on one physiological measure of reactivity may show a greater degree of discrimination between two individuals than another measure, although the direction of discrimination between two individuals is the same. In the second form of patterning, "actual reversals occur in the direction of discrimination between two subjects (p. 341)." It is apparent

then, that individuals exhibit characteristic and persistent patterns of somatic response to stress.

Theoretical Framework

In attempting to explain a phenomenon related to activation and arousal, it is consistent to examine theories relating to both of these subjects. Lindsley's Activation Theory provides a theoretical guide with which to view the present study (Duffy, 1972; Goldstein, 1972; Lindsley, 1951; Malmo, 1959). Briefly stated, the activation theory states that:

The more intense, unexpected, and persistent the external stimulation, the greater is the bodily tension roused reflexly through lower levels of the spinal cord and brain stem. But these afferent impulses are not necessarily limited to reflex adjustments via spinal or lower brain stem levels; some of them undoubtedly relay upward to successively higher levels. It is believed that both visceral and somatic afferent impulses feed into the reticular formulation of the lower brain stem (Lindsley, 1951, p. 507).

Lindsley's theory thus relates the stimulus situation to activation but it does not directly suggest the well-demonstrated inverted-U relationship between activation and performance (Courts, 1942; Duffy, 1932, 1972; Goldstein, 1972; Malmo, 1959). This relationship being that activation increases performance to a point including low and moderate activation, but decreasing performance under high activation.

Another theory that more directly predicts not only the relationship between the stimulus situation and activation and arousal, but also between arousal and performance, is the Optimal Arousal Theory of Fiske and Maddi (1961).

Optimal arousal theory relates not only the stimulus situation to activation, but also activation to performance. Briefly, the portion of this theory that relates to the present study proceeds as follows:

The significance for performance of the [inverted] U shaped relationship mentioned above is as follows: at low levels of activation, the organism may be inattentive, easily distracted, and not concentrating fully on the task. At somewhat higher levels, the organism is alert and attentive; it mobilizes its resources and is oriented toward coping with the situation. It performs to the best of its abilities. Still higher levels of activation are associated with excessive tension or hyperactivity. Anxiety and other strong emotional states appear and behavior is less efficient (Fiske and Maddi, 1961, p. 32).

The relationship between activation and performance is thus predicted by Optimal Arousal Theory. Fiske and Maddi believe that when the stimulus situation varies in terms of total impact, performance is affected. Impact is defined as being the " . . . intensity, meaningfulness, and variation" of the stimulus situation (Fiske and Maddi, 1961, p. 14). Malmo has interpreted the "activation concept" to form the following experimental paradigm (Malmo, 1959, p. 376):

Activation Level:	Low	Moderate	High
Expected Performance Level:	Low	Optimal	Low

It should be kept in mind that a key assumption in arousal theory is that moderate levels of arousal are more reinforcing than either high or low levels. Additionally, positive

affect is associated with an optimal stimulation level and a return to the individual optimal level during the sleep-restfulness cycle (Fiske and Maddi, 1961; Hill, 1971).

One additional point needs to be made concerning the relationship between the three sources of stimulation impact: intensity, variation, and meaningfulness. Total impact is seen to have an additive function to the "contextual and inherent properties of stimulation from all three sources at a point in time. There is a possibility, however, that impact from one source may make a larger relative contribution when impact from another source declines (p. 28)." Fiske and Maddi then cite an example in which an exteroceptive stimulus is terminated only to be immediately replaced by an interoceptive or cerebral stimulus resulting in the same net level of activation.

The Inverted-U Hypothesis

The empirical evidence substantiating the inverted-U relationship between activation and performance is considerable and has accumulated over the past thirty-five years. Yerkes and Dodson (1908) were among the first to suggest that the relationship between quality of performance and arousal is nonmonotonic. Courts (1942), Duffy (1957, 1959, 1972), and Malmö (1959) have each proposed an inverted-U hypothesis to explain the relationship between arousal and performance. Once again, the inverted-U hypothesis simply states that increases in arousal are associated with concomitant increases in the quality of performance to a certain idiosyncratic point,

after which any additional increases in arousal level result in decreasing quality of performance. The level of arousal which stimulates optimal performance, for a given task, apparently lies somewhere near the middle of the arousal continuum.

A number of studies have been able to establish that activation does affect performance but have not been able to establish the existence of the inverted-U relationship. Tennyson and Woolley (1971) and Firetlo and Davey (1971) both established that the level of reported anxiety does affect task performance with a disordinal relationship existing between the two variables. Reports by Farber and Spence (1953), Moon and Lair (1970), Walker, et al.(1970), Olmedo and Kirk (1971), and Coren and Schulman (1971), all present similar results, in that a performance decrement was noticed with increases in activation level. Several investigations have established that measures taken to decrease existing activation levels do increase performance, and these studies include Smith, et al.(1971), Leeb (1973), and Straughn and Dufort (1969).

Specific experimental evidence has been offered to substantiate the existence of the inverted-U relationship between activation, arousal, or anxiety, and performance. Studies by Cantey and Phelan (1970), Evertson (1974), Hokanson and Burgess (1964), Jacobs and Kirk (1969), Jones and Tallarico (1971), Martens and Landers (1970), O'Neil (1972), Sarason (1975), Snyder and Katahn (1970), Stennett

(1957), and Sweeney, et al.(1970), all specifically establish the existence of the inverted-U relationship in varied experimental situations. Investigations have also refuted the existence of this relationship, but one such study by Sherwood (1965), used the number of "figure reversals" per unit of time in paired associate learning as the index of arousal. This is a non-physiological index of a physiological phenomenon. Sherwood also reported that short term recall was facilitated by a high arousal level which is contrary to the findings of Kleinsmith and Kaplan (1963), Lavach (1973), and Yoes (1976), among others. However, other, more rigid studies have also refuted the inverted-U hypothesis and include Boutwell (1972), Chambers and Hopkins (1972), and Sachs and May (1969).

Optimal Arousal and Performance

Additional experimental evidence supports the existence of the inverted-U hypothesis and strongly suggests the existence of an individual optimum level of arousal during task performance. Investigation by Berlyne, et al.(1963), Jacobs and Kirk (1969), Sarason (1975), and Saleh (1971), all support the concept of optimal arousal, as does the argument presented by Leuba (1955).

