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THE RELATIONSHIP OF PRE-COMPETITION AROUSAL ASSESSMENTS TO SELF-PERCEIVED PERFORMANCE COMPETENCIES IN COLLEGIATE WRESTLERS

A Thesis

Presented to

The Faculty of University Schools

Lakehead University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in the

Theory of Coaching

by

Gerard Sean Barry

December, 1978

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ABSTRACT

Title of Thesis: The Relationship of pre-competition Arousal Assessments to Self-perceived Performance Competencies in Collegiate Wrestlers.

G. Sean Barry: Master of Science in the Theory of Coaching.

Thesis Advisor: Dr. Brent S. Rushall
Professor
Lakehead University

The purpose of this study was to examine the relationship of pre-competition arousal assessments to self-perceived performance competencies in collegiate wrestlers. This author employed the technique of self-reporting in order to examine this relationship. The research design selected was a number of replications of a single subject case study. A modified version of Rushall's (1977) Pre-Competition Psychological Checklist allowed each subject to report his pre-match arousal symptoms, his pre-match arousal (excitedness) level, his estimation of winning, and the post-match assessment of his performance for each match. The data were analyzed to determine, 1) the existence of arousal patterns that were performance-grade specific on a five category scale, 2) the arousal estimate and performance level relationship, 3) the relationship between estimation of winning and performance, 4) the arousal estimate and estimation of winning relationship, and 5) the interaction between arousal, estimate of winning and performance level. All subjects exhibited performance-grade specific arousal patterns. The highest calibre wrestlers illustrated increased

sensitivity of pattern indicators and performance discriminators. This subgroup also evidenced the highest increases as well as the highest absolute values in arousal level. When all wrestlers were considered together the relationship between arousal and performance was positive and linear thereby supporting the Drive theory. This information suggested that the highest calibre wrestler also experienced the greatest control of arousal levels and symptoms.

ACKNOWLEDGMENTS

As is the case with most publications much credit is due to numerous individuals whose names would not otherwise appear in this manuscript. This thesis is no exception.

This author wishes to recognize Dr. Brent S. Rushall's expertise and guidance through the entirety of this study. His knowledge and in some cases patience were invaluable.

Thanks must go to coach Robert Thayer and the members of the Lakehead University Nor'Westers wrestling team for their co-operation and consideration.

For the encouragement and financial assistance offered, this author would be remiss in not extending his appreciation to Dr. Geoff Gowan and the Coaching Association of Canada.

Finally the author wishes to acknowledge the love, understanding and support bestowed by his parents in this and all endeavours. There are no words to express my gratitude.

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CHAPTER I

INTRODUCTION

Purpose

The purpose of this study was to examine the relationship of pre-competition arousal symptons to self-perceived performance competencies in collegiate wrestlers.

Significance

Evidence from other nations (e.g. East and West Germany, Bulgaria and Russia) which employ scientifically based psychological support services, has illustrated accelerated performance gains in international competition. The fact that Western cultures have been reluctant to use such services coupled with their recent decline on the international sports scene is ample reason to justify such a study.

Modern sport must be considered a psychological as well as biomechanical and physiological endeavour. Research undertaken in the latter two areas has been significant in Western culture as well as elsewhere. However, research into the psychological realm of sport has been far from adequate and yet the importance of such factors as coping with competition stress, controlling arousal levels, and maintaining psychological motivation has been accepted for some time. Most of the past research has been performed in clinical lab-

oratory settings dealing for the most part with small animals and not with man in the psychoergokinetic state (Morgan, 1970).

If athletic performances are to continue to increase, the various sports are going to require the application of such scientific principles as psychological support services as well as technical and medical support services.

Unfortunately psychologists in the past have exhibited a preoccupation with personality trait-oriented tests. The applicability and reliability of these tests have been scientifically questionable (Martens, 1977; Singer, 1977). A survey of research revealed very few continuous and extensive research studies evaluating personality characteristcs (Vanek & Cratty, 1970). Furthermore, recent studies in the relationship of arousal patterns to performance illustrate two conflicting views.

The first, pioneered by Yerkes & Dodson (1908) and updated by Cratty (1973) and Sage (1971) is known as the Inverted-U theory. It states there is an optimal level of arousal as related to maximal performance. Arousal above or below this point will detract from performance. The second, pioneered by Hull (1943) is supported by Nideffer (1976), Spence & Spence (1966) and Spielberger (1971). This linear drive theory suggests the higher the arousal level the higher the probability of a maximal or optimal performance. The discrepancy between these two theories is obvious. It was hoped that one

of the effects of this study was to clarify this juxtaposition.

As an alternate on the 1976 Olympic Wrestling Team, there exists a personal interest in this topic. This writer is of the opinion that one of the major weaknesses in training for the Games was the lack of psychological preparation. Therefore, it was also hoped that another effect of this study was to develop an awareness for the need of psychological preparation for competition.

In summation then, the justification for such an undertaking lies not only in the empirical evidence illustrated by East European countries, but also in the conflicting and lack of scientific research performed in this area. Personal enthusiasm for this topic is further increased by the possible implications of such a study in enhancing the performance of the wrestler.

Delimitations

This thesis was concerned with arousal and its relationship to performance. More specifically, the study was concerned with pre-match arousal symptoms, resultant pre-match arousal patterns, arousal or excitedness levels and their relationship with self-perceived match performances.

The subjects were members of the 1977-78 Lakehead University Wrestling Team. The observations took place over an entire competitive season ranging from late November of 1977 to late February of 1978.

The dependent variables observed and measured were arousal level, arousal symptons and patterns, estimation of

winning, and self-perception of match performance.

The research instrument employed was a modified version of Rushall's (1977) Pre-Competition Psychological Checklist (PCPC). It consisted of:

1) a twenty-three item checklist designed to indicate self-perceived arousal symptoms,

ii) a numerical self-appraisal of pre-match arousal or excitedness level on a scale ranging from minus ten to plus ten,

iii) a numerical estimation of the probability of winning the upcoming match on a scale ranging from zero to ten,

iv) a performance rating scale with five distinct grades of performance including great, good, normal, poor and very poor.

Since the sample chosen is a convenient intact group no attempt was made to generalize the results of this study. All discussion will be confined to individual case studies.

Limitations

Since this tool is based on the technique of self-reporting, the reliability and validity of the results depended to a large extent upon the honesty and accuracy of each wrestler's report. It was felt by the observer that each wrestler had the ability to perform in the designated manner. Furthermore, reliability checks and intermittent restressing of the arousal symptom definitions were an integral part of this study.

In comparing the PCPC to other accepted checklists it was felt by this writer that it contained a high degree of construct and face validity. Finally, this tool has been employed before and is reputed to be reliable for such an undertaking (Rushall, 1975, 1977).

Definitions

Arousal. This is a term used to describe a complex emotional state. It is characterized by anxious nervous behaviour coupled with a high degree of excitedness. In this study it was measured with two scales. The first consisted of a list of feelings and behaviours the subject experienced prior to a wrestling match. The second consisted of a subjective rating of one's level of excitedness ranging from minus ten to plus ten.

Arousal Symptoms. These twenty-three diagnostics were specific to the PCPC and were developed and defined by Rushall (1977). They consist of those self-report items that can be reliably separated and identified as manifestations of pre-competition arousal states.

Estimation of Winning. This scale was synonymous with the subject's confidence level. It was defined as the individual's perception of his probability in winning the upcoming match. It was reported on a scale ranging from zero (no chance of winning) to ten (no chance of losing).

Intercollegiate Wrestler. The subjects were aged 18 to 25 years, and attended Lakehead University. The subjects

competed against each other as well as against other inter-collegiate and highschool wrestlers during the competitive season. The subjects' ability ranged from International to Novice calibre.

International - Any subject who was chosen to represent Canada on an International tour or competition. These subjects were considered to be the highest level wrestlers.

National - Any subject who placed among the top three Canadians at the Canadian Amateur Wrestling Championships during the course of this study.

Collegiate - Any subject who placed among the top three finishers at the Canadian Intercollegiate Athletic Union (CIAU) Wrestling Championships. Although national in nature this tournament was not considered to be of equal calibre to the previous category primarily due to the tournament's restriction to wrestlers attending university.

Novice - Any subject who did not qualify for any of the previous categories.

Performance The level or quality of behaviours or actions that were exhibited in any match situation. The two measures employed in this study were an objective measure in the form of the match result, and a subjective measure whereby the subject rated his performance on a scale from Great to Very Poor.

CHAPTER 2

REVIEW OF LITERATURE

Arousal

The Concept: Arousal, activation, anxiety, or energy mobilization has been a much researched concept throughout the history of psychology. Unfortunately much of the literature in this area has been contradictory and unsystemically researched (Kane, 1971; Klavora, 1975). Korman (1974) agreed, and discussed the possibility of more than one type of arousal. Years prior to this Duffy (1957) suggested that arousal was a multi-dimensional concept containing both specific as well as general characteristics. The general level of arousal of any organism was defined by Malmo (1959) as:

> ... being a continuum that ranges from one extreme of deep sleep to the other extreme of wild excitement. (p.378)

Kane (1971) further elaborated on this concept by hypothesizing that each individual has two related arousal mechanisms. The first being a "tonic arousal system" which is concerned with maintaining a gross level of arousal and the second, a "modulating arousal system" which controls the level at which the arousal system functions as well as integrates the stimulus input by appropriate facilitation or suppression of behaviours. This second mechanism Kane suggested, was highly specific to the individual. Eysenck (1967) explains arousal in a neuro-

physiological manner with the excitation and inhibition of neural impulses. He cited Teplov (1964), a Soviet psychologist, as offering a threefold description of the neural process fundamental to the behaviour of an individual. The behaviour was dependent upon the "strength", "balance of arousal and inhibition", and "mobility" of the neural impulses. Klavora (1975) cited Spielberger (1971) as developing one of the most recent and scientific conceptualizations of arousal. Spielberger's State-Trait Anxiety Theory differentiates trait anxiety, a generally acquired behavioural disposition, from state anxiety which refers to situationally aroused transitory states.

Arousal and the individual. Optimal levels of arousal for each individual vary from person to person. Malmo (1959) stated:

> ... physiological measures show a high intra-individual concordance for quantifying this arousal or activation dimension. (p.378)

Furthermore, the optimal level of arousal for any particular individual has been suggested to vary depending upon the difficulty of the task (Cratty, 1973; Oxendine, 1970). Berlyne (1967), Carron (1971) and Martens (1977) suggested other factors that might influence the optimal level of arousal for an individual, such as, level of experience, degree of introversion, and self-confidence.

Cratty (1973), Fenz & Jones (1972), Morgan (1970) and Sullivan (1964) all concluded that elite or superior athletes are able to control their arousal levels better than the less experienced athlete. Klavora (1975) cited Singer (1968) as stating that elite athletes possessed superior skill as well as the ability to control their arousal level. Moreover, in a later study Morgan (1974) concluded that a reduction in arousal after a wrestling tournament was not related to the individual's success in the tournament. Duffy (1957) stated:

> A high degree of activation may, I suggest, lead to impulsive, disorganized behaviour or to sensitive, alert, vigorous and co-ordinated response to the environment. (p. 274)

However, Bacon (1974) and Easterbrook (1959) stated that the effect of arousal was to reduce the range of cue utilization and that emotional arousal decreased responsiveness to peripheral stimuli.

In summation, then, there has been a consensus of opinion in the literature suggesting arousal to be very specific to the individual, as well as to the situation. Some of the factors affecting arousal are self-confidence, degree of experience how well the task was learned, degree of task difficulty, self-perception, and physiological factors such as muscular fatigue and lack of sleep. The controversy arises however, when the authors attempt to explain to what degree and in what direction

such factors affect the arousal of an individual.

Measurement of arousal. Throughout the history of psychology numerous methods have been employed to measure the amount of arousal an individual may be experiencing under various conditions. Some of these methods were neurological in nature (Malmo, 1959; Teplov 1964), biochemical by studying the sodium lactate concentration in the blood (Fink, Taylor & Volavka, 1969; Pitts & McClure, 1967, 1971), physiological, by means of skin conductance, respiratory ventilation, and heart rate (Schnore, 1959), psychometric tests such as IPAT 8-Parallel Form Anxiety Battery, (Cattell,1957); State-Trait Anxiety Inventory, (Spielberger, 1970); Sport Competition Anxiety Test, (Martens, 1977); and Pre-Competition Psychological Checklist, (Rushall, 1977).

However, most of the research has been confined to the laboratory setting in which case the external validity of the results must be closely scrutinized. Johnson and Hutton (1955) stated:

> ... we have as yet very little information on the much broader question of the effects of the competitive sports experience upon the individual. (p.59)

Only in the last decade has the question begun to be answered. The competitive environment poses manifestations of many threats to the individual, thereby possessing the potential to evoke changes in the arousal levels of the participants (Klavora,

1975; Martens, 1977).Past physiological measures have presented many problems in that the numerous measures did not correlate highly with each other or from individual to individual (Cratty 1973). Thayer (1967) concluded that because of theoretical as well as methodological factors psychometric measures such as self-reports would be more representative than any single physiological measure. The individual nature of arousal in conjunction with the uniqueness of the sporting environment has demanded the development of a more specialized sensitive index of arousal (Martens, 1977; Spence 1971). These tests must be refined further, however, if subtle differences in arousal are to be measured (Carron, 1975; Kroll, 1970; Lowe, 1973; Rushall, 1973, 1975, 1976).

Dermer and Berscheid (1972) reported successful use of a self-report checklist as an accurate indicator of an individual's arousal. The scale used ranged from -10 indicating extreme boredom or fatigue to +10 indicating extreme excitement or alertness. Martens (1977) stated:

> ... evidence indicated that a general self-report measure of arousal is a better predictor of theoretically related constructs than physiological variables. (p. 104).

Fiske and Maddi(1961) however postulated that self-reports may be too "indirect and subjective" to yield valid statistics. Thayer (1967) stated that factor scores on the Activation-Deactivation Adjective Checklist (AD-ACL) correlated more highly with both heart rate and skin conductance measures

than heart rate and skin conductance correlated to each other. Further support was given to this concept when Rushall (1977) successfully corroborated arousal patterns and self-report checklists for elite Olympic freestyle wrestlers.

Arousal and Performance

The Performance Concept

The relationship of arousal to performance is a complex one. It has been suggested that a slightly above average level of arousal is preferable for any type of physical activity or the performance of motor tasks (Oxendine, 1970; Sage, 1971). Anxiety that produces any lactate is debilitating to optimal performance particularly in anxiety neurotic individuals (Fink, Taylor & Volavka, 1969; Pitts, 1971). Klavora (1975) cited Oxendine (1970) as stating:

> ... that on the basis of research and other evidence, a high level of arousal is essential to optimal performance in gross motor activities involving strength, endurance and speed, but it interferes with performance involving complex skills requiring fine muscle movements, coordination , steadiness and general concentration. (p.279)

Cratty (1973), Duffy (1957) and Sage (1971) support this concept. Klavora (1975), however, conducted an experiment in Edmonton, Alberta with 300 high school football and basketball players to test this hypothesis. He concluded:

> Oxendine's propositions regarding differential effects of playing positions on optimal emotional arousal of football players, whose playing assignments differed does not hold for the subjects in this study.(p.287).

Morgan and Hammer (1974) found similar results with twenty-nine freestyle wrestlers. Of the numerous factors which effect performance Morgan (1974) suggested pre-competition anxiety to be the most important. This in turn, he suggested, may be affected by task difficulty, i.e. tough or weak opponent. Fundamental to the scientific analysis of the arousal-performance relationship is the standardization of the concept of performance and the establishment of individual baseline levels of anxiety for the athlete.

The Arousal-Performance Relationship. The notion of an optimal level of arousal to produce an optimal performance reflects psychological theory based upon, for the most part, research with small animals in the laboratory and not man in a psychoergokinetic context (Morgan, 1970).

The above statement refers to one of two prominent theories that attempts to explain the arousal-performance relationship. This theory based on the Yerkes-Dodson Law (1908) is referred to in the literature as the Inverted-U theory. Duffy (1957), Kane (1971) and Korman (1974) supported this theory which postulates a curvilinear relationship between arousal and performance whereby an increase or decrement in the optimal anxiety level will result in a less than

optimal performance. Oxendine (1970) qualified the theory by stipulating a number of factors which must also be accounted for in order to achieve an optimal performance, such as, task difficulty, anxiety trait level of the individual and environmental factors. Corcoran (1965) varied the arousal level of nine subjects by depriving them of sleep before performing a number of motor tasks. His results supported those of Oxendine in that the arousal performance relationship is a qualified Inverted-U relationship.

The Drive theory, postulated originally by Hull (1943) hypothesizes a linear relationship between arousal and performance. An increase in drive (arousal) increases the probability that an optimal performance will occur. Spence and Spence (1966) further qualified the theory by suggesting that the dominant response be the correct response if an optimal performance is to occur. On the other hand, if the dominant response was not well-learned or an incorrect response, increase in arousal will lead to impaired performance. The crux of the theory is to establish in each situation if the dominant habit is the correct response for that situation. The literature, to date has not proven nor disproven this either in the laboratory or the actual competitive environment.