A number of explanations for the high arousal performance decrement have been proposed, but perhaps the one that has received the most attention is the cue dysfunction explanation of Hebb (1955). In attempting to explain the high arousal performance decrement, Hebb has said that:

the greater [cortical] bombardment [from the RAS] may interfere with the delicate adjustments involved in cue function, perhaps by facilitating irrelevant responses (a high D arouses conflicting sH_R 's) (Hebb, 1955, p. 250).

In responding to Hebb's suggestion, Malmo says that:

It seems reasonable to suppose that as diffuse [cortical] bombardment from the RAS greatly exceeds an amount that is optimal for some simple psychological function being mediated by a particular cell assembly, the operation of that cell assembly will be impaired, and that the performance being mediated by it will suffer accordingly (Malmo, 1959, p. 369).

This particular explanation is somewhat incomplete in that it does not indicate what triggering mechanism is responsible for this end result. Studies and interpretations by Carlson, et al (1969), Meyers and Martin (1974), Munz, et al. (1971), Sarason (1975), Tobias, et al. (1974), and Wine (1971), indicate that many highly aroused subjects divide their allotted task performance time making both task relevant and task irrelevant (but ego relevant) responses and thus miss out on a lot of cue based feedback. These authors are in general agreement that this situation arises due to a perceived evaluative threat on the part of the subject. Thus, we have a chain of events that roughly goes as follows:

- (1) A perceived evaluative threat on the part of the subject,
- (2) over-activation by the RAS, (3) a dividing of time between task relevant and task irrelevant cues and responses, (4) a loss of task relevant information, and (5) a performance decrement, as compared to subjects who attend only to task

relevant cues and/or do not feel the evaluative threat. Thus, we have the evaluative threat facilitating two adverse conditions. First, the threat itself stimulates over activation which results in cue dysfunction. Second, the threat causes the subject to divide his attention between task relevant and task irrelevant feedback. At this point, it would be proper to inquire as to the cause or causes of this fear of evaluation. Probably the most obvious answer to this question centers around the self perceived competency level of the individual subject in a specific situation. It appears reasonable to assume that subjects who perceive themselves as being competent in a particular area of endeavor will be less threatened by evaluation in that specific subject area. It also follows that if a person is unsure of himself, he will fear evaluation and failure, and subsequently waste time worrying about failing and in the process fail because of real or presumed incompetence. In the realm of teacher education and when improved teaching performance is a question, a key to the remediation of the evaluative threat problem may lie with a competency based teacher education program. This point will be discussed later.

CHAPTER III

METHODOLOGY

This chapter outlines the population and sample, instrumentation, research design and experimental procedure.

Population and Sample

The population from which the sample was drawn for this study consisted of undergraduates enrolled in the Teacher Certification Program at the University of Oklahoma.

All subjects were members of two sections of a senior level teacher education course, Education 4160, "Media and Technology in Teaching." The sample included 48 females and 16 males. Subjects ranged in age from 20 to 38 years, with the mean age being 22 years. All subjects were randomly assigned to groups and all groups were randomly assigned to experimental conditions. Randomization was accomplished through the use of a table of random numbers (Downey and Heath, 1971). Each of the four cells of the 2 X 2 factorial experimental design contained 16 subjects. All data were collected during the Spring Semester of 1976 at the University of Oklahoma, College of Education, Norman, Oklahoma.

Procedure and Materials

The general procedure prior to any treatment was this: First, all subjects were instructed to model their teaching

behavior after the behavior described on the Stanford Teacher Competence Appraisal Guide (STCAG) during their microteaching. Each subject was furnished a copy of this instrument and participated in a one hour discussion of the instrument four weeks prior to the first taping. After the subject was taped giving his microteaching lesson for the first time, he viewed this tape twice and received one of four treatments during the second playback to be described later. At this point, the subject was taped again and this second tape became the lesson that was analyzed and rated by a panel of three judges (all experienced teachers) using the STCAG. After this second taping, he was allowed to see his performance. He was then asked to complete four instruments: (1) The STCAG (Appendix A), (2) Form I of the Teaching Anxiety Scale (TCHAS) (Parsons, 1970) (Appendix B), (3) The Anxiety Self Report (Parsons, 1970) (Appendix C), and (4) One month after the final taping, Form II of the TCHAS (Appendix D). These activities were present in all cases regardless of the experimental condition of the particular subject. In all cases, the tape was played back twice after the first taping and once after the second taping.

The first factor, biofeedback, consisted of the subject being connected to an Autogenic Systems Model 1500b Electromyograph. The subject had three electrodes from the machine attached to the extensor muscle of his right forearm. This muscle is considered to be an excellent point to sample the muscle tension of a subject during stressful conditions.

Test-retest reliability coefficients range from .70 to .95 for this particular muscle area during stress (Goldstein, 1972, p. 339). The two levels of this first factor were that the biofeedback was either present or not present.

The second factor under investigation was focused intervention during playback. This basically meant that the tape was stopped during a playback in order that attention could be focused upon a particular teaching behavior that was exhibited by the subject. In the first level of this factor, the subject himself had to initiate the focused intervention. The second level situation was one in which either the subject himself or the helping person in attendance (the author) was able to stop the tape to engage in focused intervention.

The reasoning behind the selection of these two factors both proceed from the belief that precise goal discrepancy identification is essential to a successful microteaching experience. This general process has been suggested by Fuller and Manning (1973) in that they believe that the " . . . development of felicitous combinations of feedback modes: perhaps in vivo video playback and physiological feedback for initial arousal and [goal] discrepancy identification" would greatly compliment the situation when coupled with focused intervention (p. 509). Thus, the biofeedback indicates to the subject (and the observing helper) when the subject has become aroused, probably due to a goal discrepancy or some other negative aspect of his teaching performance,

and also when focused intervention is needed to analyze and remediate the problem area in the microlesson.

Treatment

Subjects contained in Cell #1 received biofeedback but had to rely upon self initiated focused intervention. Subjects in Cell #2 received no biofeedback and again had to initiate the focused intervention themselves. The situation in Cell #3 was one in which the biofeedback was present and the focused intervention could be initiated by either the subject or the helping person. Cell #4 received no biofeedback but the focused intervention was either self or helper initiated. As previously stated, the rationale was that the biofeedback enabled the subject to precisely identify those aspects of his lesson which did not meet his lesson goals. Subjects were also informed that arousal could indicate a positive goal discrepancy. With this previously unobtainable information available to both himself and the monitoring helper, focused intervention should have taken place. However, if the person was closed to discrepant feedback, he may have chosen to disregard this information and not stop the tape if he was the one who had to initiate the focused intervention. But, feedback was never disregarded when the helper was present. In this case, the helper stopped the tape and inquired about a possible goal discrepancy. It should be noted that goal discrepant arousal was defined for this study as being equal to an arousal level three times that of the subject's individual baseline of EMG scale activity prior to watching the microlesson playback. Along

these same lines, anxiety was that which was reported by the subject on the two anxiety instruments previously mentioned.

The data collected in this experiment related to eight criterion variables: (1) Teaching competence as measured by the STCAG filled out by the judges, (2) an index of competence realism as measured by the difference between the STCAG, completed by the subject, and the STCAG completed by the judges, (3) Form I of the TCHAS completed by the subject, (4) each of the four rating scales completed by the subject on the Anxiety Self Report (two relate to teaching anxiety and two relate to general anxiety, and (5) Form II of the TCHAS completed thirty days after the microteaching experience. This last criterion was included to look at the delayed or long term effects of the treatments in terms of residual teaching anxiety (Campbell and Stanley, 1963).

Research Design

The two factors that were investigated in this study were: (1) biofeedback, and (2) focused intervention. The two levels of each of these dependent variables were: (1) biofeedback (EMG) being either present or not present, and (2) focused intervention being either self-initiated only, or helper or self initiated.

The influence of the manipulation of the two independent variables mentioned above were measured upon the two dependent variables of anxiety and teaching competence. Specific instruments used to measure both anxiety and teaching competence have been previously defined. A 2 X 2

factorial design (fixed effects) was utilized in this experiment (Campbell and Stanley, 1963).

Apparatus

The actual microteaching lessons used in this study were taped at College of Education Television Studios, University of Oklahoma. This studio contains two tripod mounted television cameras and several videotape recorders, along with adequate lighting and other normal audio and switching features. A Sony 3600 videotape recorder (VTR) was utilized to record all microlessons.

The biofeedback instrument used in this study was an Autogenic Systems, Incorporated, model 1500b electromyograph. The sensitivity of this instrument ranges from two-tenths of a microvolt to one-thousand microvolts. Additional technical data pertaining to this instrument are contained in Appendix E. Generally speaking, the 1500b is considered to be of clinical quality (ASI, 1975).

Data Analysis

The data generated by this experiment were subjected to an Analysis of Variance (ANOVA). The author used the Biomedical Program 02V to analyze the generated data (Dixon, 1974). Additionally, a Test of Main Effects was used to analyze significant interaction between variables when indicated (Kirk, 1968).

In order to establish the degree of relationship between judges' ratings of teaching competence, an intra-class correlation coefficient was calculated. This was

undertaken in order to establish how reliably the three judges were able to assess teaching performance and competence (Guilford and Fruchter, 1956).

CHAPTER IV

RESULTS

This chapter reports the results of the statistical tests used to test the hypotheses stated on page 4.

Reliability Coefficient Between Judges Ratings: The intra-class correlation among the three judges' ratings of teaching competence was .67. This coefficient basically estimates the typical intercorrelation of the three raters to be .67. This coefficient is quite conservative and an extension of the same basic formula indicates a coefficient of .85 as applied to these same data. This latter figure indicates that if the three ratings of each ratee were averaged, and this set could then be correlated with a separate and similar set of averages from comparable raters, the resultant correlation coefficient would be .85 (Guilford and Fruchter, 1956, p. 264). The coefficient is considered adequate.

Stanford Teacher Competence Appraisal Guide Results:

(Completed by subject): This instrument was designed to establish the degree to which a student teacher could perform specific teaching acts during a microlesson. The STCAG form used in this experiment consisted of ten items

followed by individual rating scales ranging from zero to seven with a higher number indicating a more positive performance. A copy of this instrument appears in Appendix A.

The Ss group means, and the analysis of variance are presented in Tables 1 and 2 of Appendix F. The results showed no differences between groups on either the factor of biofeedback or focused intervention. Additionally, no interaction between variables was present. No differences between groups were hypothesized.

The Teaching Anxiety Scale (Form I) Results: Hypotheses one and three. This 25-item instrument was intended to measure general teaching anxiety due to the diversity of the individual items. It was one of three indices of teaching anxiety administered immediately after the micro-teaching experience.

Results indicated no differences between groups on the biofeedback factor or focused intervention factor. The Ss group means, and the analysis of variance are presented in Tables 3 and 4 of Appendix G.

Anxiety Self Report - Item One Results: Hypotheses one and three. This item asks the subject to respond to the statement, "I feel anxious about some aspect of teaching" by placing an "X" along a continuum ranging from "always" through "occasionally" to "never". Refer to Tables 5 and 6 in Appendix H for complete results.

Results indicate no differences between groups on either biofeedback or focused intervention. This item is the second index of teaching anxiety that was completed immediately after the microteaching experience.

Anxiety Self Report - Item Two Results: Hypotheses one and three. The Ss were asked to respond to the statement, "My anxiety about teaching is," on this last index of teaching anxiety completed immediately after the microteaching lesson. This rating scale continuum ranged from "extreme" through "moderate" to "insignificant".

Significant differences between groups were found on the biofeedback factor, but not on the focused intervention (FI) factor. Additionally, a significant interaction effect was found to exist between these two factors. A test of simple main effects was performed (Kirk, 1968) and indicated that significant differences did appear in the first level of the focused intervention factor. Self or helper initiated FI results indicate that the presence of both biofeedback and self or helper initiated FI decreased anxiety while the absence of biofeedback along with the presence of self or helper initiated FI interacted to increase anxiety greatly. Complete group means and the analysis of variance are contained in Appendix I, Tables 7 and 8, and Figure 1.

Of the three indices of teaching anxiety completed immediately after the microlesson, two resulted in nonsignificant differences while one resulted in significant

differences in the opposite direction expected between groups on the factor of biofeedback. No consistent differences were found within the factor of focused intervention on these three indices of teaching anxiety at all levels of the first factor, biofeedback. Hypotheses one and three are thus rejected in reference to teaching anxiety, but not general anxiety as indicated on the following two items.