Rushall (1976) employed the individual case study approach using self-reporting techniques within the actual competitive environment to offer support to the drive theory. He observed a Canadian Olympic wrestler for 20 matches.The wrestler rated his arousal level on a scale from -10 to +10 prior to each

match. The arousal performance relationship was positive and linear.

In summation then, the literature reveals much contradictory evidence about arousal or anxiety and the arousal-performance relationship. The concept of arousal within the competitive environment must be further researched (Morgan, 1970). The methods of measures must be more standardized (Thayer, 1967). The concept of optimal performance and its relationship to arousal must be researched further (Martens, 1977).

CHAPTER 3

METHODOLOGY

Research Design

The research design selected for this thesis was a number of replications of a single subject case study.

The Subjects

The subjects consisted of ten varsity wrestlers attending Lakehead University. One subject was an "N/C" carded athlete, supported by Sport Canada. Another wrestler was a fourth year graduating student. A third wrestler was a graduate student. These wrestlers were the only members to previously have won a medal at the Canadian Intercollegiate Athletic Union (CIAU) Championships. The remainder of the team was comprised of first and second year students.

Measurement Technique

From a review of the literature concerning this topic, it was felt some form of self-report would be the most appropriate measurement technique to suit the purpose of this study. The Pre-Competition Psychological Checklist (Rushall, 1977) was constructed as a comprehensive, valid checklist applicable to sporting environments. Figure 1 is an illustration of this checklist. It consisted of a list of 23 arousal symptoms (diagnostics), an excitedness (arousal) scale ranging

PRE-COMPETITION PSYCHOLOGICAL CHECKLIST

NAME_____

DATE_____ _____

EVENT_____

If any of the following descriptions apply to you as you feel now mark them "yes." If not, then answer "no." Complete this form before you see your coach prior to the race.

	YES	NO
1. Can't be bothered attitude	___	___
2. Drowsy, sleepy feeling	___	___
3. Feeling of being alone	___	___
4. Feeling of weakness	___	___
5. Inadequate attention to preparation	___	___
6. Impatient feeling	___	___
7. Aggressive feeling towards others	___	___
8. I have cried a little	___	___
9. Some shaking and trembling	___	___
10. Poor movement coordination	___	___
11. Trouble seeing and remembering	___	___
12. I have vomited	___	___
13. I have diarrhea	___	___
14. I have urinated several times	___	___
15. I have had frequent bowel movements	___	___
16. Nervous	___	___
17. Butterflies in the stomach	___	___
18. Lack of confidence	___	___
19. Do not feel well	___	___
20. I do not think that I will be able to perform well	___	___
21. Very confident	___	___
22. Can't take the competition seriously	___	___
23. Frightened	___	___
24. Other (describe)_____	___	___
_____		
TOTAL NUMBER OF EACH	_____	_____

Excitedness Scale

-10 -5 0 -5 -10

Bored
Sleepy
Very relaxed

Normal

Extremely excited
Wild
Raging mad

Estimation of Winning

0 1 2 3 4 5 6 7 8 9 10

No chance of winning

50-50 chance

No chance of losing

Event or game result _____

Rate how you performed: Great__ Good__ Normal__ Poor__ Very poor__

Figure 1. PCPC self-report checklist employed in this study.

from -10 to +10, the match result, and a subjective evaluation of the subject's quality of performance. The arousal symptoms fell within four general categories: feelings, external emotional behaviours, internal emotional behaviours, and performance expectations. As such it was felt by this author, relative to similar self-report checklists, that the PCPC offered high face validity. A list of definitions (Appendix A) explaining each diagnostic was distributed with the initial PCPC. The subjects read these definitions and posed questions on points of clarification. Three trial sessions were held during various practices to familiarize the subjects with the use of the instrument.

An estimation of Winning Scale was added to the PCPC. Four separate test-retest reliability checks were completed at various times during the competitive season for this scale. The reliability check was calculated as follows. Two measurements of estimation of winning were made for the same match. The first was made when the athlete was called to be "on deck", usually about ten minutes before the scheduled bout. The second estimation was made just prior to stepping on the mat to compete. All reliability checks were completed by all subjects at the same four tournaments. Pearson-product moment correlation coefficients for these checks were .89, .91, .82 and .87. These figures, which are significant at the .05 level, indicated that the estimation of winning scale was reliable.

The subjects were instructed to complete the pre-match portion of the PCPC without consultation with any

individual upon hearing his name called to be "on deck". This portion of the PCPC consisted of checking those arousal symptoms that applied to him at that time, estimating his present arousal level, and estimating his chance of winning the upcoming match. The post-competition assessment of the PCPC consisted of the subject recording the match result and making a subjective evaluation of his match performance on a five category scale.

Data Collection

Data were gathered over the competitive season from November, 1977 to the end of February, 1978. The subject competed in Ontario and in parts of the United States. The competitive season culminated with the CIAU Championships. For various reasons, the number of tournaments and consequently matches, wrestled by each subject varied. The pre-match reporting process occurred for each subject approximately ten minutes prior to his match. The report required less than three minutes to complete. The post-match completion of the PCPC, occurred within five minutes of the completion of the match and required less than one minute to complete.

Subject Control

Subjects were informed of the nature of the PCPC, its contents, and provided with a list of definitions to clarify the meaning of the 23 diagnostics. Intermittent restress-

ing of these definitions was undertaken by the investigator. The reports were completed on a voluntary basis. However, once a subject agreed to participate in this study, he was asked to complete a report for every match throughout the competitive season and to complete it as honestly and accurately as possible. As mentioned previously, the subjects, as a group, initially were assembled and informed of the procedures required to complete each form accurately. This procedure was repeated in the second half of the competitive season. Three pilot trials were conducted during practises under simulated competition conditions prior to the commencement of the actual study. The purpose of this procedure was to eliminate any confusion or inconsistencies with the definitions or the reporting technique itself.

Data Analysis

Psychological Checklist Summary. A checklist summary sheet of pre-match arousal symptoms was categorized with each of the five performance ratings. Figure 2 is an illustration of this instrument employing data derived from Subject 5. The Psychological Checklist Summary for each subject can be found in Appendix B. These were utilized to determine whether or not a wrestler illustrated a pattern of arousal symptoms prior to a specific performance rating. A pattern was considered to be demonstrated if the following three conditions were satisfied. First, the frequency of occurrence within a specific performance category for any diagnostic had to be at least 64

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S5 (21)

DIAGNOSTIC	PERFORMANCE RATING				
	2	11	4	4	
	Great	Good	Normal	Poor	Very Poor
1. Can't be bothered					
2. Drowsy, sleepy					
3. Feels alone					
4. Feels weak		1	1		
5. Inadequate preparation					
6. Impatient	1	2	1	2	
7. Aggressive feelings	1	3	1	1	
8. Cried					
9. Shaking, trembling				1	
10. Poor coordination					
11. Trouble seeing, remembering					
12. Vomited					
13. Diarrhea					
14. Urinated frequently		2	1	1	
15. Frequent bowel movements		4		3(75)	
16. Nervous	2(100)	9(81)	3(75)	4(100)	
17. Butterflies	1	1		2	
18. Lack of confidence					
19. Did not feel well					
20. Thinks will not perform well					
21. Very confident	2(100)	9(81)	3(75)	3(75)	
22. Can't be serious		1			
23. Frightened				1	

Figure 2. Frequency table for the percentage occurrence of arousal diagnostics within each performance category obtained from the PCPC reports of subject 5.

percent. This value was selected since it is analogous to the amount of common variation between two distributions with a correlation of .80. The value .80 was considered to be the lower limit for a diagnostic to have significance as a "performance pattern indicator". This rule was relaxed when rounding to the nearest decile was required with high total frequencies of occurrence. In those circumstances 60 percent was the criterion used. Second, if the performance pattern indicator was present under only one category then it was considered to be a "performance category discriminator". A diagnostic had to qualify first as a performance pattern indicator before it was considered as a performance category discriminator. Third, a diagnostic required a minimum of three performance category checks in order to have reliability as a pattern indicator or a performance category discriminator. This final qualification was relaxed to two data points for the Great and Poor performance categories due to the decreased likelihood of these categories being checked. This hierarchy of conditions provided a consistent method of determining whether or not the subject exhibited a reliable pattern of arousal symptoms specific to each performance category.

Arousal Estimate and Performance Relationship. Summary graphs, located in Appendix C, were constructed for each subject with performance ratings along the horizontal axis and arousal estimations along the vertical axis. Figure 3 is an illustration of this graph using data from subject 5. Points

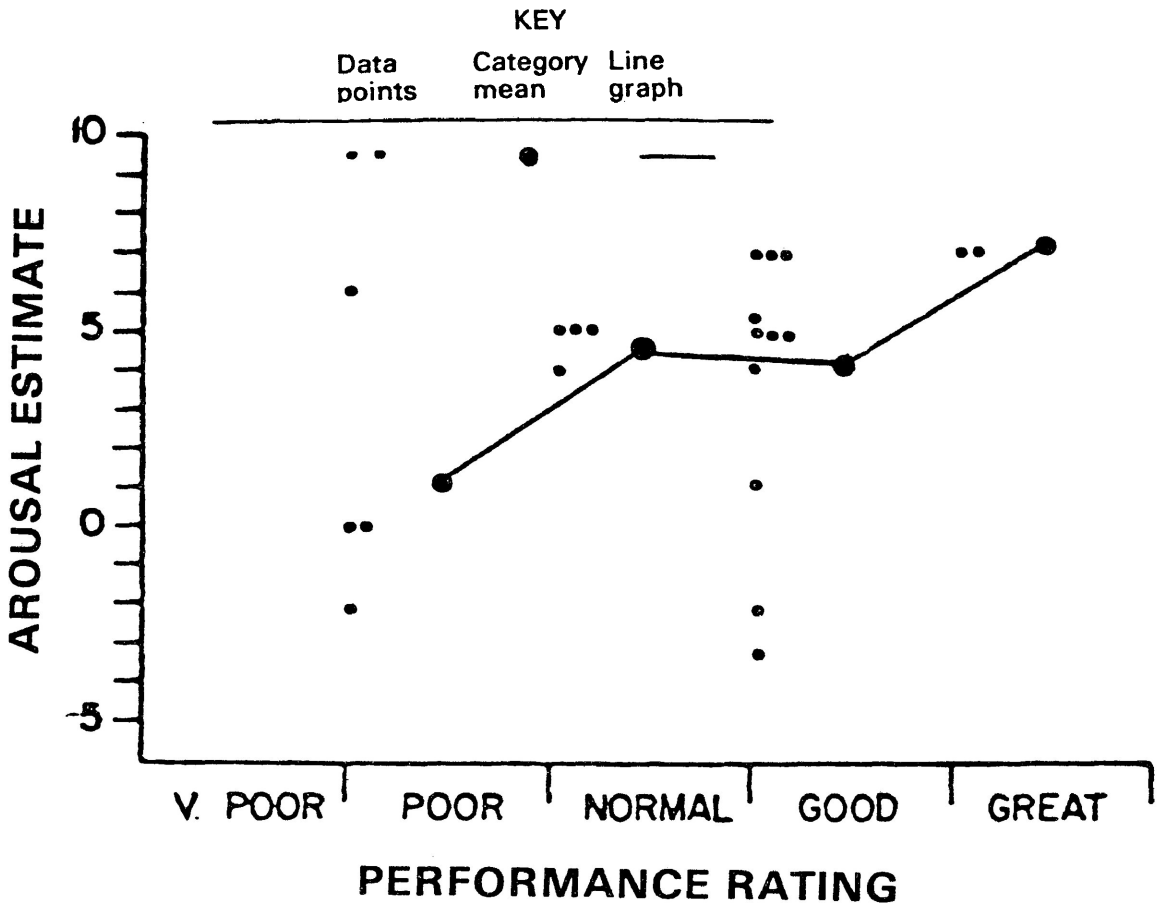

Figure 3. The relationship between arousal level and performance obtained from the PCPC reports of subject 5.

were plotted for each match using the arousal estimate and the subjective performance rating of the PCPC. The mean arousal level for each performance category was calculated from this summary. For the analysis of all relationships, a minimum of three data points was required to calculate the factor averages, except in the Great and Poor performance category where two data points were felt to be sufficient. An arbitrarily defined appreciable change from one factor level to another was set at one whole unit on the arousal scale (Rushall, 1976). If this minimum level of difference was not demonstrated in the data, then the factor variation involved was not considered to be of practical significance. These graphs made it possible to analyse the arousal-performance relationship for each subject. These relationships are summarized in Table 3.

Estimate of Winning and Performance Relationship. Summary graphs, Appendix C, were constructed for each subject with performance ratings along the horizontal axis and estimates of winning along the vertical axis. Figure 4 is an illustration of this graph using the data from subject 5. Points were plotted for each match using the estimation of winning scale and the subjective match evaluation of the PCPC. The mean estimate of winning for each performance category was calculated from this summary. For the analysis of all relationships, a minimum of three data points was required to calculate the factor averages, except in the Great and Poor performance

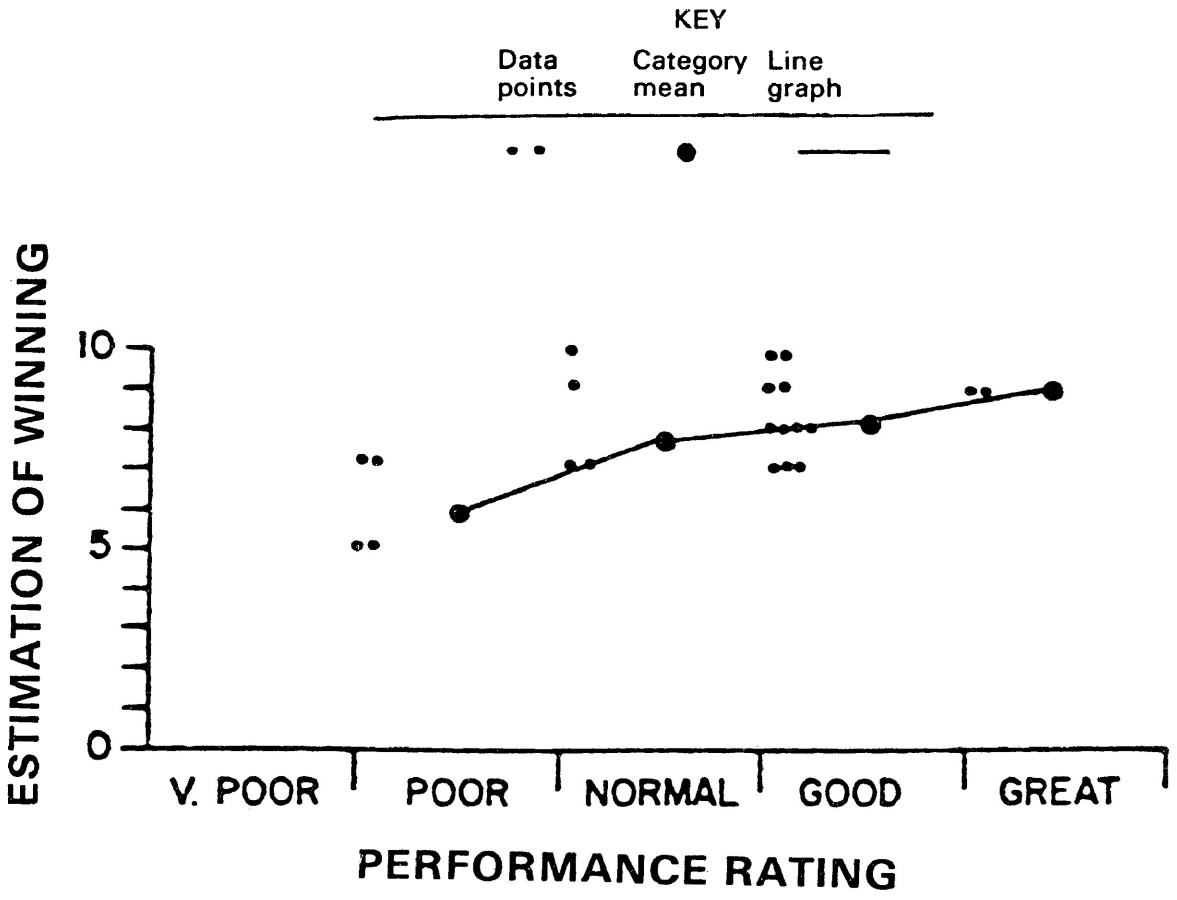

Figure 4. The relationship between estimation of winning and performance obtained from the PCPC reports of subject 5.

category where two data points were felt to be sufficient. An arbitrarily defined appreciable change from one factor level to another, was set at one whole unit on the estimate of winning scale. If this minimum level of difference was not demonstrated in the data, then the factor variation was not considered to be of practical significance. These graphs made it possible to analyse the estimate of winning-performance relationship for each subject. These relationships are summarized in Table 4.

Estimate of Winning and Arousal Relationship. Summary graphs, located in Appendix C, were constructed for each subject with estimation of winning along the horizontal axis and arousal estimation along the vertical axis. Figure 5 is an illustration of such a graph employing data from subject 5. Points were plotted for each match using the estimation of winning scale and arousal scale data from the PCPC. The mean arousal estimate for each estimation of winning level was calculated from this summary. For the analysis of all relationships, a minimum of three data points were required to calculate factor averages. An arbitrarily defined appreciable change from one factor level to another was set at one whole unit on the arousal scale. If this minimum level of difference was not demonstrated in the data, then the factor variation involved was not considered to be of practical significance. These graphs made it possible to analyse the estimate of winning-arousal estimation relationship for each subject.