Anxiety Self Report - Item Three Results: Hypotheses one and three. The third and fourth items of this instrument "refer to anxiety in a more general sense--that is, anxiety other than anxiety about teaching." On this third item, Ss are asked to respond to the statement, "I am anxious . . ." by placing an "X" along the scale which ranged from "always" through "occasionally" to "never".

Results are reported in Tables 9 and 10 of Appendix J and indicate that biofeedback was not significant while focused intervention was on this item. In this situation, biofeedback failed to affect anxiety while the influence of the helper significantly increased the Ss general anxiety level.

Anxiety Self Report - Item Four Results: Hypotheses one and three. This final item on the Anxiety Self Report asks the S to respond to the statement, "My anxiety (general) is" The S then places an "X" along a scale which ranges from "insignificant" through "moderate" to "extreme".

Tables 11 and 12 in Appendix K contain group means in addition to the analysis of variance. Results indicate no differences between groups on either factor. Additionally, there was no interaction between variables.

Because of the only partial significance of differences between groups on either of the two factors being examined, hypotheses one and three are also rejected in terms of general subject anxiety.

The Teaching Anxiety Scale (Form II) Results: Hypothesis six. It was hypothesized that there would be no long term differences between groups as evidenced by this instrument. Results indicate that there were no differences on either factor. However, the importance of these findings is almost totally diminished in view of prior nonsignificant findings. Complete results are contained in Tables 13 and 14 of Appendix L. Hypothesis six is not rejected.

Stanford Teacher Competence Appraisal Guide (Completed by Judges) Results: Hypotheses two and four. The competency level ratings of the three judges indicate that significant differences between groups exist only on the biofeedback factor. Thus we see that the biofeedback factor tended to produce more competent performances by subjects according to the ratings of the judges. The group means and the analysis of variance are reported in Tables 15 and 16 of Appendix M.

Hypothesis two is not rejected while hypothesis four is rejected.

Stanford Teacher Competence Appraisal Guide Results (Completed by Subjects and Judges):

Hypothesis five. It was hypothesized that subjects who received the two treatments would be more realistic about their teaching competency levels as evidenced by a significantly smaller difference between self perceived and judged competency levels. A very similar index of reality was used by Watts (1973) in a similar experiment. Group means and the analysis of variance are reported in Tables 17 and 18 of Appendix N.

Results indicate that the two factors did not enable the Ss to become more realistic about their microteaching competency. No significant differences were indicated on either the biofeedback factor or the focused intervention factor. Also, no interaction between factors was indicated. Hypothesis five is thus rejected.

CHAPTER V

SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Summary

The purpose of this study was to investigate the relationship between selected variables that may have considerable influence upon microteaching anxiety and competence. Two additional questions were formulated in an attempt to examine the two main concerns of the study. These questions were: (1) Can biofeedback (EMG) assist the student teacher in precisely identifying discrepant behavior in his or her microteaching lesson through the detection of physiological arousal? and (2) Can focused intervention and feedback, initiated by the student teacher and as a consequence of biofeedback, enable this person to carefully examine videotaped microteaching behavior and thus set the stage for remediation?

This study has as areas of investigation two methodology variables, biofeedback and focused intervention. The study drew upon research in the areas of: videotape playback in microteaching; focused feedback; activation, arousal, and anxiety; and, activation and optimal arousal theory. This experiment was devised in order to explore the relationships

between anxiety and teaching competence. The level of teaching competence of each subject was established by having three judges rate each subject's teaching performance.

Several instruments were used for data gathering. These instruments were: (1) The Stanford Teacher Competence Appraisal Guide, used to establish the level of teaching competence, (2) The Teaching Anxiety Scale, Form I, utilized in a number of specific teaching situations, (3) The Anxiety Self Report was also used to measure teaching anxiety and additionally, general anxiety, and (4) Form II of the Teaching Anxiety Scale which was used to measure long term teaching anxiety. Another criterion variable sought to establish how realistically each subject was able to view his or her own performance. This index was obtained by subtracting the mean judge's score from the subject's own rating of the same videotaped microteaching lesson.

Results of the nine separate analyses of variance indicate some differences between groups. No differences were found to exist between the Stanford Teacher Competence Appraisal Guide ratings completed by the subjects themselves of their own microteaching performances. There was no hypothesized difference; however, this measure was used in a comparison of the ratings of competence by the three judges. Similarly, no differences were found on either variable in the results of the Teaching Anxiety Scale, Form I, or on Item One of the Anxiety Self Report.

Significant findings were obtained on Item Two of the Anxiety Self Report, indicating that the biofeedback factor resulted in lower reported anxiety. No differences were found between groups on the second factor, focused intervention. In addition, significant interaction between variables was detected and indicated that the presence of both biofeedback and self or helper initiated focused intervention tended to decrease anxiety, while the absence of biofeedback coupled with the self or helper initiated FI tended to increase anxiety. Of the three above mentioned indexes of teaching anxiety, all were not significant with respect to the factor of focused intervention at all levels and in each instance. However, one of the three measures was significant in terms of the biofeedback factor.

The last two items of the Anxiety Self Report were designed to measure general anxiety rather than teaching anxiety. Item Three results indicate no differences on the factor of biofeedback, but significant differences on the factor of focused intervention. In this situation, the influence of the helper tended to increase the reported anxiety level of the subject. Item Four results indicated no differences.

It was hypothesized that there would be no long term (30-day) differences between groups on either factor on Form II of the Teaching Anxiety Scale. Results indicate that this was the case. It was previously noted that these findings are of little actual significance in view of prior nonsignificant findings.

Results of the competency ratings of the three judges indicate that the influence of the biofeedback factor was significant while the apparent influence of the second factor, focused intervention, was not. These findings would indicate that the biofeedback factor enabled subjects to be judged more competent in microteaching with respect to the Stanford Teacher Competence Appraisal Guide.

The last criterion variable of the present study involved the question of how realistically each subject was able to evaluate his or her own microteaching competency level. An index of realism was established by subtracting the judges' competency rating of a subject from the subject's own rating of the same videotaped microteaching lesson. No differences were found between groups on either factor. Findings would indicate that neither factor was able to assist the student teacher in becoming more realistic about his or her microteaching competency. It may be of interest to note that the vast majority of all subjects tended to overestimate their own competency level, even though they knew that their videotaped lessons were to be judged by others later.

Conclusions

The author of this study believes two points of interest have been clarified as a consequence of this investigation. First, the results indicate that the electro-myograph can be of value in increasing the microteaching

competency level of student teachers. There is some additional evidence that this same device can be of use in reducing anxiety toward teaching on the part of student teachers. Second, the immediate study helps clarify the influence of the helper, or microteaching supervisor, with respect to goal discrepancy identification and consequent analysis and remediation.

In this study, it was found that the focused intervention factor had no significant and consistent affect upon either the criterion variable of anxiety or teaching competence. It was concluded that in the presence of some objective index of goal discrepancy arousal, it made no difference who initiated the focused intervention and feedback. It may be that in those cases where the subject has sole control over the type and amount of feedback, he or she will attend to as much of this information as possible without the influence of the helping person in attendance. It may be that the helper overloads the student with additional feedback from the videotape, resulting in no increased learning on the part of the student teachers. Furthermore, results from Item Three of the ASR indicate that the influence of the helper may tend to increase anxiety.

It could be concluded that the analysis and discussion portion of the microteaching lesson should be under the control of the student teacher when a device such as the EMG is present. This would support prior research that

indicates the desirability of the subject being the locus of control with respect to feedback. Even if this is the case, the teacher educator should provide an objective index of goal discrepancy arousal and an objective instrument or checklist of positive teaching behaviors to be demonstrated by the microteaching student.

Another more speculative comment about the influence of the helper centers around the tendency for some microteaching students to completely defer to the helper during the playback and analysis portions of the microteaching experience. The author noticed a tendency for some subjects to completely rely upon the helper to initiate the focused intervention in those experimental situations in which he could. In these instances, once the helper began initiating the focused intervention, the student stopped doing so, or at least seemed to curtail his interventions. This sort of behavior continued even after repeated urgings for the subject to assert himself and not become passive. It may be that the helper should only intervene where blatant departures from the desired goal are present or at the end of the analysis portion.

It was feared that results of this investigation might be uninterpretable, with respect to the theory base, because of the presumed curvilinear relationship between activation and performance. This appears to be the case at this point.

It would appear that the lower anxiety level and higher performance level of those who received biofeedback is contrary to optimal arousal theory. At least it refutes the simplistic notion that stimulus situation impact will necessarily increase activation level which will in turn increase performance level. However, it could be argued that the biofeedback group was somewhere on the left side of the inverted-U curve, while the nonbiofeedback group was on the right side of the curve but simply at a lower point on the performance continuum. Of course, this nonbiofeedback group would have to report a higher anxiety level, which they tended to do.

It is clear that Fiske and Maddi must consider the qualitative dimension of the stimulus situation, to some extent. The theory predicted that as the complexity, meaningfulness, and novelty of the stimulus situation increased, so would activation and anxiety levels. However, in this instance, it was observed that the reported anxiety level was down, perhaps because although the stimulus situation became more complex (the electromyograph, etc.) and certainly more novel (same reason), this particular complex and novel EMG machine possessed the unique qualities of enabling the subjects to perhaps control their activation levels through operant learning principles, and additionally help them spot troublesome goal discrepancies. In other words, some relaxation training could have taken place along with the identification of goal discrepancies.

Previously in this report, some mention was made of the desirability of the competency or performance based teacher education approach as a means of reducing the recurrence of the evaluative threat performance deficit in both microteaching and classroom teaching. It is obvious that most student teachers would fear evaluation in areas in which the person has not had an opportunity to demonstrate competence to himself. However, if the person is afforded an opportunity to demonstrate competent performance to himself and others early in his teacher education coursework, perhaps the effects of the evaluative threat could be greatly diminished by the time he begins his microteaching and off-campus student teaching. It is possible that programs such as the Performance Based Teacher Education Program (PBTE) of the Center for Vocational Education of The Ohio State University will eventually become a more widely applied approach to teacher education.

Suggestions for Further Research

It is believed that further research should concentrate upon the role of the helping person in attendance and the increased use of biofeedback as a relaxation training device prior to and during microteaching. The rationale being that early familiarization with the biofeedback device may increase its anxiety inhibiting effects during microteaching.

The immediate investigation indicates that the optimal microteaching anxiety performance level is relatively low,

and that biofeedback may be of help in achieving this lowered anxiety condition. Further investigation should be made into the area of lowering teaching anxiety, by any means possible, with particular attention being paid to the resultant effects upon microteaching competency. It would be interesting to find under what conditions teaching performance would decrease because of insufficient arousal and anxiety.

The perplexing failure of the reality index is perhaps best explained by the tendency of those who received biofeedback to grossly overestimate their teaching competence level. This ego inflation is perceived by some to be preferable to the usual experience of the microteaching experience. However, by the biofeedback factor could be of value, if this was the area of further research could center upon giving sole access to his own biofeedback. Hopefully this would lessen anxiety even more. It is recommended that each student be given some biofeedback training prior to microteaching, especially if the student is to have sole access to the biological feedback.

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The perplexing failure of the reality index is perhaps best explained by the tendency of those who received biofeedback to grossly overestimate their teaching competence level. This ego inflation could be considered by some to be preferable to the usual ego deflation following the microteaching experience. An investigation as to why the biofeedback factor could produce this effect may be of value, if this was the case. One additional area of further research could center upon the student having sole access to his own biofeedback. Hopefully, this would lessen anxiety even more. It is recommended that each student be given some biofeedback training prior to microteaching, especially if the student is to have sole access to the biological feedback.