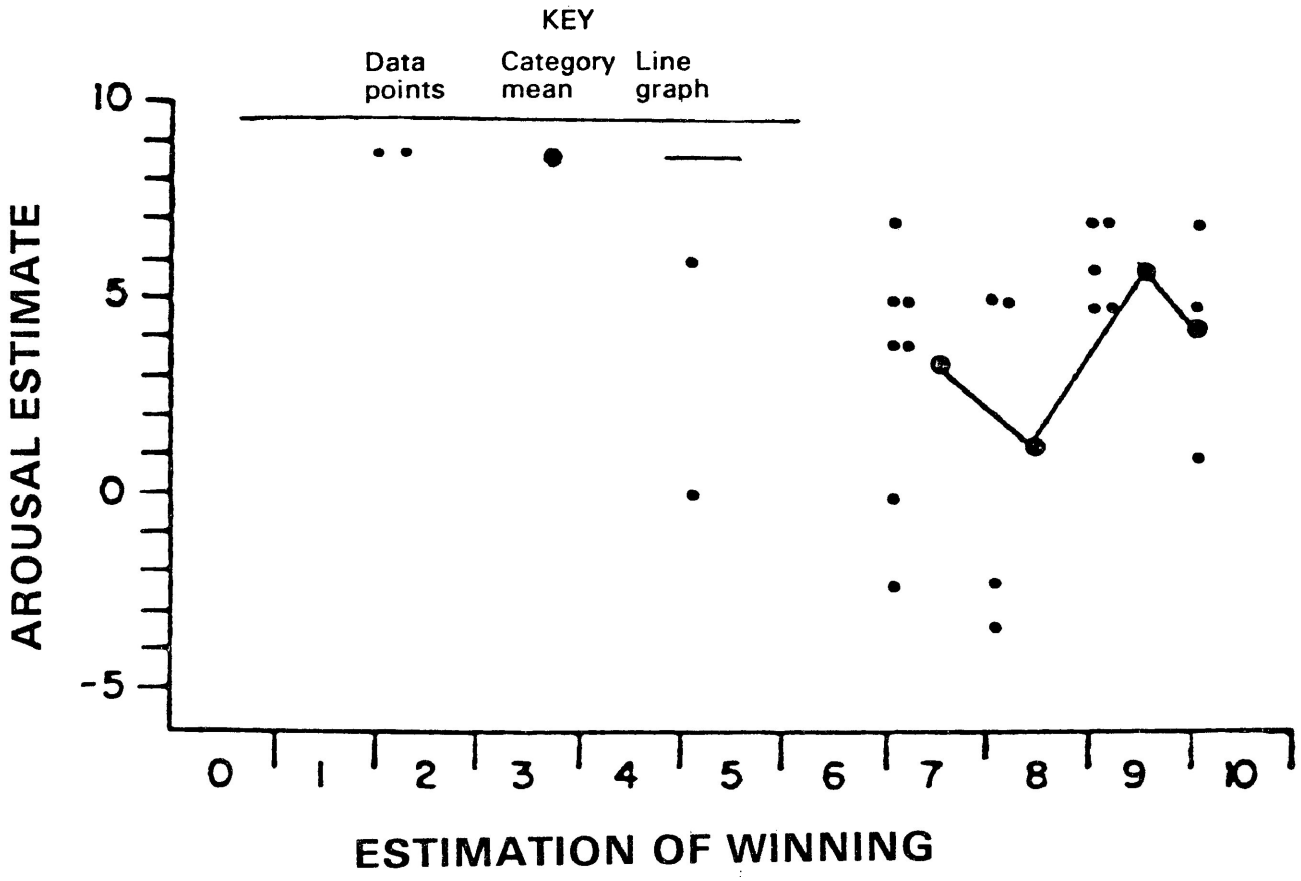

Figure 5. The relationship between estimation of winning and arousal level obtained from the PCPC reports of subject 5.

Arousal, Estimate of Winning, and Performance Interaction. Summary graphs (Appendix C) were constructed for each subject with arousal estimate for each performance category along the vertical axis and the estimation of winning for each performance category along the horizontal axis. Figure 6 is an illustration of such a graph employing data from subject 5. Points were plotted using the mean scores for arousal estimate and estimate of winning that were obtained for each performance category. These graphs were used to examine any patterns that occurred in the interaction of arousal level, performance rating, and estimate of winning. For an interaction to be demonstrated, the data points had to be ordered in some logical manner. That is, a progression in the performance categories would be obvious among the points plotted.

Summary

A checklist summary was compiled for each wrestler in an attempt to determine patterns of arousal symptoms specific to a performance category. Summary graphs were constructed for each subject to examine the nature of the arousal-performance relationship, estimate of winning-performance relationship, as well as the relationship between arousal estimation and estimate of winning. Graphs were also constructed for each subject in an attempt to discover the existence of patterns of interaction between arousal estimation, performance, and estimation of winning.

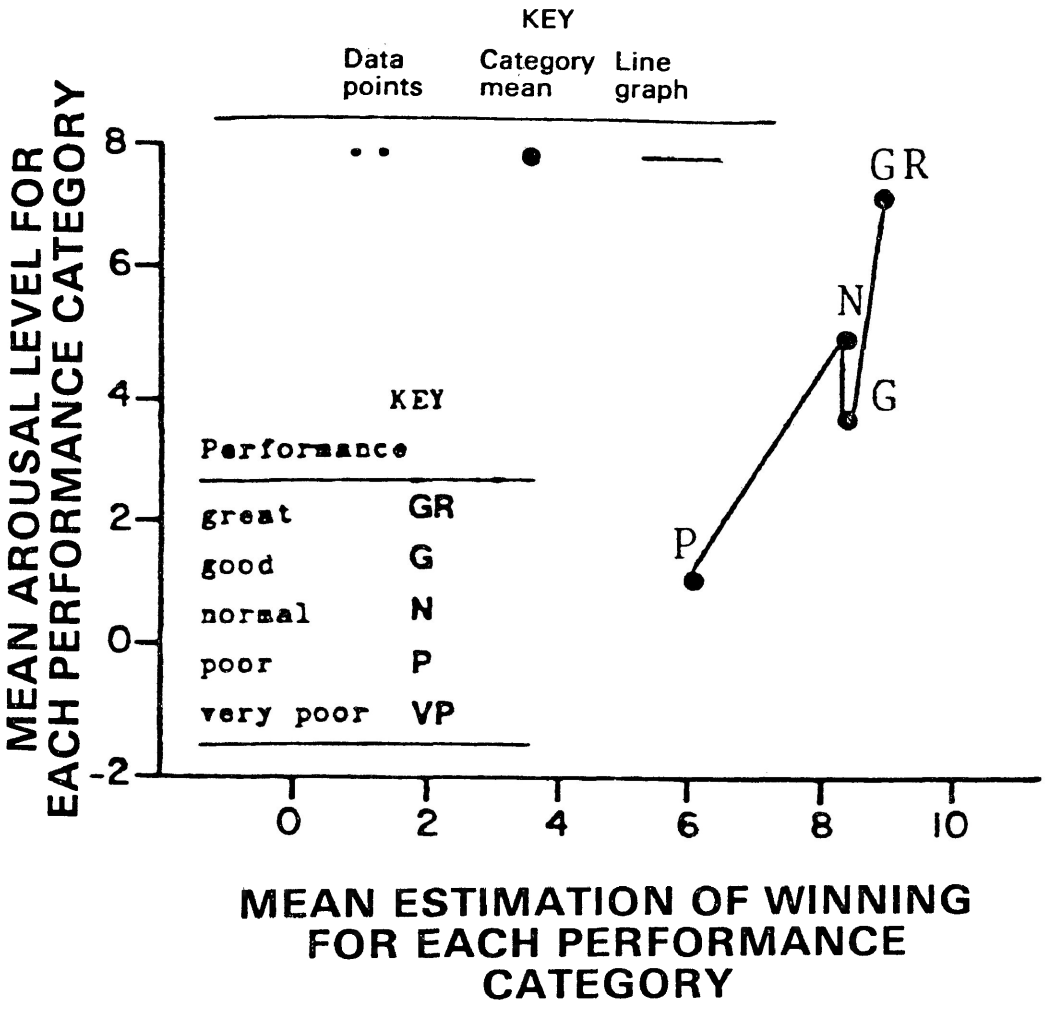

Figure 6. The interaction of arousal, performance and estimation of winning compiled from the summary graphs of subject 5.

CHAPTER 4

RESULTS

Psychological Checklist Summaries

PCPC summary tables for all subjects are included in Appendix B. Distinct arousal patterns for one or more performance levels were exhibited by all subjects. These patterns ranged across all categories with most subjects illustrating more than one pattern. Table 1 lists a comparison of the arousal patterns exhibited by each subject, the number of times a pattern was exhibited for a particular performance rating and each subject's calibre of wrestling. Table 2 illustrates the percentage of normal or better performances for each subject, and its relationship to the calibre of the wrestler. Due to the individual nature of the arousal patterns, the results of the individual subject will be discussed.

Subject 1 (S1). Of 26 performances by this national calibre wrestler, 25 fell within the Great to Poor classification and each of these four levels illustrated some form of arousal pattern. A wide range of diagnostics (18 of 23) were checked across all performance ratings. S1 checked the diagnostic "Nervous" as a performance indicator (PI) in each of the four categories. This diagnostic was the only PI for the Normal classification. The same five diagnostics were checked for both the Great and Poor levels of performance. As well the diagnostic "Frightened" was checked as a pattern indicator

TABLE 1

The relationship between the Calibre of the wrestler and the number of Arousal Patterns exhibited for each Performance Category.

Subject	Calibre	Exhibited Arousal Patterns	
1	National	Great (3) Normal (6)	Good (11) Poor (5)
2	Collegiate	Good (10) Poor (4)	Normal (4) Very Poor (2)
3	International	Great (2) Normal (4)	Good (12)
4	Collegiate	Good (12)	
5	International	Great (2) Normal (4)	Good (11) Poor (4)
6	Novice	Good (3)	
7	National	Great (2) Normal (3)	Good (4) Poor (3)
8	International	Great (2) Normal (12)	Good (11)
9	Novice	Normal (3)	Very Poor (2)
10	Novice	Normal (3)	Poor (3)

TABLE 2

The relationship between the percentage of Normal or better performance and the Calibre of each subject.

Subject	Calibre	Normal or better performances	Total number of performances	Percentage
8	International	25	25	100
3	International	18	19	94.7
4	Collegiate	15	18	83.3
5	International	17	21	80.9
1	National	20	26	76.9
2	Collegiate	14	20	70.0
7	National	9	13	69.2
10	Novice	4	9	44.4
6	Novice	5	12	41.6
9	Novice	4	10	40.0

only for the Poor performance appraisal. This served as the only performance discriminator (PD) for this subject. There existed no uniform or appreciable change in the number of diagnostics checked under the different categories.

Subject 2 (S2). The range of performances indicated by this Collegiate calibre wrestler covered the Good to Very Poor classifications. Of 23 diagnostics, 20 were checked at one time or another. Eight occurred often enough to qualify as PIs. Six diagnostics were checked as PIs for the Poor performance category, four of which were also depicted for the Good performance category. The diagnostics "Weak" and "Nervous" were PIs in three of the four categories. The diagnostic "Frightened" was a PD for the Good level of performance and "Impatient" was a PD for the Normal classification. No significant change was illustrated in the number of diagnostics checked for the various performance categories.

Subject 3 (S3). Eighteen of nineteen performance levels were noted as Normal or better by this International calibre wrestler. Arousal patterns were evidenced in each of these classifications. Only 12 of the possible 23 diagnostics were indicated for the performance appraisals. Of these, three were PIs. The diagnostics "Impatient" and "Nervous" were common to both the Great and Good self-perceived performances with "Shaking, Trembling" being the PD for the Good category. "Nervous" was the only PI for the Normal level of performance. The number of diagnostics checked were less for the Great cate-

gory than for the Good classification.

Subject 4 (S4). For this Collegiate calibre wrestler, four performance categories were checked with 12 of 18 self-perceived performances being rated as Good. Of 23 diagnostics, 13 were checked at one time or another. Of these "Impatient" and "Very Confident" were PIs as well as PDs for the Good performance classification. No significant change was illustrated in the number of diagnostics checked per category. This subject evidenced the most consistent performance self-appraisal of all subjects.

Subject 5 (S5). This International calibre wrestler checked four classifications ranging from Great to Poor. Eleven of twenty-one performances were rated as Good. Twelve of twenty-three diagnostics were checked across all levels of performance. Three of these met the requirements of being classified as PIs. They were "Frequent bowel movements", "Nervous" and "Very Confident". The latter two diagnostics were common to all performance levels. The only PD was "Frequent bowel movements" for the Poor classification. The number of diagnostics checked per category were fairly consistent across all levels.

Subject 6 (S6). A Novice calibre wrestler, this subject checked four classifications ranging from Good to Very Poor. Fifty percent of self-perceived performance competencies were classified as Very Poor. Only six of a possible twenty-three diagnostics were checked at one time or another. Five

of these were common to three of the four categories. Four PIs were indicated "Impatient", "Aggressive feelings", "Nervous" and "Very Confident". They were also PDs and all fell under the Good performance rating. No appreciable change was illustrated in the number of diagnostics checked for each category.

Subject 7 (S7). All five categories were checked by this National calibre wrestler with a fairly even frequency of occurrence. Fourteen of twenty-three diagnostics were marked under one rating or another, with three, "Impatient", "Nervous" and "Very Confident" being PIs. "Very Confident" was the only PD. It occurred in the Great performance classification. The diagnostic "Nervous" was the only PI for the Good category and "Impatient" was the only PI for the Poor performance rating. The other two self-perceived performance competencies, Great and Normal, each contained two PIs. No marked variation was evidenced in the number of diagnostics checked per category.

Subject 8 (S8). All performances were classified by this International calibre wrestler as Normal or better. Only eight of the twenty-three diagnostics were checked and of these, three "Impatient" "Nervous" and "Very Confident" were PIs. The first PI was also the only PD falling under the Normal rating. The latter two PIs were common to all three classifications. An appreciable change was evidenced in the number of diagnostics checked between the Good and

Great classifications. The number of diagnostics checked under the Good category was double that of the Great category.

Subject 9 (S9). This Novice wrestler checked four categories ranging from Good to Very Poor with 6 of 10 performances classified as Poor or Very Poor. Only 8 of 23 possible diagnostics were checked at one time or another. Two diagnostics "Shaking, trembling" and "Nervous" were both PIs and PDs, the latter under the Normal category rating and the former under the Very Poor classification. There was little variation in the number of diagnostics checked under each level.

Subject 10 (S10). This Novice wrestler also checked the categories ranging from Good to Very Poor, with a fairly even frequency of occurrence. Across these four classifications, 17 of 23 diagnostics were checked at one time or another. Six PIs were evidenced in the Normal category while four PIs were indicated for the Poor classification of performance. Each of these PIs were also PDs under their respective performance rating. There was an appreciable decrease in the number of diagnostics checked in the Good category as compared to the other levels of performance.

Summary. Each athlete illustrated at least one distinct arousal pattern for a performance classification. Most subjects illustrated a different arousal pattern for different performance categories. Pattern indicators for

a performance category ranged from one to six diagnostics with most averaging two or three PIs for a particular performance level appraisal. The total number of diagnostics checked by each subject ranged from 6 to 20 out of a possible of 23. All subjects evidenced at least one PI that also qualified as a PD. Only International and National Calibre wrestlers illustrated PIs for the Great performance rating. Table 1 lists a comparison of the arousal patterns exhibited by each subject, the number of times a pattern was exhibited for a particular performance rating and the calibre of each subject. Table 2 illustrates the percentage of normal or better self-perceived performances by each subject and its relationship to the calibre of the wrestler. Three of the four highest percentages were those of the International Calibre wrestlers. These subjects perceived more than 80 percent of their performances as normal or better. The Novice wrestler illustrated the lowest percentages of normal or better performances ranging from 40 to 44 percent.

Arousal Estimate and Performance Relationship

Table 3 presents a summary of the changes in mean arousal level for each performance category and the total change in mean arousal levels from the lowest to the highest checked performance category. Arousal-performance graphs for all subjects are included in Appendix C.

TABLE 3

A Summary of the change in the Mean Arousal Level for each Performance Category and the total change in these means from the lowest to the highest performance categories checked.

Subject	Calibre	Mean Arousal Level for Each Performance Category					Summary Category Change
		Great	Good	Normal	Poor	Very Poor	
3	International	5.00 ↑	3.58 ↑	2.00	--	--	3.00 ↑
5	International	7.00 ↑	3.72 ↓	4.75 ↑	1.00	--	6.00 ↑
8	International	6.00 ↑	3.81	3.75	--	--	2.25 ↑
1	National	4.00	3.64 ↑	1.16 ↓	2.40	--	1.60 ↑
7	National	3.00 ↑	0.66	0.33	1.00	--	2.00 ↑
2	Collegiate	--	1.30	1.00 ↑	-1.00	-1.50	2.80 ↑
4	Collegiate	--	0.83 ↑	-1.33	--	--	2.16 ↑
6	Novice	--	3.33	--	--	1.83	1.50 ↑
9	Novice	--	--	-1.33 ↓	1.50	1.50	2.83 ↓
10	Novice	--	--	1.66 ↑	-1.00 ↓	1.00	0.66

↑ significant increase from lower performance category.

↓ significant decrease from lower performance category.

Subject 1. The mean arousal level for this wrestler increased in each ascending category from Normal through Great. The increase from Normal to Good was significant while the increase from Good to Great was not. There was a total significant increase across all levels of 1.6 units.

Subject 2. There was an overall increase in the mean arousal level of 2.3 from the Very Poor to Good rating. The increase from Poor to Normal was significant, while the increase from Very Poor to Poor and from Normal to Good was not.

Subject 3. The mean arousal level of this subject increased significantly from the Normal to Good and from the Good to Great levels. The increase across all categories was 3.0 units.

Subject 4. The mean arousal level increased significantly from the Normal to Good category. These two self-appraisal levels were the only two categories with enough data points for comparison purposes. The total increase in mean arousal level was 2.16 units.

Subject 5. This wrestler showed a total increase in mean arousal levels over all categories of 6.0 units. A significant increase was evidenced from the Poor to Normal rating and from the Good to Great rating. A significant decrease in mean arousal levels was evidenced from the Normal to Good category.

Subject 6. Data points were such that mean arousal levels could be calculated for only two of the four categories

checked. The mean arousal level for the Very Poor category was 1.83 while the mean arousal level for the Good category was 3.33. This was a significant overall increase of 1.5 units.

Subject 7. There was a total increase in mean arousal levels for this subject of 2.0 units. This significant increase occurred between the Poor and Great categories.There was a nonsignificant increase from Normal to Good category and nonsignificant decrease from Poor to Normal category.

Subject 8. This subject checked only three categories and illustrated an overall increase in mean arousal levels of 2.25 from the Normal to Great performance classifications. The increase between the Normal and Good categories was nonsignificant while the increase from Good to Great was significant being 2.19 units.

Subject 9.This wrestler illustrated an overall significant decrease in mean arousal levels of 2.83 from the Poor to the Normal performance appraisals. There were not sufficient data points in the other ratings to calculate averages.

Subject 10. This subject illustrated a nonsignificant overall increase in mean arousal levels of 0.66 units from the Poor to Normal classifications. There were not enough data points to calculate means for the remaining categories.

Estimate of Winning and Performance Relationship.

Table 4 presents a summary of the change in the mean estimates of winning for each performance category and the

TABLE 4

A Summary of the change in the Mean Estimate of Winning for each Performance Category and the total change in these means from the lowest to the highest categories checked.

Subject	Calibre	Mean Estimate of Winning Levels for Each Performance Category					Summary Category Change
		Great	Good	Normal	Poor	Very Poor	
3	International	6.50 ↓	8.20 ↑	7.00	--	--	-0.50
5	International	9.00	8.27	8.25 ↑	6.00	--	3.00 ↑
8	International	8.25	9.14	9.33	--	--	1.08 ↓
1	National	5.00 ↓	6.14	5.66	5.55	--	-0.55
7	National	6.75	5.83	5.00	--	--	1.75 ↑
2	Collegiate	--	5.50	6.00	5.55	5.00	0.50
4	Collegiate		9.50 ↑	7.33	--	--	2.25 ↑
6	Novice	--	9.16	--	--	6.08	3.08 ↑
9	Novice	--	--	6.16	6.75 ↑	5.00	1.16 ↑
10	Novice	--	--	7.00 ↑	5.00 ↓	6.50	0.50

↑ significant increase from lower performance category.

↓ significant decrease from lower performance category

total change in these average estimates from the lowest to the highest performance categories checked. The Estimate of Winning-Performance graphs for all subjects are included in Appendix C.

Subject 1. A significant increase in the mean estimate of winning was evident from the Good to Great category. There was an overall decrease of 0.55 in the mean estimate of winning across all levels of performance for this subject.

Subject 2. This wrestler exhibited an oscillating pattern of mean estimates of winning across four categories. The total change in the mean estimate of winning from the Very Poor to Good rating was 0.05.

Subject 3. An International Calibre wrestler, this subject illustrated a significant increase of 1.2 from the Normal to Good levels of performance, but then exhibited a significant decrease from the Good to Great levels. The overall change in mean estimate of winning was -0.50.

Subject 4. An overall increase of 2.23 was evidenced by this Collegiate calibre wrestler between the Normal and Good performance classifications. Data points were insufficient to calculate averages for the other two categories.

Subject 5. A significant increase of 2.25 was evidenced from the Poor to Normal classifications. An overall increase of 3.0 was illustrated across all categories of performance.

Subject 6. Only two categories contained enough data

points to calculate means. This significant increase of 3.08 occurred between the Very Poor and Good categories.

Subject 7. No significant increases in mean estimates of winning were illustrated between the Normal through Great self-perceived performance competencies. The overall increase of 1.75 across all categories was significant.

Subject 8. There was a gradual nonsignificant decrease between the Normal to Good and Good to Great performance levels that showed an overall significant decrease of 1.08 between the performance extremes.

Subject 9. This Novice calibre wrestler showed a marked increase of 1.75 from the Very Poor to Poor performance ratings and a decrease of 0.59 from the Poor to Normal classifications.

Subject 10. A Novice wrestler, this subject showed a significant decrease of 1.5 between the Very Poor and Poor performance categories and a significant increase of 2.0 between the Poor and Normal classifications, for a total nonsignificant increase across all levels of 0.5.

Summary. No consistent relationship between the estimate of winning and performance level was evidenced. Subjects S1, S2, S3 and S9 illustrated first an increase in mean estimates of winning and then a decrease. S10 illustrated first a decrease and then an increase across all categories. S4, S5, S6 and S7 showed increases through all categories. S8 was the only athlete who illustrated a decrease across all categories.

Five wrestlers illustrated overall significant increases, two showed insignificant increases, two evidenced insignificant decreases and S8 offered the only significant decrease in mean estimates of winning across all performance ratings.

Estimate of Winning and Arousal Relationship.

S1 and S5 illustrated oscillating relationships between estimates of winning and arousal levels. S3 and S4 showed overall nonsignificant increases in both estimates. S2, S6, S7 and S10 did not display sufficient data to graph a relationship between the estimate of winning and arousal levels. S8 showed a significant decrease in arousal related to a significant increase in estimate of winning. S9 illustrated similar arousal levels across all estimates of winning.

Arousal, Estimate of Winning, and Performance Interaction.

Graphs depicting the relationship between the mean arousal level for each performance rating and the mean estimate of winning for each performance category for all subjects are included in Appendix C.

Subject 1. No pattern of increase or decrease in either arousal or estimate of winning was demonstrated by this subject.

Subject 2. An oscillating change in mean estimate of winning was accompanied by an overall significant increase in mean arousal level for ascending performances.

Subject 3. A similar pattern of oscillation in the estimate of winning was related to a significant increase in mean

arousal level across all ratings.

Subject 4. This wrestler demonstrated a significant increase in both estimates of winning and arousal from the Normal to Good classifications of performance.

Subject 5. An overlapping but significant increase in mean arousal level in the Poor through Great categories related to an equally significant increase in estimate of winning for this International calibre wrestler.

Subject 6. An increase in both estimates was evidenced for this wrestler from the Very Poor to Good categories.

Subject 7. A nonsignificant increase in arousal and estimate of winning was illustrated from Normal to Good with a significant increase in both measures across all categories.

Subject 8. This International calibre wrestler matched a significant increase in arousal levels with a significant decrease in estimates of winning in the Normal through Great classifications.

Subject 9. This subject demonstrated a decrease in both arousal and estimates of winning from the Poor to Normal category.

Subject 10. This individual evidenced a significant increase in both arousal and estimate of winning from the Poor to Normal level of performance.

Summary. S4, S5, S6, S7 and S10 demonstrated overall significant increases in both mean arousal levels and mean estimates of winning with increased levels of performance. S1 showed no pattern. S2 and S3 illustrated oscillating patterns in estim-

ates of winning with increases in arousal levels. S8 depicted an inverse relationship between arousal and estimates of winning. S9 demonstrated a significant decrease in both measures as performance ratings increased.

CHAPTER 5

DISCUSSION

Psychological Checklist Summary

In discussing arousal patterns each International calibre wrestler displayed three performance indicators (PI) and one performance discriminator (PD). The diagnostic "Nervous" was common to the three of them, "Very Confident" was common to S5 and S8 and "Impatient" was checked by both S3 and S8. In each of the Novice class subjects all performance indicators were also performance discriminators, thereby suggesting little ability to discriminate between arousal symptoms. The wide range of the number of diagnostics checked (International subjects,12,12 and 8; Novice wrestlers, 6, 8 and 17) illustrates the individual nature of the diagnostic patterns and self-perceptions. As an example, consider the diagnostic "Frightened" for subject 1 and subject 2. In each case the symptom was both a performance indicator and a performance discriminator. However, for S1 it was a discriminator for the Poor performance rating and for S2 it was a discriminator for the Good performance category. Therefore, in interaction with the respective performance indicators of each subject, this diagnostic is related to Poor performances for S1 whereas it is related to Good performances for S2.

The self-perceived performance competencies of the Novice subjects evidenced an absence of Great performance

appraisals coupled with a majority of Poor and Very Poor ratings. The opposite was found to be the case for the International class subjects. With them, more than 80 percent of all performances were rated as Normal or better, with at least two performances rated as Great. With respect to the number of diagnostics checked under the Great classification, in each case the number was approximately half as many as were checked under the Good level of performance. This suggests an increased sensitivity or awareness of the symptoms being experienced prior to the emission of a Great performance.

As mentioned in the Delimitations section of this study because of the intact nature of the group and the number of subjects involved, only restricted generalizations are possible. However, in this investigation it was evident that the highest level wrestlers illustrated the highest self-perceptions of performance standards and the lowest calibre subjects illustrated the lowest self-perceptions of performances. The highest level subjects also illustrated more clearly defined patterns of arousal symptoms while the lowest calibre wrestlers displayed patterns which did not discriminate between performance levels.

Arousal Estimate and Performance Relationship.

When all wrestlers are considered together an increase in performance standard was related to increased self-perceptions of arousal levels. As individuals, the lowest significant

increase in arousal as well as the only two nonsignificant increases in arousal were evidenced by the Novice wrestlers. On the other hand, the highest increases as well as the highest absolute values for arousal increases were evidenced by the International class subjects. This lends support to a Drive theory interpretation of the relationship between arousal and performance as well as supporting Rushall's (1977) findings on the case study of an Olympic wrestler. Furthermore, in four of five subjects that checked at least one Great performance rating there was a significant increase in the mean arousal estimate from the Good to the Great level of performance.

The fact that this evidence applies to the higher calibre wrestlers also lends support to Morgan's (1970) contention that elite athletes may be more aware of and therefore, more able to control their arousal levels.

Estimation of Winning and Performance Relationship.

This relationship does not illustrate a consistent pattern for the subjects in this study. The individual patterns varied. Five wrestlers illustrated significant increases in mean estimate of winning across categories, two displayed nonsignificant decreases and one subject evidenced a significant decrease. Furthermore, each subject in both the International and Novice subgroups showed different changes

in magnitude and direction for the mean estimate of winning across all performance categories.

Arousal Estimate and Estimation of Winning Relationship.

This relationship also revealed a lack of consistent patterns among the subjects. This was primarily due to the inconsistency of the estimate of winning values and patterns. With arousal being individual in nature no significant overall pattern was expected to surface between these two variables. Four subjects illustrated only one mean data point for these two variables, two displayed oscillating patterns of interaction and two evidenced a linear relationship indicating the same level of arousal across all estimates of winning. Among these subjects, no general relationship between arousal and estimation of winning levels was evidenced for the total group or any subgroup.

Arousal, Estimate of Winning and Performance Interaction

Five subjects demonstrated overall significant increases in both mean arousal levels and mean estimate of winning across performance classifications. Two subjects evidenced oscillating patterns, one subject no pattern, and S9 demonstrated the only significant decrease in both estimates. On the basis of these data and the various inconsistencies shown, no general interaction was illustrated nor was an interaction evidenced for a pre-defined subgroup of wrestlers.

Further Considerations

The numerous and varied arousal patterns evidenced from the Psychological Checklist Summaries across all levels of performance demonstrated the complexity of the concept and the manifestations of arousal within the competitive environment. The literature indicated that variables such as self-confidence (Carron, 1971), degree of task difficulty (Cratty, 1973), nature of the task, that is fine or gross motor activity (Oxendine, 1970), and self-perception (Martens, 1977) have a significant effect upon the arousal level of the individual athlete. This study supported these qualifications. The estimation of winning scale may be looked upon as being synonymous with the self-confidence of the wrestler. This estimation is in turn dependent upon the esteem of the opponent (task difficulty). The self-perception of each subject's performance was noticably different between the extreme subgroups in this study. The highest calibre wrestlers experienced the highest self-perception of performance by illustrating the highest percentage of better than normal ratings. The lowest level subjects appraised no Great self-perceived performance competencies as well as the highest percentage of Poor or Very Poor performances. Correspondingly, the highest calibre subjects evidenced the highest absolute as well as relative increases in arousal levels and the lowest level wrestlers

illustrated the lowest levels. These findings support Fenz and Jones' (1972) supposition that elite athletes illustrate superior sensitivity to and control of their arousal.

This study demonstrated linear relationships between arousal levels and performance classifications. This does support a drive theory interpretation. However, there is another interpretation possible. The athletes in this study who demonstrated a positive relationship could have been manifesting only the positive slope of the inverted-U curve. It is possible, through learning to control arousal and having more awareness of arousal symptons, that elite athletes do not allow themselves to get "over-aroused". Clearly, this raised a dilemma which needs to be resolved in a more complete study. However, on pure face value these data appear to support a drive concept of the arousal-performance relationship. The data also supported Oxendine's (1970) conclusion that:

> ... a high level of arousal is essential for optimal performance in gross motor activities involving strength, endurance and speed... (p.279)

However, the level of arousal is relative for the individual athlete and a more detailed study could attempt to measure how "high" this arousal level should be for elite athletes

participating in other gross motor sports.

Implications for Theory and Practice

It was hoped that one of the outcomes of this study would be the enhancement of the performances of wrestlers. This could be accomplished by two measures. First, subjective pre-competition reporting could be an effective method of increasing an athlete's self-awareness of his or her various arousal levels. For elite athletes this information could then be utilized in preparing for each competition. Second, from data obtained through the PCPC, last minute behaviour modification techniques could be employed by the coach to enhance the upcoming competitive performance of the athlete. The applicability of this instrument to any sporting environment begins to answer Morgan's (1970) demand for increased investigation concerning the relationship of performance and arousal within the sporting environment itself.

The tool's simplicity coupled with its ease of ulitization requires only the honest completion of the checklist by the athlete to provide information that could be used in an effective manner to produce the proper preparation for every competition. This characteristic could fulfill the needs of the superior athlete who desires a feedback mechanism which allows him/her to evaluate and modify the effectiveness of his/her pre-competition psychological preparation.

If one looks upon optimal competitive performance as the positive interaction of the sporting event (task) difficulty), the coach and the athlete, then this tool offers useful information. The task difficulty, synonymous with the estimation of winning scale, informs the coach of the athlete's self-confidence in a particular situation or against a particular opponent. The excitedness scale informs the coach of the athlete's corresponding arousal level. This information can be interpreted immediately and last minute steps can be taken at the event site itself to increase the likelihood of the occurrence of an optimal performance. Knowing this, changes in preparation may be made to better future performances as well. The athlete can initiate his own modifications from the past knowledge he/she has gained through the PCPC. The coach may be made aware of a specific grade of performance. Seeing this, the coach can stimulate the appropriate behaviour necessary to enhance the upcoming performance. It is felt by this author that this will be most effective if the athlete is of an elite calibre.

The importance of this instrument as a theoretical construct is that concerning elite athletes it offers support to Fenz and Jones (1972), Thayer (1967) and Morgan (1970) conclusion that elite or superior athletes are more aware of and therefore able to control their pre-competitive arousal

levels. Further research, however, is needed to investigate the various mechanisms that elite athletes employ to control their arousal levels and symptons.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study employed the technique of self-reporting to examine the relationship of pre-competition arousal assessments to self-perceived performance competencies in collegiate wrestlers.

The research design selected for this thesis was a number of replications of a single subject case study.

Four dependent variables were observed for 10 Lakehead University varsity wrestlers during the 1977-1978 competitive season. The instrument employed for the collection of data was a modified version of Rushall's (1977) Pre-Competition Psychological Checklist. This checklist was completed at the competition site by each subject immediately upon hearing his name called to be "on deck" (approximately 5-10 minutes prior to a competitive bout). The post-match completion of the checklist occurred within five minutes of the termination of the match. Each subject reported his pre-competition arousal symptoms selected from 23 diagnostics of the checklist, a pre-competition arousal (excitedness) level, an estimation of winning and the post-match assessment of his performance standard.