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APPENDIX A

**STANFORD TEACHER COMPETENCE
APPRAISAL GUIDE**

	0 Unable to Observe	1 Weak	2 Below Average	3 Average	4 Strong	5 Superior	6 Outstanding	7 Truly Exc- ptional
1. <u>Clarity of Aims</u> The purposes of the lesson are clear.	()	()	()	()	()	()	()	()
2. <u>Appropriateness of Aims</u> The aims are neither too easy nor too difficult for the pupils. They are appropriate, and are accepted by the pupils.	()	()	()	()	()	()	()	()
3. <u>Organization of the Lesson</u> The individual parts of the lesson are clearly related to each other in an appropriate way. The total organization facilitates what is to be learned.	()	()	()	()	()	()	()	()
4. <u>Selection of Content</u> The content is appropriate for the aims of the lesson, the level of the class, and the teaching method.	()	()	()	()	()	()	()	()
5. <u>Selection of Materials</u> The specific instructional materials and human resources used are clearly related to the content of the lesson and complement the selected method of instruction.	()	()	()	()	()	()	()	()
6. <u>Beginning the Lesson</u> Pupils come quickly to attention. They direct themselves to the tasks to be accomplished.	()	()	()	()	()	()	()	()
7. <u>Clarity of Presentation</u> The content of the lesson is presented so that it is understandable to the pupils. Different points of view and specific illustrations are used when appropriate.	()	()	()	()	()	()	()	()
8. <u>Pacing of the Lesson</u> The movement from one part of the lesson to the next is governed by the pupil's achievement. The teacher stays with the class and adjusts the tempo accordingly.	()	()	()	()	()	()	()	()
9. <u>Pupil Participation and Attention</u> The class is attentive. When appropriate the pupils actively participate in the lesson.	()	()	()	()	()	()	()	()
10. <u>Ending the Lesson</u> The lesson is ended when the pupils have achieved the aims of instruction. There is a deliberate attempt to tie together the planned & chance events of the lesson & relate them to the immediate & long range aims of instruction	()	()	()	()	()	()	()	()

APPENDIX B

THE TEACHING ANXIETY SCALE (TCHAS)

Form I

Name _____

Date _____

Your answers will be kept strictly confidential. Your professors and supervisors will not have access to this information.

Instructions: Please read each question carefully.

Answer every question, even if it seems vague to you or difficult to answer.

Mark an "X" in only one box for each question. Be sure the "X" falls well within the box and does not extend into another box.

Use the following scale for all questions:

Never Infrequently Occasionally Frequently Always

	Never	Infrequently	Occasionally	Frequently	Always
	(1)	(2)	(3)	(4)	(5)
1. I feel calm and collected when I think about holding parent-teacher conferences.	☐	☐	☐	☐	☐
2. If I have trouble answering a student's question I (will find) find it difficult to concentrate on questions that follow.	☐	☐	☐	☐	☐
3. I feel uncomfortable when I speak before a group.	☐	☐	☐	☐	☐
4. I (would feel) feel calm (if I were) when I am preparing lessons.	☐	☐	☐	☐	☐
5. I'm worried whether I can be a good teacher.	☐	☐	☐	☐	☐
6. I feel sure I will find teaching a satisfying profession.	☐	☐	☐	☐	☐

Form I

Name _____

Date _____

		Never	Infrequently	Occasionally	Frequently	Always
		(1)	(2)	(3)	(4)	(5)
7.	I would feel calm and controlled if a student's parent observed in my classroom.	☐	☐	☐	☐	☐
8.	I feel inferior to other teachers-in training.	☐	☐	☐	☐	☐
9.	I feel that students will follow my instructions.	☐	☐	☐	☐	☐
10.	I feel secure with regard to my ability to keep a class under control.	☐	☐	☐	☐	☐
11.	I'm less happy teaching than I thought I'd be.	☐	☐	☐	☐	☐
12.	I feel nervous when I am being observed by my college supervisor.	☐	☐	☐	☐	☐
13.	I feel confident about my ability to improvise in the classroom.	☐	☐	☐	☐	☐
14.	I feel other teachers (will think) think I'm very competent.	☐	☐	☐	☐	☐
15.	I (would feel) feel panicky when a student asks me a question I (couldn't) can't answer.	☐	☐	☐	☐	☐
16.	I feel anxious because I don't know yet whether I really want to be a teacher.	☐	☐	☐	☐	☐
17.	I feel better prepared for teaching than other teachers-in-training.	☐	☐	☐	☐	☐
18.	Lack of rapport with my students (will be) is one of my biggest worries.	☐	☐	☐	☐	☐

Form I

Name _____

Date _____

	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
19. I would feel anxious if the principal informed me he was coming to my class to observe.	☐	☐	☐	☐	☐
20. I (would find) find it easy to speak up in the staff room.	☐	☐	☐	☐	☐
21. I worry about being able to keep the students interested in what I (will teach) teach them.	☐	☐	☐	☐	☐
22. I (would find) find it easy to admit to the class that I don't know the answer to a question a student asks.	☐	☐	☐	☐	☐
23. Deciding how to present information in the classroom (would make) makes me feel uncertain.	☐	☐	☐	☐	☐
24. I feel I will have good recall of the things I know when I am in front of a class.	☐	☐	☐	☐	☐
25. I feel I (will be) am as competent in the classroom as other teachers-in-training.	☐	☐	☐	☐	☐

APPENDIX C

Date _____

always **occasionally** **never**

Page 2

Name _____

2. My anxiety about teaching is

extreme moderate insignificant

The next two questions refer to anxiety in a more general sense - that is, anxiety other than anxiety about teaching.

3. I am anxious

always _____ **occasionally** _____ **never**

APPENDIX D

THE TEACHING ANXIETY SCALE (TCHAS)

Form II

Name _____

Date _____

Your answers will be kept strictly confidential. Your professors and supervisors will not have access to this information.

Instructions: Please read each question carefully.

Answer every question, even if it seems vague to you or difficult to answer.

Mark an "X" in only one box for each question. Be sure the "X" falls well within the box and does not extend into another box.