The data were analyzed to determine 1) the existence of arousal patterns that were specific to a level of perform-

ance on a five category scale, 2) the arousal estimate and performance level relationship, 3) the relationship between the estimation of winning and performance, 4) the arousal estimate and estimation of winning relationship, and 5) the interaction between arousal, estimate of winning, and performance.

Conclusions

1. Self-perceived performance competencies indicated patterns for the extreme subgroups in this study. The highest performance level subjects evidenced higher self-perceptions of performances while the lowest calibre wrestlers illustrated the lowest self-perceptions of performances. No conclusion could be made about the intermediate level wrestlers.

2. All subjects in this study illustrated arousal patterns that were performance-grade specific. Each subject evidenced numerous performance indicators and at least one performance discriminator. The highest level subjects displayed heightened sensitivity to and consistency of their respective arousal symptoms.

3. The arousal estimate and performance relationship was positive and linear when all wrestlers were considered together. The highest increase in arousal estimate as well as the highest absolute values were illustrated by the highest calibre wrestlers. The lowest level subjects illustrated

the lowest increases in arousal estimate. These data lend support to a Drive theory interpretation of the relationship between arousal and performance.

4. The technique of self-reporting is more applicable to and useful for elite athletes.

5. No significant patterns were evidenced for 1) the estimation of winning and performance relationship, 2) the arousal estimate and estimation of winning relationship, and 3) arousal, estimate of winning, and performance interaction.

Recommendations

1. This study should be replicated using only high level athletes (perhaps National Teams) for a variety of individual gross motor (combative) sports.

2. Future researchers should investigate the various mechanisms employed by elite athletes to control their arousal levels.

3. Studies similar to this should be followed up by employing behaviour modification techniques in an attempt to control and manipulate the arousal levels of elite athletes.

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APPENDIX A

About the Pre-Competition Psychological Checklist

These checklists require you to assess how you feel prior to competition. They should be completed just prior to an event or game.

The information that is provided should be the most truthful and accurate that you can provide. Some of the descriptions are very personal but remember your answers will remain private, being only known to you and the coach. The reason that this information needs to be obtained is that depending on how you answer, the coach will be able to make very important last-minute coaching decisions. These decisions should help you to perform even better than you normally would expect.

WHAT TO DO

1. Fill in your name, the date, and the event or game that you are about to contest.
2. Check "yes" for the descriptions or feelings that are applicable. If you have other feelings that are not listed write them briefly in the "24. Other (describe)" section.
3. On the numbered excitedness scale indicate where you feel you are in terms of your arousal (excitedness). Note that the -10 end is complete inactivity and lack of excitedness whereas the +10 end is an extremely aroused feeling, something like how you would feel if you were about to make your first parachute jump or you had just been involved

in a fight. The zero entry is what would be normal for you. Mark where you think you would be considering how you now feel by putting an "X" on the scale line.

4. On the numbered estimation of winning scale, indicate your level of confidence in terms of how you think you will do in the competition.
5. After the competition indicate how you feel about your performance in the "Rate how you performed" section.

Definitions for the Pre-competition Psychological Checklist

These definitions should be read to, discussed and clarified with the users of the checklist.

1. Can't be bothered attitude. The athlete cannot get excited or interested in the competition. He feels it is not important. If the competition was missed, the athlete would not care one way or the other.

2. Drowsy, sleepy feeling. The athlete feels sleepy. His eyelids are heavy. He would prefer to sit down and doze or take a nap.

3. Feeling of being alone. The athlete would like to have someone to keep him company. He feels unsure of what is expected of him or of what to do. He would like to have some other person to talk to.

4. Feeling of weakness. The athlete feels weak all over. His arms feel heavy. His knees are hard to keep straight. The athlete feels that he could just crumple up on the floor, The feeling of being strong does not exist.

5. Inadequate attention to preparation. The athlete has not had time nor been able to prepare himself physically and mentally for the event. This produces a feeling of "something missing" in the event preparation procedures and consequently, the athlete has some doubts about his readiness to compete.

6. Impatient feeling. The athlete wishes the event would occur sooner than it is scheduled. The time to be spent waiting is frustrating. The athlete feels that he is ready to compete at the time of completing the checklist.

7. Aggressive feeling towards others. The athlete dislikes the other competitors. In the event that is to come it will be this athlete that dictates what will happen. There is no feeling of friendship with or like for the other competitors.

8. I have cried a little. The athlete has shed some tears while preparing for the competition. The amount of crying is not important just the fact that some crying has occurred.

9. Some shaking and trembling. The athlete has noticed his hands, legs, or some part of the body shaking or trembling. He has been able to see the shaking occurring.

10. Poor movement coordination. The athlete feels awkward and different. The activities followed in warm-up have not felt normal. The athlete is concerned about this unusual and distracting occurrence.

11. Trouble seeing and remembering. The athlete has occasional bursts of blurred vision. He cannot focus on anything

for a long time. His mind is in a turmoil. It is difficult to concentrate on any one thing for any appreciable length of time.

12. I have vomited. This has occurred at least once.

13. I have diarrhea. The athlete has been to the toilet frequently and his bowel movements are like liquid.

14. I have urinated several times. The frequency of urination is more noticeable than usual.

15. I have had frequent bowel movements. The athlete has been to the toilet frequently but the bowel movements are not like diarrhea.

16. Nervous. The athlete feels nervous all over. Tingling , jittery feelings occur everywhere and are noticeable. It is hard to locate where the exact feelings occur.

17. Butterflies in the stomach. The athlete's stomach feels like it is moving or churning inside. The nervous feeling is decidedly more evident in the stomach than in any other part of the body.

18. Lack of confidence. The athlete feels that he is not prepared or does not have the ability to perform to expectations in the forthcoming event.

19. Do not feel well. The athlete feels ill or slightly ill. He could become sick if the feeling got worse.

20. I do not think that I will be able to perform well. The athlete believes that he will do a poor performance in the forthcoming event.

21. Very confident. The athlete is sure that he will be able to perform at least to expectations. He also feels that there is a good chance of performing even better than is expected.

22. Can't take the competition seriously. The athlete is not able to concentrate on the forthcoming event. It is hard to get ready or even be serious about preparing for it. The game will be played but the athlete does not care about the result.

23. Frightened. The athlete is afraid of the experiences that will occur in the forthcoming event. He has some hesitancy about competing. It would be nice to be able to withdraw from the event at the stage of completing the checklist.

24. Other (describe). Indicate any other feelings or sensations which exist but have not been describd above.

PRE-COMPETITION PSYCHOLOGICAL CHECKLIST

NAME_____

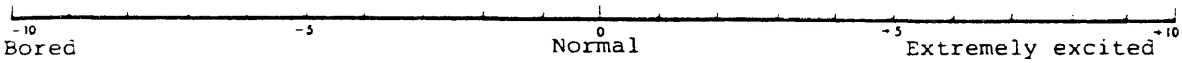
DATE_____

EVENT_____

If any of the following descriptions apply to you as you feel now mark them "yes." If not, then answer "no." Complete this form before you see your coach prior to the race.

	YES	NO
1. Can't be bothered attitude	___	___
2. Drowsy, sleepy feeling	___	___
3. Feeling of being alone	___	___
4. Feeling of weakness	___	___
5. Inadequate attention to preparation	___	___
6. Impatient feeling	___	___
7. Aggressive feeling towards others	___	___
8. I have cried a little	___	___
9. Some shaking and trembling	___	___
10. Poor movement coordination	___	___
11. Trouble seeing and remembering	___	___
12. I have vomited	___	___
13. I have diarrhea	___	___
14. I have urinated several times	___	___
15. I have had frequent bowel movements	___	___
16. Nervous	___	___
17. Butterflies in the stomach	___	___
18. Lack of confidence	___	___
19. Do not feel well	___	___
20. I do not think that I will be able to perform well	___	___
21. Very confident	___	___
22. Can't take the competition seriously	___	___
23. Frightened	___	___
24. Other (describe)_____	___	___
_____		
TOTAL NUMBER OF EACH	_____	_____

Excitedness Scale

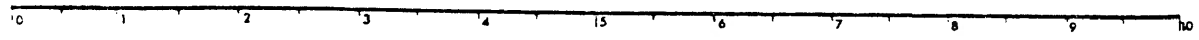


Bored
Sleepy
Very relaxed

Normal

Extremely excited
Wild
Raging mad

Estimation of Winning



No chance of winning

50-50 chance

No chance of losing

Event or game result _____

Rate how you performed: Great__ Good__ Normal__ Poor__ Very poor__

APPENDIX B

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S ( )

DIAGNOSTIC	PERFORMANCE RATING				
	Great	Good	Normal	Poor	Very Poor
1. Can't be bothered					
2. Drowsy, sleepy					
3. Feels alone					
4. Feels weak					
5. Inadequate preparation					
6. Impatient					
7. Aggressive feelings					
8. Cried					
9. Shaking, trembling					
10. Poor coordination					
11. Trouble seeing, remembering					
12. Vomited					
13. Diarrhea					
14. Urinated frequently					
15. Frequent bowel movements					
16. Nervous					
17. Butterflies					
18. Lack of confidence					
19. Did not feel well					
20. Thinks will not perform well					
21. Very confident					
22. Can't be serious					
23. Frightened					

( ) - Number of checklists completed.

S - Subject

* - Significant Change

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S1 (26)

DIAGNOSTIC	PERFORMANCE RATING					
	3	11	6	5	1	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy						
3. Feels alone				1		
4. Feels weak		1	3	1		
5. Inadequate preparation			1			
6. Impatient	3(100)	5	3	3(60)		
7. Aggressive feelings		2				
8. Cried						
9. Shaking, trembling	1	1	1	2	1	
10. Poor coordination	1	2	2			
11. Trouble seeing, remembering			1			
12. Vomited						
13. Diarrhea		2	2	1		
14. Urinated frequently	2(66)	6	1	5(100)		
15. Frequent bowel movements	3(100)	7(63)	3	3(60)	1	
16. Nervous	3(100)	10(91)	6(100)	5(100)	1	
17. Butterflies	2(66)	9(81)	3	3(60)	1	
18. Lack of confidence			1	1		
19. Did not feel well		1	1	1		
20. Thinks will not perform well			1			
21. Very confident		2				
22. Can't be serious						
23. Frightened	1	6	3	4(80)	1	*

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S2 (20)

DIAGNOSTIC	PERFORMANCE RATING					
		10	4	4	2	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered				1		
2. Drowsy, sleepy		6(60)	2	3(75)	1	
3. Feels alone		1		2		
4. Feels weak		6(60)	3(75)	4(100)	2 (100)	
5. Inadequate preparation		3	2	3(75)	1	*
6. Impatient		3	4(100)	1	1	*
7. Aggressive feelings		4	2	2		
8. Cried						
9. Shaking, trembling		7(70)	2	3(75)	1	
10. Poor coordination		1		1		
11. Trouble seeing, remembering						
12. Vomited		1				
13. Diarrhea		2				
14. Urinated frequently		4	2	1		
15. Frequent bowel movements		2	1			
16. Nervous		9(90)	4(100)	3(75)	1	
17. Butterflies			1	1	1	
18. Lack of confidence		3	2	3(75)	1	*
19. Did not feel well		2	1	1		
20. Thinks will not perform well		3	1	2	1	
21. Very confident						
22. Can't be serious		3				
23. Frightened		7(70)		2		*

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S3 (19)

DIAGNOSTIC	PERFORMANCE RATING					
	2	12	4		1	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy						
3. Feels alone		1	1		1	
4. Feels weak			1			
5. Inadequate preparation	1		2			
6. Impatient	2(100)	12(100)	1			
7. Aggressive feelings	1	3				
8. Cried						
9. Shaking, trembling		8(66)	1		1	*
10. Poor coordination			2		1	
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently						
15. Frequent bowel movements		1				
16. Nervous	2(100)	8(66)	3(75)			
17. Butterflies		5	1		1	
18. Lack of confidence					1	
19. Did not feel well						
20. Thinks will not perform well						
21. Very confident	1	6	2			
22. Can't be serious						
23. Frightened						

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S4 (18)

DIAGNOSTIC	PERFORMANCE RATING					
		12	3	2	1	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy		1		1		
3. Feels alone						
4. Feels weak		1		2	1	
5. Inadequate preparation			1	1		
6. Impatient		10(83)	1	1	1	*
7. Aggressive feelings		7	1	1		
8. Cried						
9. Shaking, trembling			1	1		
10. Poor coordination			1	1		
11. Trouble seeing, remembering				1		
12. Vomited						
13. Diarrhea						
14. Urinated frequently						
15. Frequent bowel movements						
16. Nervous						
17. Butterflies		1	1			
18. Lack of confidence				1		
19. Did not feel well		1		2	1	
20. Thinks will not perform well				1		
21. Very confident		10(83)				*
22. Can't be serious						
23. Frightened						

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S5 (21)

DIAGNOSTIC	PERFORMANCE RATING					
	2	11	4	4		
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy						
3. Feels alone						
4. Feels weak		1	1			
5. Inadequate preparation						
6. Impatient	1	2	1	2		
7. Aggressive feelings	1	3	1	1		
8. Cried						
9. Shaking, trembling				1		
10. Poor coordination						
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently		2	1	1		
15. Frequent bowel movements		4		3(75)		*
16. Nervous	2(100)	9(81)	3(75)	4(100)		
17. Butterflies	1	1		2		
18. Lack of confidence						
19. Did not feel well						
20. Thinks will not perform well						
21. Very confident	2(100)	9(81)	3(75)	3(75)		
22. Can't be serious		1				
23. Frightened				1		

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S6 (12)

DIAGNOSTIC	PERFORMANCE RATING					
		3	2	1	6	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy						
3. Feels alone						
4. Feels weak						
5. Inadequate preparation						
6. Impatient		3(100)			2	*
7. Aggressive feelings		2(66)			1	*
8. Cried						
9. Shaking, trembling		1	2		1	
10. Poor coordination						
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently						
15. Frequent bowel movements						
16. Nervous		2(66)		1	2	*
17. Butterflies		1		1	1	
18. Lack of confidence						
19. Did not feel well						
20. Thinks will not perform well						
21. Very confident		2(66)				*
22. Can't be serious						
23. Frightened						

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S7 (13)

DIAGNOSTIC	PERFORMANCE RATING					
	2	4	3	3	1	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered				1		
2. Drowsy, sleepy		1				
3. Feels alone						
4. Feels weak		1				
5. Inadequate preparation	1	2	1	1	1	
6. Impatient	2(100)	1	2(66)	2(66)		
7. Aggressive feelings						
8. Cried						
9. Shaking, trembling	1	2		1		
10. Poor coordination		1				
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently	1					
15. Frequent bowel movements						
16. Nervous	1	4(100)	2(66)	1	1	
17. Butterflies						
18. Lack of confidence		1	1	1	1	
19. Did not feel well				1		
20. Thinks will not perform well		1			1	
21. Very confident	2(100)	1				*
22. Can't be serious						
23. Frightened				1		

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S8 (25)

DIAGNOSTIC	PERFORMANCE RATING					
	2	11	12			
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy		2	1			
3. Feels alone		2	3			
4. Feels weak						
5. Inadequate preparation	1	3	4			
6. Impatient		4	8(66)			*
7. Aggressive feelings						
8. Cried						
9. Shaking, trembling		5				
10. Poor coordination						
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently						
15. Frequent bowel movements						
16. Nervous	2(100)	10(90)	12(100)			
17. Butterflies	1	4	1			
18. Lack of confidence						
19. Did not feel well						
20. Thinks will not perform well						
21. Very confident	2(100)	11(100)	12(100)			
22. Can't be serious						
23. Frightened						

PSYCHOLOGICAL CHECKLIST SUMMARY

Athlete: S9 (10)

DIAGNOSTIC	PERFORMANCE RATING					
		1	3	4	2	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered						
2. Drowsy, sleepy			1	2		
3. Feels alone						
4. Feels weak		1	1	2	1	
5. Inadequate preparation				1		
6. Impatient			1			
7. Aggressive feelings						
8. Cried						
9. Shaking, trembling		1	1	1	2 (100)	*
10. Poor coordination						
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently						
15. Frequent bowel movements						
16. Nervous			2(66)	1	1	*
17. Butterflies				1		
18. Lack of confidence						
19. Did not feel well						
20. Thinks will not perform well						
21. Very confident						
22. Can't be serious			1	1		
23. Frightened						

PSYCHOLOGICAL CHECKLIST SUMMARY

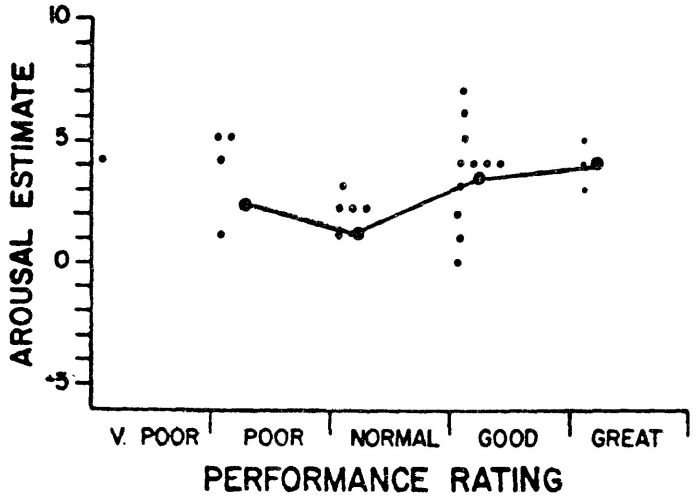
Athlete: S10 (9)