Use the following scale for all questions:

Never Infrequently Occasionally Frequently Always

	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
1. I feel uncertain about my ability to improvise in the classroom.	☐	☐	☐	☐	☐
2. Even if I have trouble answering a student's question, I (would find) find it easy to concentrate on questions that follow.	☐	☐	☐	☐	☐
3. I (would feel) feel anxious (if I were) when I am preparing lessons.	☐	☐	☐	☐	☐
4. I'm afraid students won't follow my instructions.	☐	☐	☐	☐	☐
5. I would feel calm if the principal informed me he was coming to my class to observe.	☐	☐	☐	☐	☐
6. I'm afraid other teachers (will think) think I'm incompetent.	☐	☐	☐	☐	☐
7. I feel anxious about my ability to keep a class under control.	☐	☐	☐	☐	☐

Form II

Name _____

Date _____

	Never (1)	Infrequently (2)	Occasionally (3)	Frequently (4)	Always (5)
8. I'm happier teaching than I thought I'd be.	☐	☐	☐	☐	☐
9. I feel I (will be) am less competent in the classroom than other teachers-in-training.	☐	☐	☐	☐	☐
10. I (would be) am afraid to speak in the staff room.	☐	☐	☐	☐	☐
11. The thought of holding parent-teacher conferences makes me feel panicky.	☐	☐	☐	☐	☐
12. I feel certain I really want to be a teacher.	☐	☐	☐	☐	☐
13. I feel certain about my ability to keep the class interested in what I (will teach) teach them.	☐	☐	☐	☐	☐
14. I (would find) find it difficult to admit that I don't know the answer to a question a student asks.	☐	☐	☐	☐	☐
15. I'm worried whether I will find teaching a satisfying profession.	☐	☐	☐	☐	☐
16. I feel that I am as good as other teachers-in-training.	☐	☐	☐	☐	☐
17. I feel at easy when I am being observed by my college supervisor.	☐	☐	☐	☐	☐
18. I'm afraid I will forget everything I know when I get in front of a class.	☐	☐	☐	☐	☐

Form II

Name _____

Date _____

- | | (1) | (2) | (3) | (4) | (5) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 19. I feel comfortable when I speak before a group. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. I (would feel) feel calm and collected even when a student asks me a question I (couldn't) can't answer. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. I feel less well prepared for teaching than other teachers-in-training. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. I (would be) am able to decide how to present information in the classroom without a feeling of uncertainty. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. I would feel edgy and nervous if a student's parent observed in my classroom. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. I feel sure I can be a good teacher. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. Good rapport with my students (will be) is one of my strong points. | ☐ | ☐ | ☐ | ☐ | ☐ |

APPENDIX E

Technical Data Pertaining To The Autogenic
Systems Incorporated Autogen 1500b Electromyograph

The following information was taken from an ASI sales brochure entitled, Biological Feedback Instrumentation, dated July, 1975:

The Autogen 1500b is a clinical EMG feedback trainer It exhibits the second highest sensitivity (next to the Autogen 1700) of any clinically-oriented feedback myograph and incorporates a logarithmic meter (with five selectable meter sensitivity scales) as well as six forms of audio feedback, including analog click feedback and derivative feedback, an innovative audio feedback modality which can register the most minute shifts in EMG activity. The 1500b also provides a calibrated amplitude threshold, which allows the user to set the lower limit of the feedback range.

The Autogen 1500b

Sensitivity (Minimum RMS Signal)	-	0.1 uV
Dynamic Range	-	0.1-1000uV

The Electromyogram - The activity of the skeletal muscles is triggered by a complex pattern of electrical impulses originating in the central nervous system. These impulses travel from the brain and spinal chord through motor nerve pathways which terminate in the muscle fibers. Innervation of the muscle fibers, and consequent muscular contraction is brought about when a significant number of motor nerves in a given area are emitting repeated electrical discharges. Since muscular tension is proportional to the degree of electrical discharge stimulating the muscles, the EMG is a direct physiological index of muscle contraction or relaxation (the lower the microvolt level of EMG activity, the more relaxed the monitored muscle)(ASI, 1975).

APPENDIX F

Table 1

Results of the Two-Way Analysis of Variance for the Stanford Teacher Competency Appraisal Guide Completed By Subjects

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	76.56	76.56	1.34	n.s.*
(2) Focused Intervention	1	64.00	64.00	1.12	n.s.*
(3) Interaction	1	175.56	175.56	3.06	n.s.*
(4) Within Cell	60	3440.88	57.35	-	-
(5) Total	63	3757.00	-	-	-

*Not significant at the .05 level.

Table 2

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	44.13	8.79
(2) No BFB With Self or Helper FI	38.63	5.75
(3) BFB With Self Only FI	42.81	8.01
(4) No BFB With Self Only FI	43.94	7.42

APPENDIX G

Table 3

Results of the Two-Way Analysis of Variance for the Teaching Anxiety Scale - Form I

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	213.89	213.89	1.91	n.s.*
(2) Focused Intervention	1	66.02	66.02	0.59	n.s.*
(3) Interaction	1	394.95	394.95	3.52	n.s.*
(4) Within Cell	60	6724.44	112.07	-	-
(5) Total	63	7399.30	-	-	-

*Not significant at the .05 level.

Table 4

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	54.00	9.62
(2) No BFB With Self or Helper FI	62.63	7.27
(3) BFB With Self Only FI	56.94	10.67
(4) No BFB With Self Only FI	55.63	13.75

APPENDIX H

Table 5

Results of the Two-Way Analysis of Variance for Anxiety Self Report - Item #1

SOURCE	df	SS	MS	F	P.
(1) Biofeedback	1	1.29	1.29	0.21	n.s.*
(2) Focused Intervention	1	3.11	3.11	0.50	n.s.*
(3) Interaction	1	4.57	4.57	0.74	n.s.*
(4) Within Cell	60	371.32	6.19	-	-
(5) Total	63	380.29	-	-	-

*Not significant at the .05 level.

Table 6
Cell Means

CELL	MEAN	S.D.
(1) BFB With Self or Helper FI	4.91	2.24
(2) No BFB With Self or Helper FI	5.73	2.39
(3) BFB With Self Only FI	5.00	2.65
(4) No BFB With Self Only FI	4.75	2.64

APPENDIX I

Table 7

Results of the Two-Way Analysis of Variance and Test of Simple Main Effects for the Anxiety Self Report - Item #2

SOURCE	df	SS	MS	F	p.
(1) Biofeedback (BFB)	1	19.69	19.69	4.08	<.05
(2) BFB With Self or Helper FI	1	49.00	49.00	10.16	<.05
(3) BFB With Self Only FI	1	0.58	0.58	0.12	n.s.*
(4) Focused Intervention (FI)	1	0.51	0.51	0.11	n.s.*
(5) FI with BFB	1	11.51	11.51	2.39	n.s.*
(6) FI without BFB	1	19.07	19.07	3.96	n.s.*
(7) Interaction	1	30.39	30.39	6.30	<.05
(8) Within Cell	60	289.32	4.82	-	-
(9) Total	-	339.91	-	-	-

*Not significant at the .05 level.