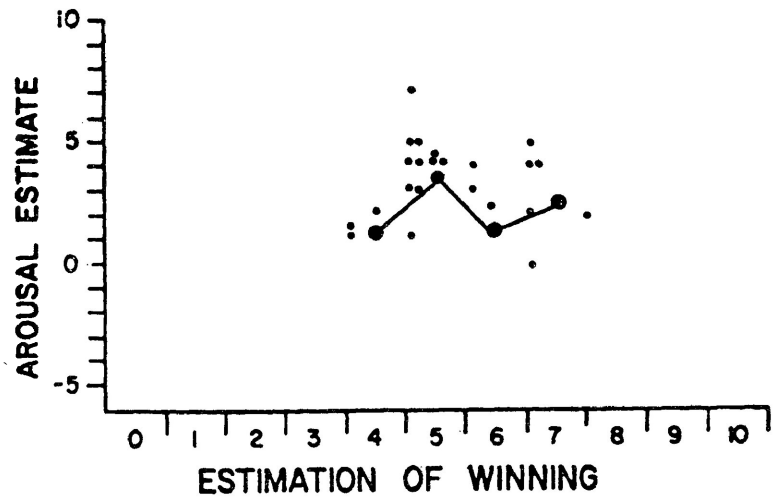
DIAGNOSTIC	PERFORMANCE RATING					
		1	3	3	2	
	Great	Good	Normal	Poor	Very Poor	
1. Can't be bothered					1	
2. Drowsy, sleepy		1		2(66)	1	*
3. Feels alone			1			
4. Feels weak			1	2(66)	1	*
5. Inadequate preparation			3(100)	1	1	*
6. Impatient		1	3(100)		1	*
7. Aggressive feelings		1		2(66)	1	*
8. Cried					1	
9. Shaking, trembling			2(66)	1	1	*
10. Poor coordination					1	
11. Trouble seeing, remembering						
12. Vomited						
13. Diarrhea						
14. Urinated frequently			2(66)			*
15. Frequent bowel movements			2(66)			*
16. Nervous			2(66)	1	1	*
17. Butterflies			1		1	
18. Lack of confidence				1	1	
19. Did not feel well						
20. Thinks will not perform well			1	3(100)	1	*
21. Very confident						
22. Can't be serious						
23. Frightened					1	

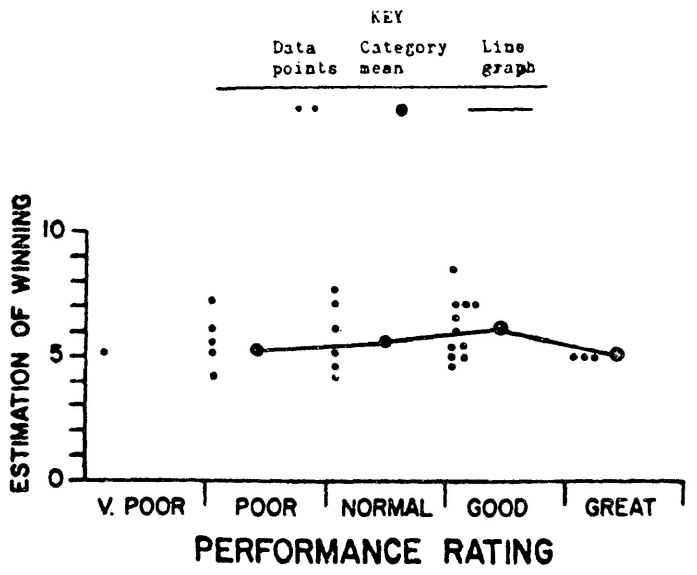
APPENDIX C

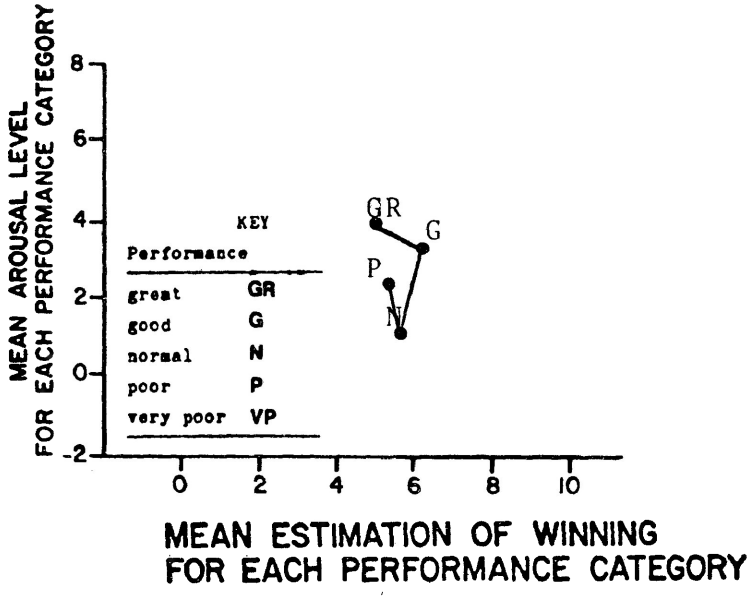
SUBJECT GRAPHS

Summary graphs were constructed for each subject to examine the nature of the arousal - performance relationship, estimate of winning - performance relationship and the relationship between arousal estimation and estimate of winning. A fourth graph was constructed for each subject in an attempt to discover the existence of patterns of interaction between arousal estimation, performance, and estimation of winning.

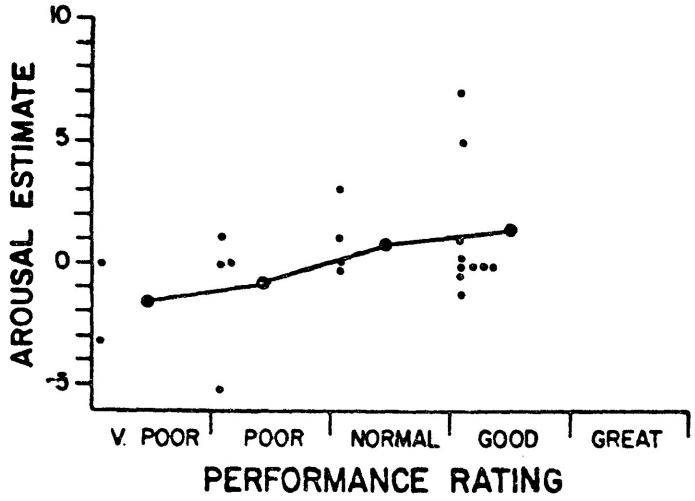


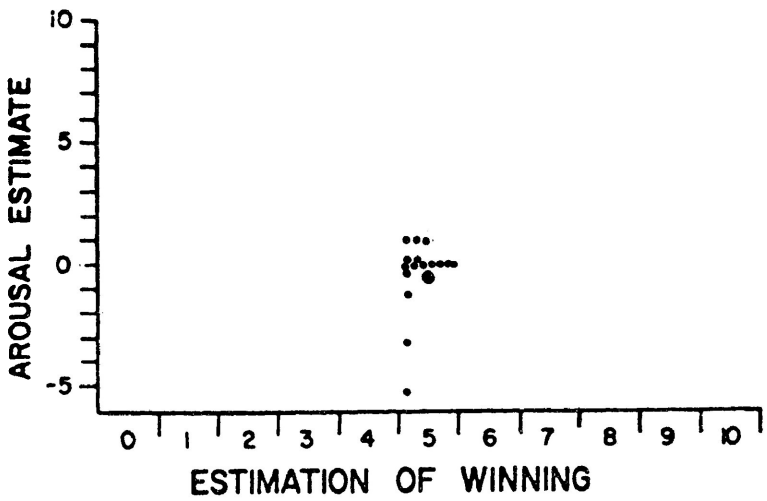


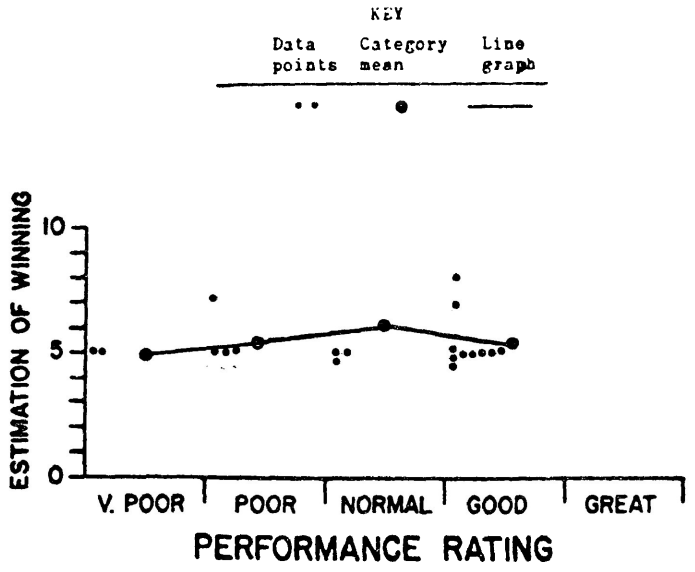


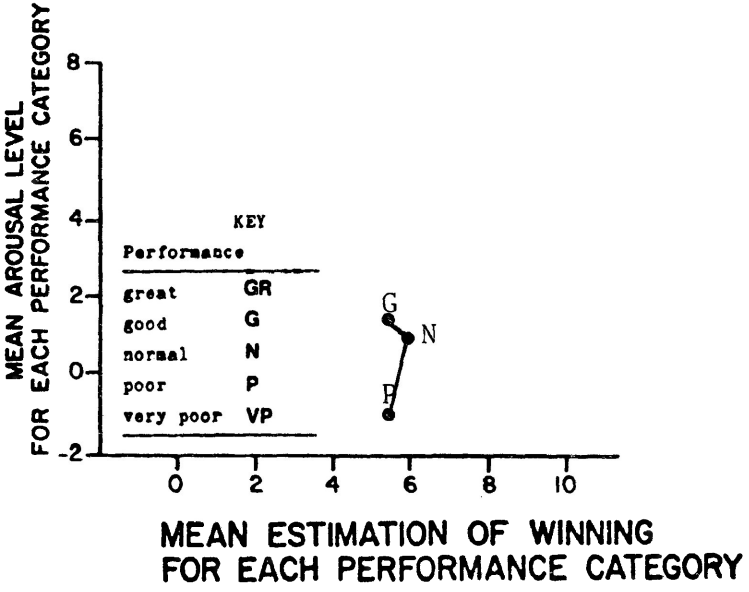


Appendix C Subject 1









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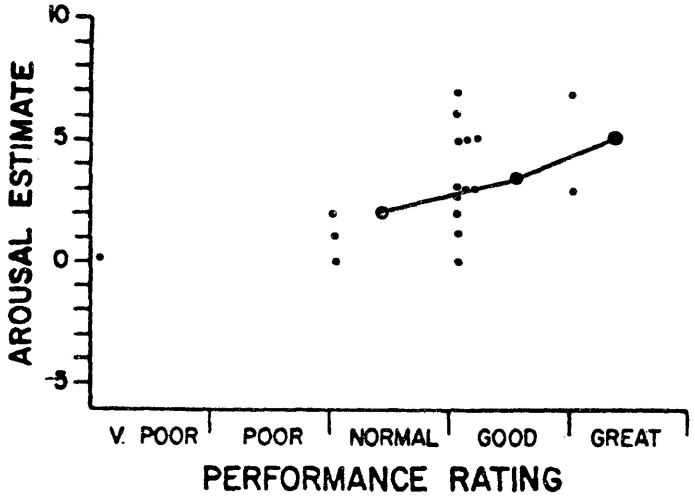

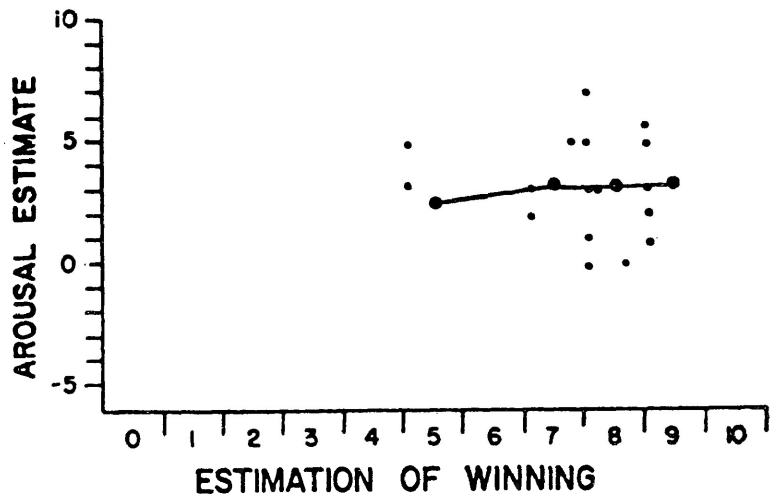

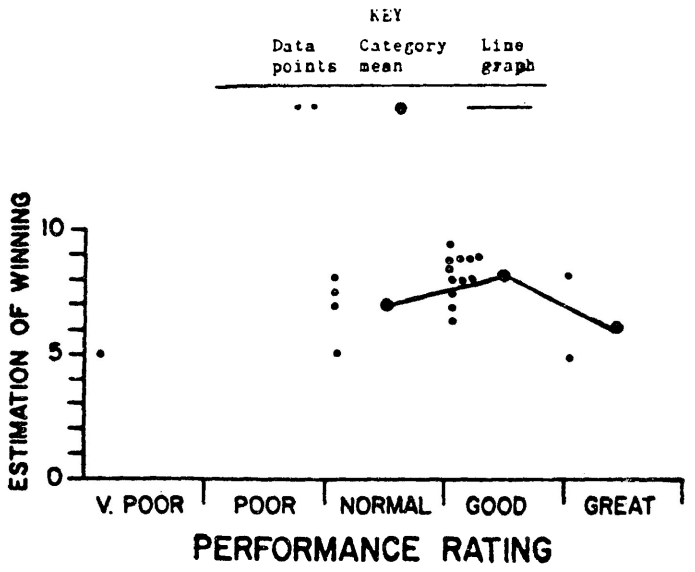

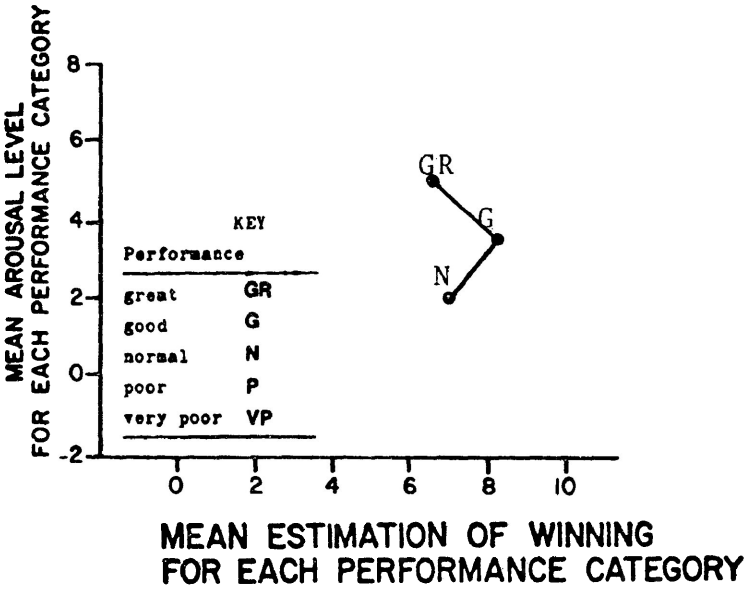

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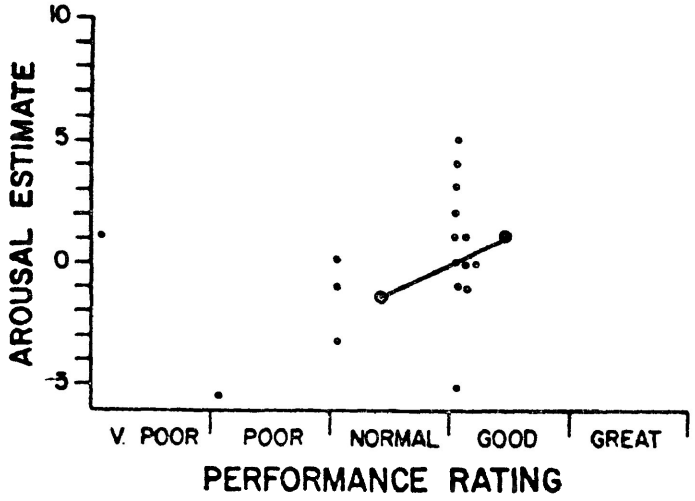

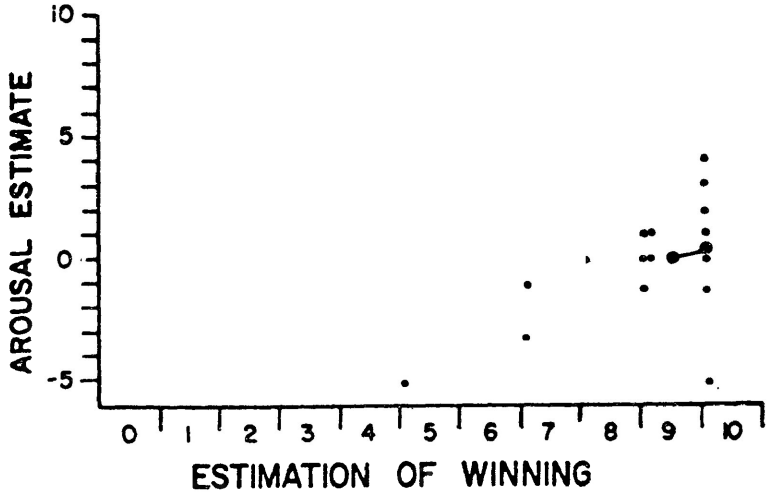

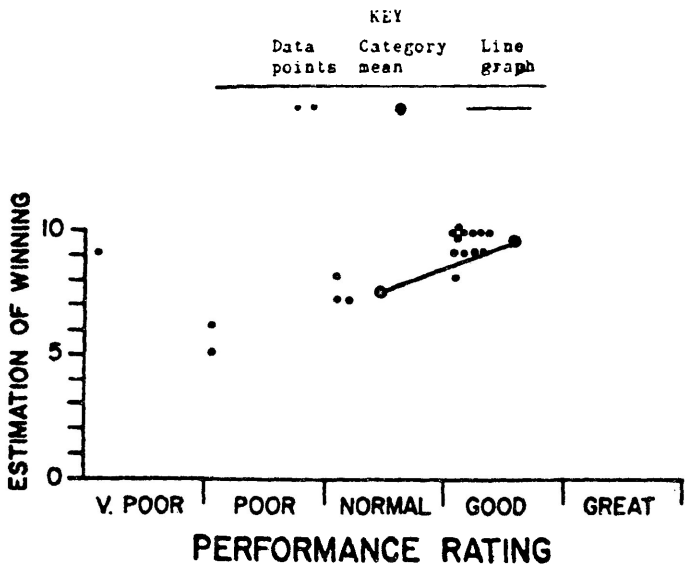

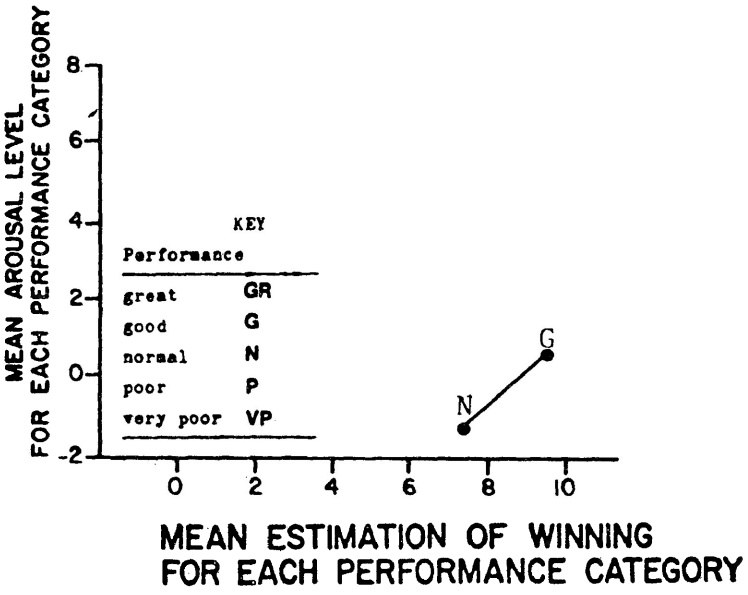

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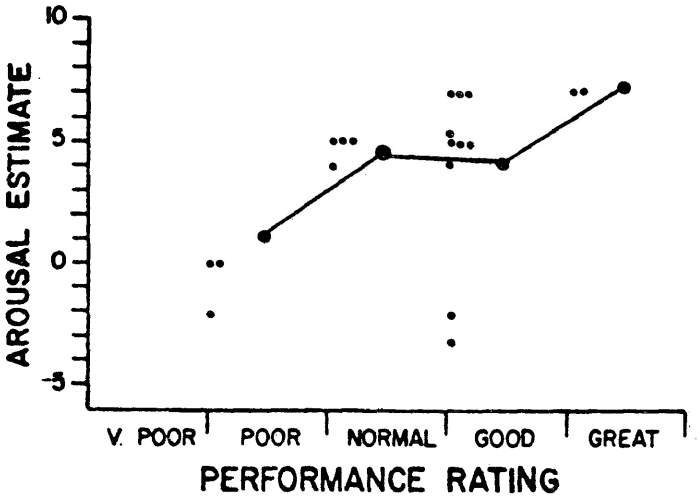

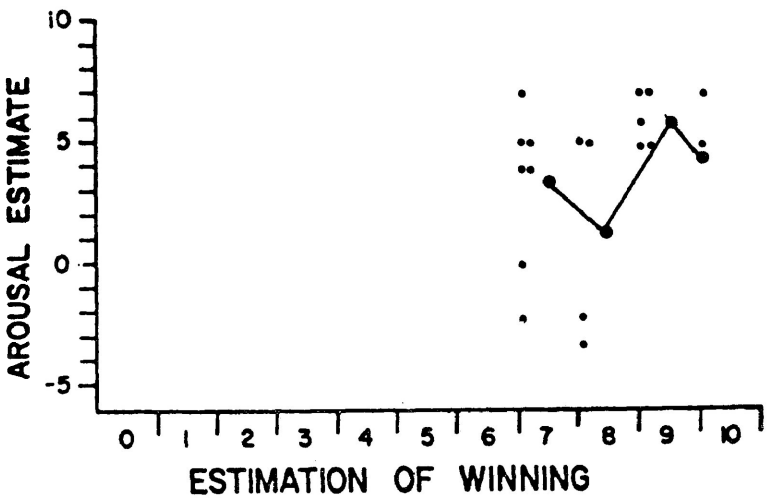

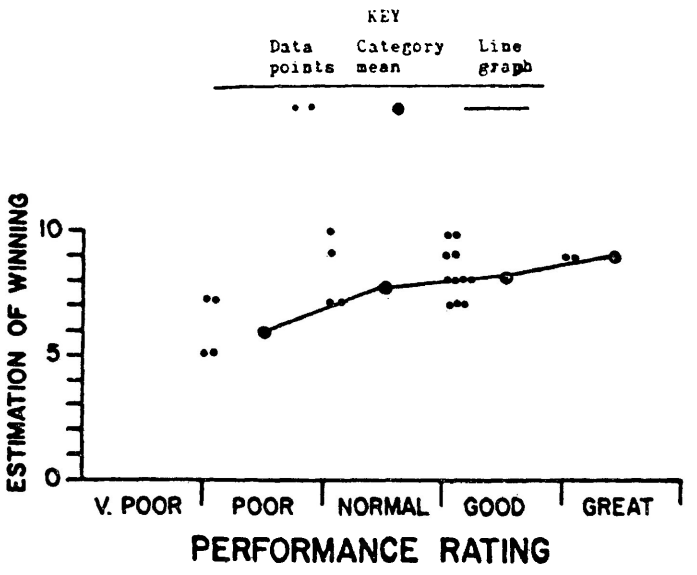

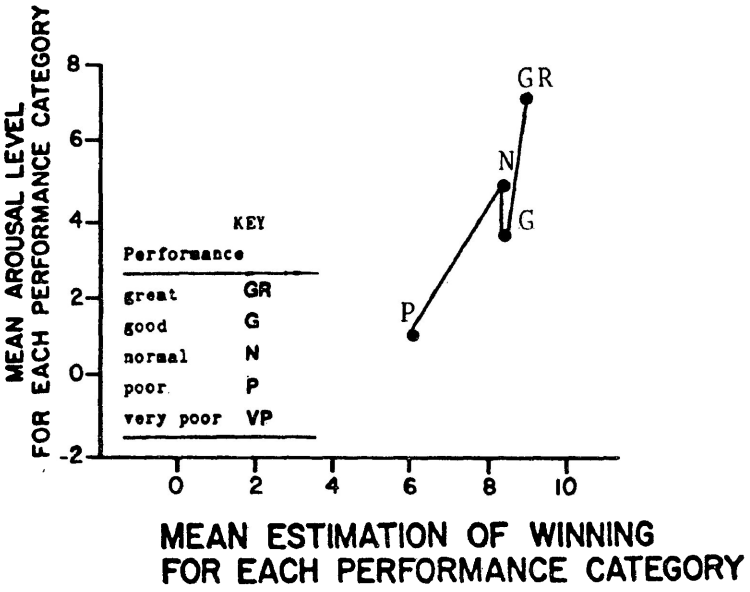

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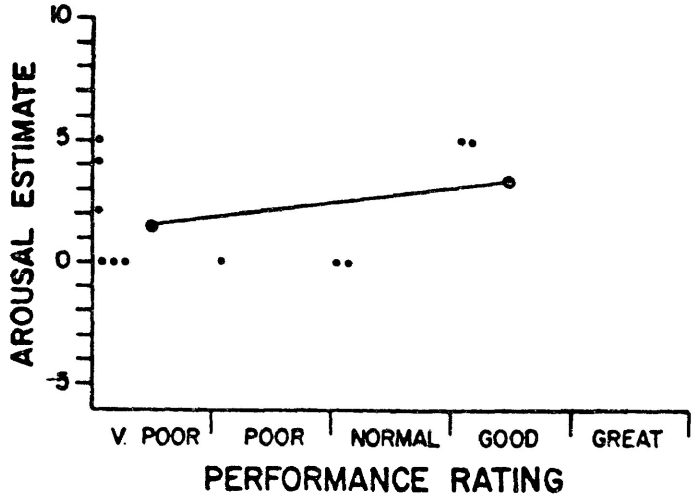

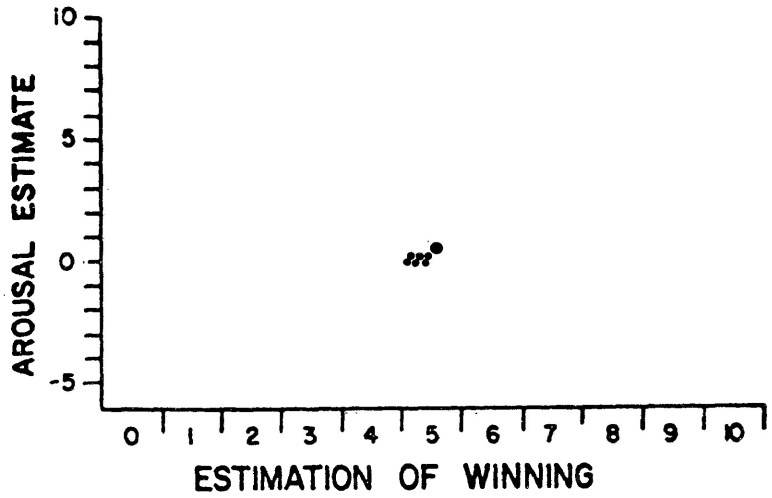

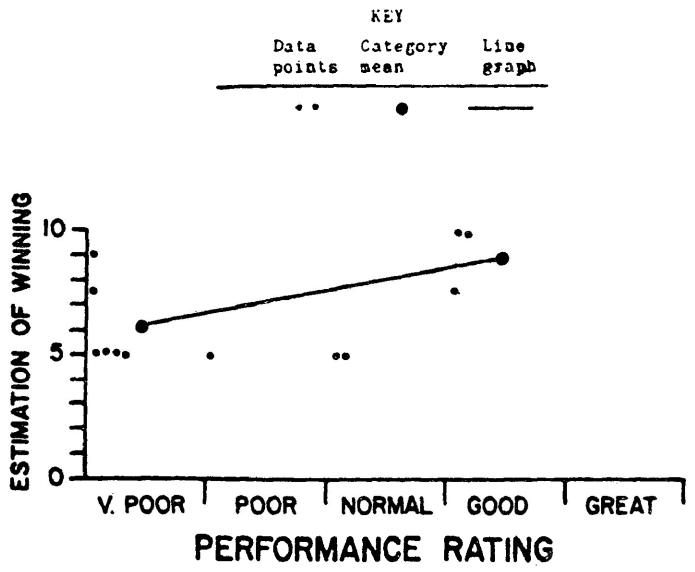

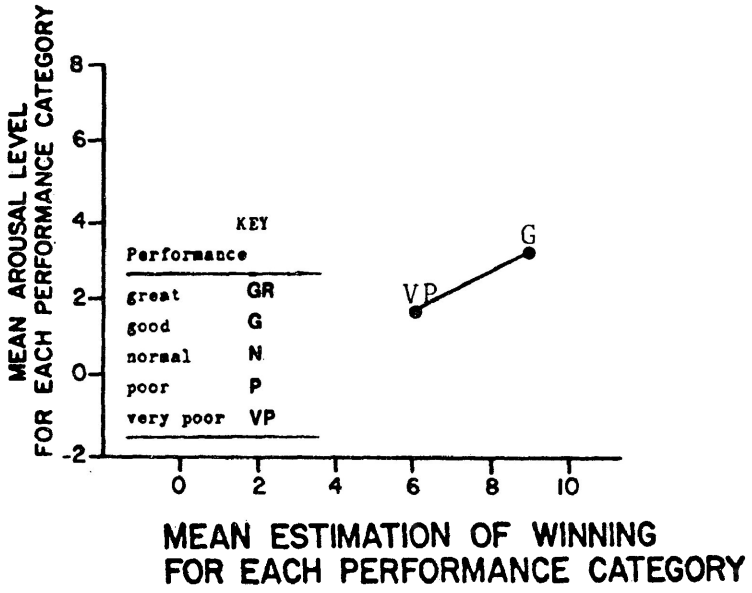

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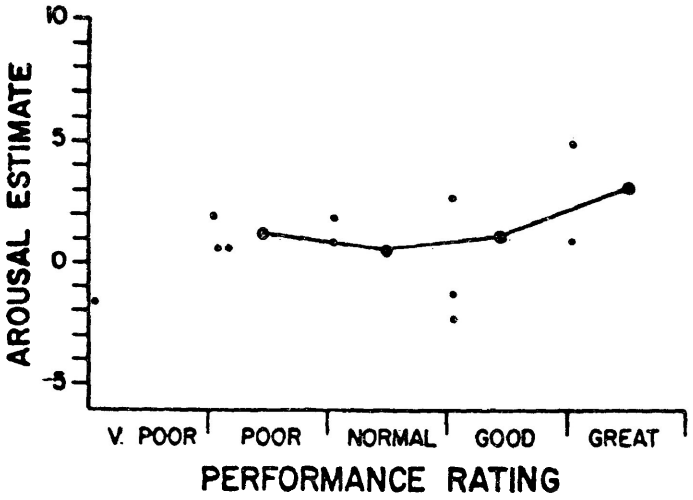