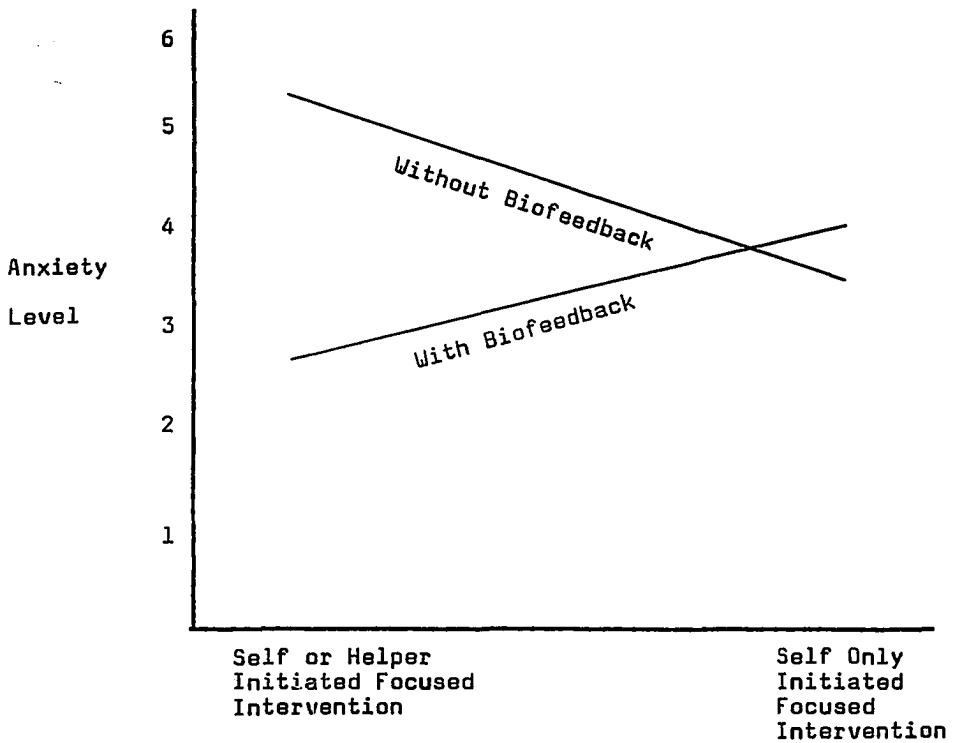
Table 8

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	2.7	1.86
(2) No BFB With Self or Helper FI	5.2	2.13
(3) BFB With Self Only FI	3.9	2.54
(4) No BFB With Self Only FI	3.6	2.20

Figure 1

The Effects of Biofeedback and Focused Intervention Upon Teaching Anxiety as Measured by the Anxiety Self Report - Item #2



APPENDIX J

Table 9

Results of the Two-Way Analysis of Variance for the Anxiety Self Report - Item #3

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	4.25	4.25	1.25	n.s.*
(2) Focused Intervention	1	21.74	21.74	6.40	<.05
(3) Interaction	1	0.04	0.04	0.01	n.s.*
(4) Within Cell	60	203.71	3.39	-	-
(5) Total	63	229.74	-	-	-

*Not significant at the .05 level.

Table 10

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	5.46	1.84
(2) No BFB With Self or Helper FI	6.02	2.01
(3) BFB With Self Only FI	4.34	1.93
(4) No BFB With Self Only FI	4.81	1.55

APPENDIX K

Table 11

Results of the Two-Way Analysis of Variance for the Anxiety Self Report - Item #4

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	4.90	4.90	0.97	n.s.*
(2) Focused Intervention	1	3.66	3.66	0.72	n.s.*
(3) Interaction	1	8.05	8.05	1.59	n.s.*
(4) Within Cell	60	303.34	5.06	-	-
(5) Total	63	319.95	-	-	-

*Not significant at the .05 level.

Table 12

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	3.91	2.01
(2) No BFB With Self or Helper FI	5.18	2.67
(3) BFB With Self Only FI	4.14	2.09
(4) No BFB With Self Only FI	3.98	2.17

APPENDIX L

Table 13

Results of the Two-Way Analysis of Variance for the Teaching Anxiety Scale - Form II

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	153.14	153.14	1.46	n.s.*
(2) Focused Intervention	1	47.27	47.27	.45	n.s.*
(3) Interaction	1	123.71	123.71	1.18	n.s.*
(4) Within Cell	60	6293.44	104.89	-	-
(5) Total	63	6617.15	-	-	-

*Not significant at the .05 level.

Table 14

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	49.50	10.22
(2) No BFB With Self or Helper FI	55.37	7.68
(3) BFB With Self Only FI	50.56	10.92
(4) No BFB With Self Only FI	50.88	11.70

APPENDIX M

Table 15

Results of the Two-Way Analysis of Variance for the Stanford Teacher Competency Appraisal Guide - Ratings by Judges

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	159.39	159.35	4.75	<.05
(2) Focused Intervention	1	1.89	1.89	0.06	n.s.*
(3) Interaction	1	2.64	2.64	0.08	n.s.*
(4) Within Cell	60	2014.06	33.57	-	-
(5) Total	63	2177.98	-	-	-

*Not significant at the .05 level.

Table 16

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	36.69	7.14
(2) No BFB With Self or Helper FI	33.94	3.79
(3) BFB With Self Only FI	37.44	7.45
(4) No BFB With Self Only FI	33.88	3.65

APPENDIX N

Table 17

Results of the Two-Way Analysis of Variance for the Stanford Teacher Competency Appraisal Guide Ratings Completed by Judges and Subjects as Realism Index

SOURCE	df	SS	MS	F	p.
(1) Biofeedback	1	7.56	7.56	0.12	n.s.*
(2) Focused Intervention	1	27.56	27.56	0.43	n.s.*
(3) Interaction	1	182.25	182.25	2.84	n.s.*
(4) Within Cell	60	3832.63	63.88	-	
(5) Total	63	4050.	-	-	

*Not significant at the .05 level.

Table 18

Cell Means

CELL	MEAN	S. D.
(1) BFB With Self or Helper FI	7.44	10.57
(2) No BFB With Self or Helper FI	4.75	4.68
(3) BFB With Self Only FI	5.38	8.90
(4) No BFB With Self Only FI	9.44	6.53