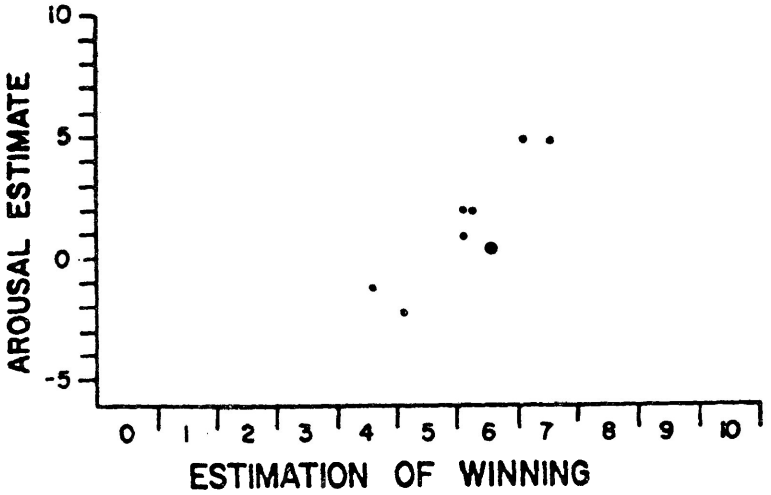

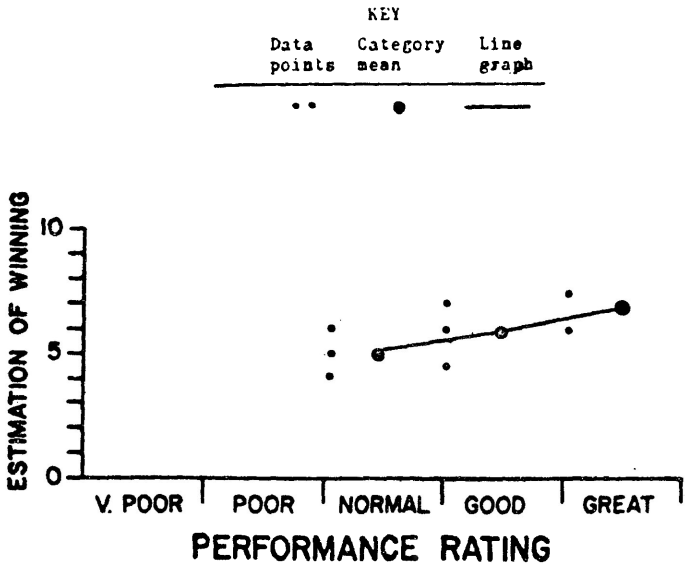

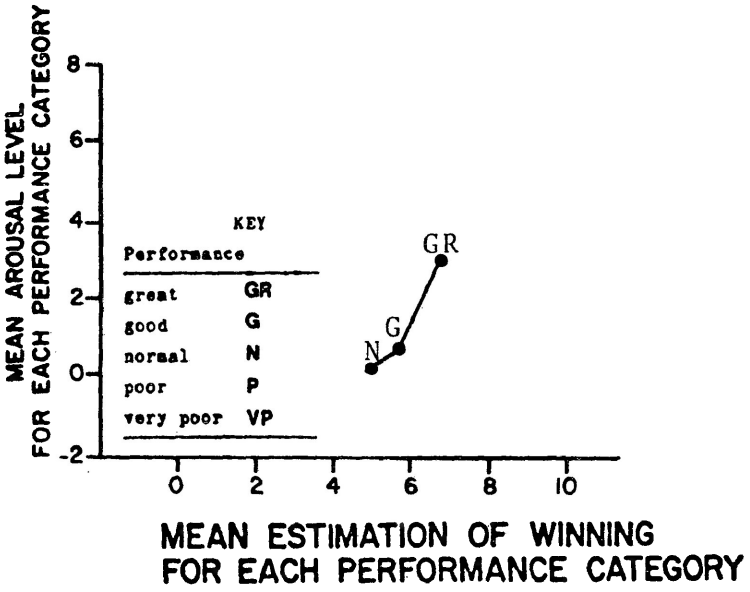

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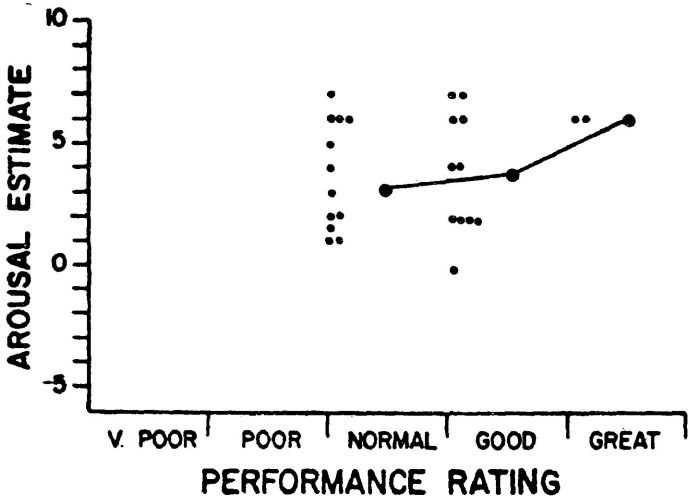

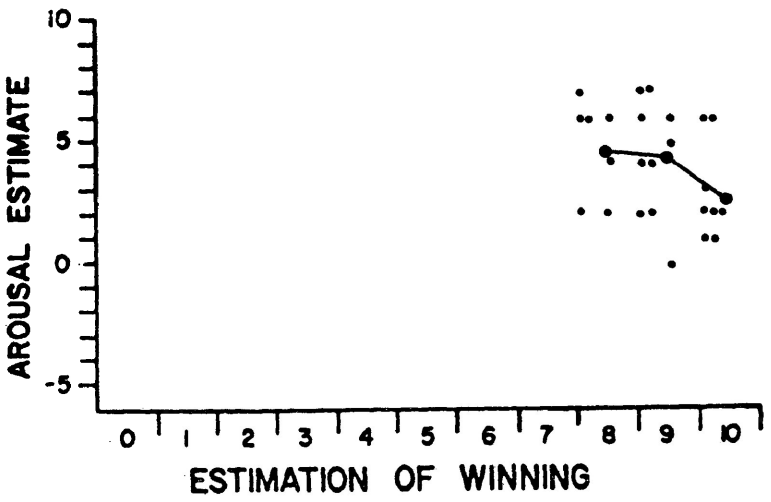

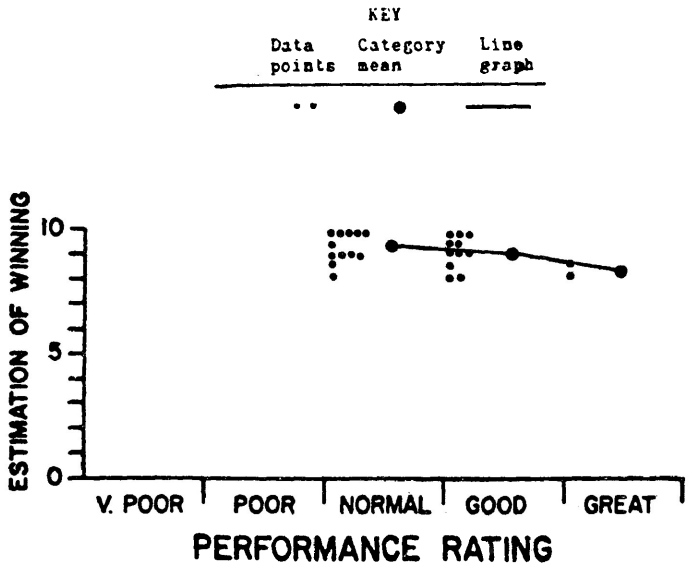

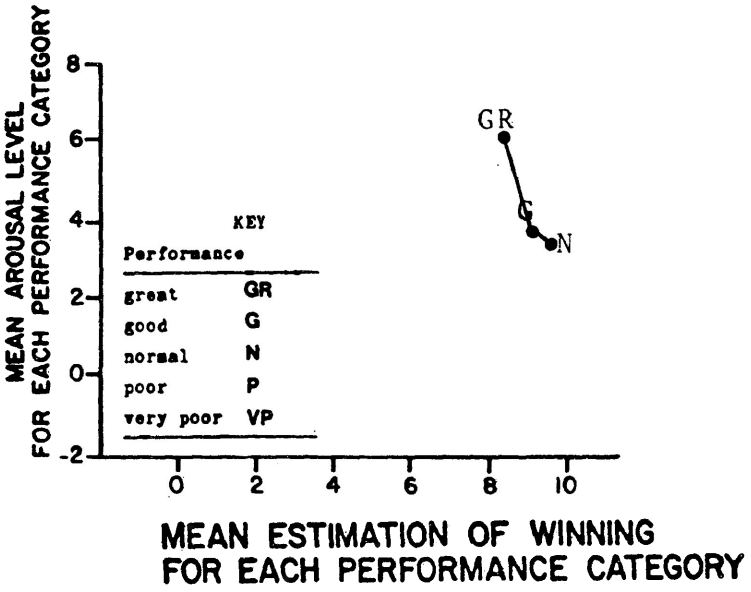

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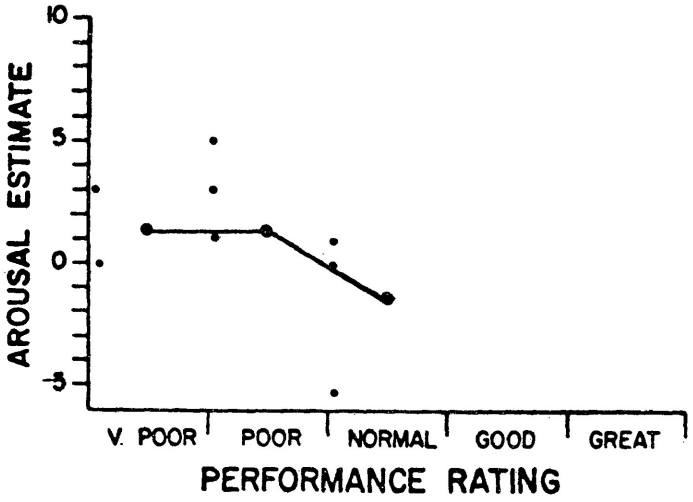

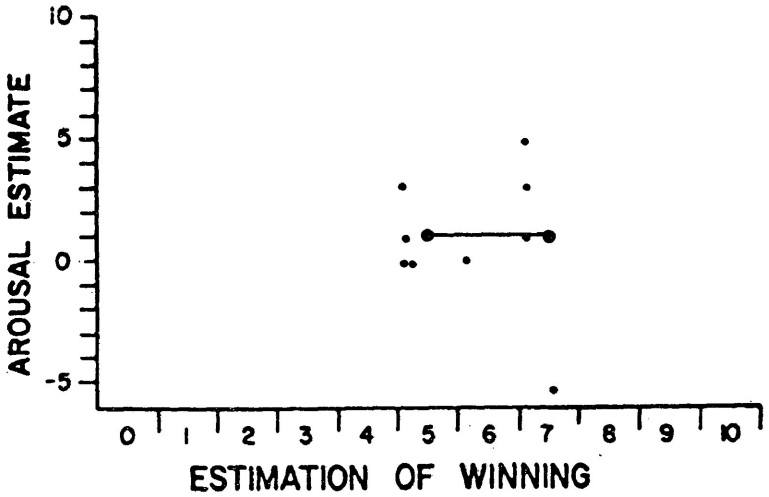

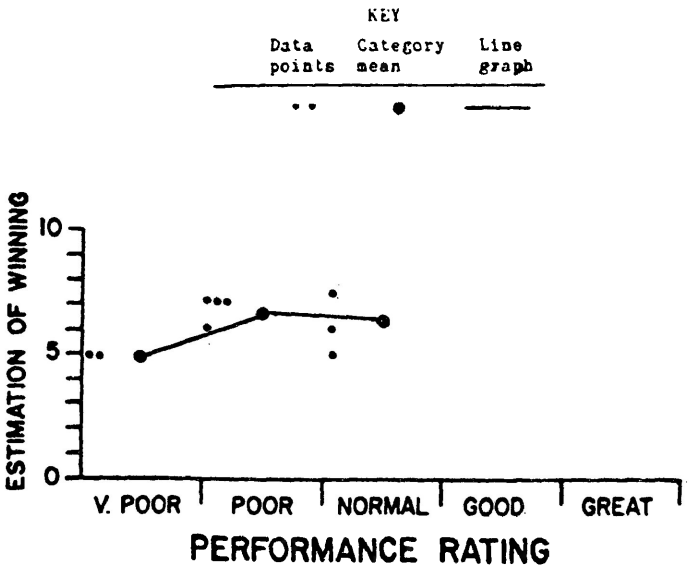

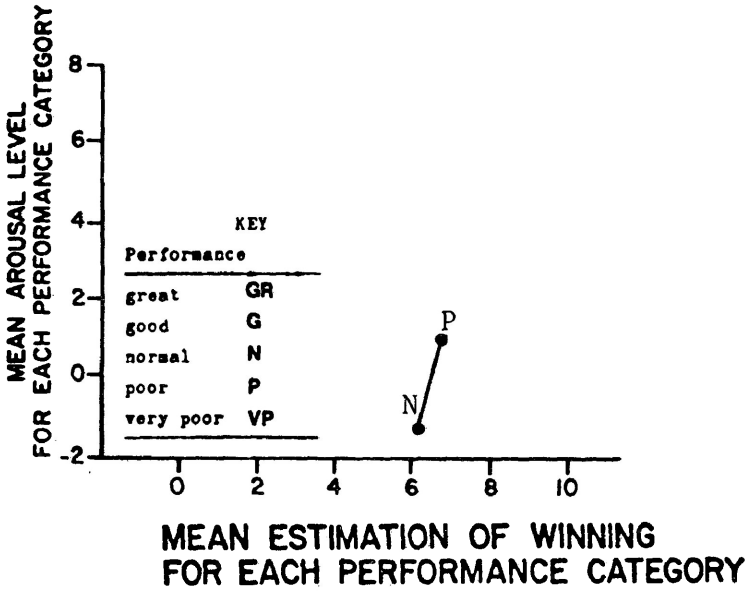

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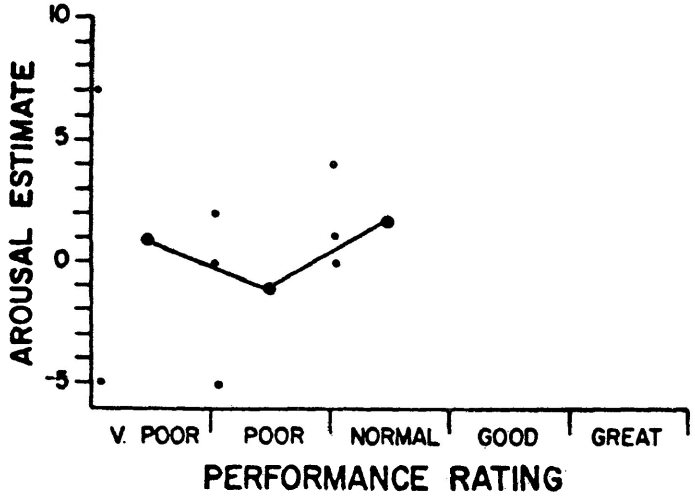

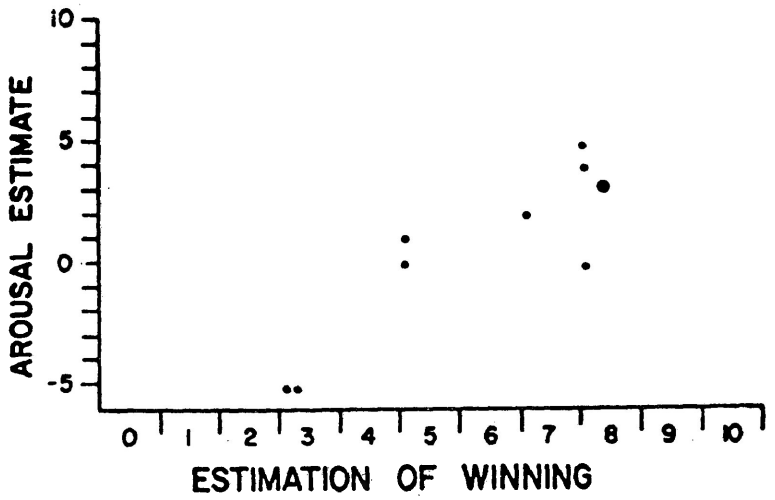

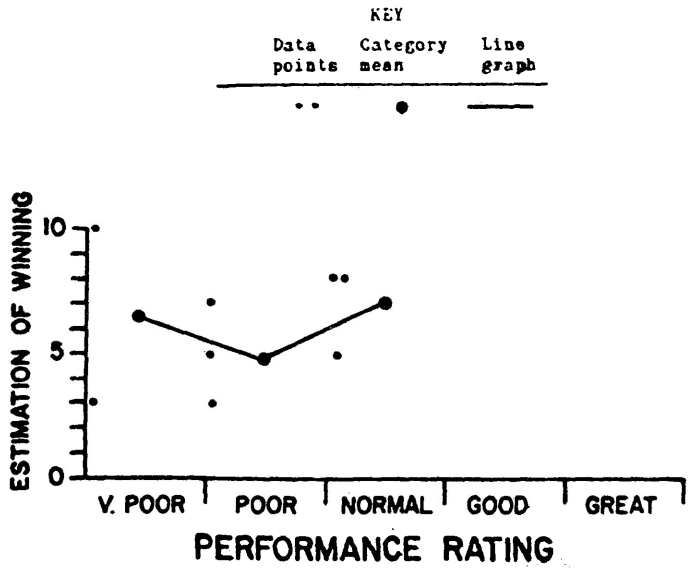

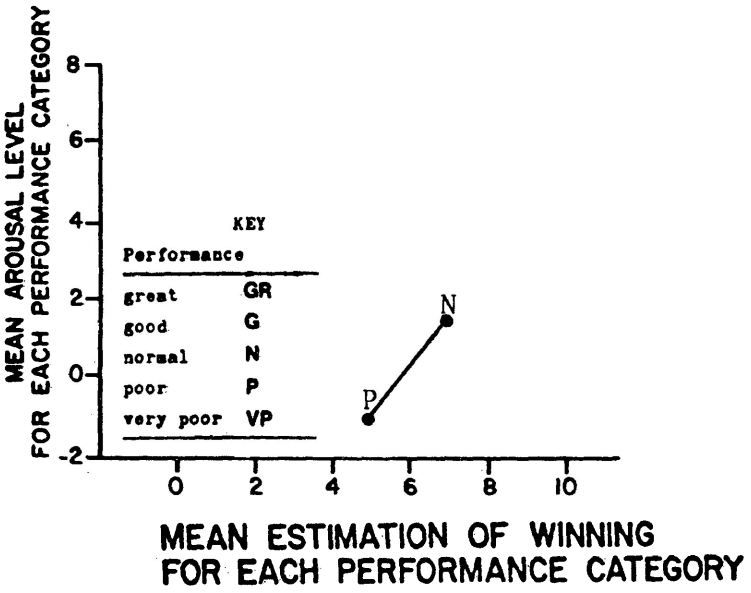

Appendix C Subject 10