THE RELATIONSHIP BETWEEN COHESION AND PERFORMANCE IN INDIVIDUALLY COMPETING SPORT TEAMS

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ABSTRACT

THE RELATIONSHIP BETWEEN COHESION AND PERFORMANCE IN INDIVIDUALY COMPETING SPORT TEAMS

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Sports cohesion studies have failed to investigate the relationship between cohesion and performance within teams where members compete as individuals. Research has shown a positive relationship within coacting and interacting sports teams. The purpose of this study was to determine the relationship between cohesion as measured by the Group Environment Questionnaire and performance as determined by final tournament placement. Subjects were competitors in a regional fencing tournament comprised of five events; mixed foil, women's foil, mixed epee, women's epee, and mixed saber. Each team's average percentile placement within the events was correlated

to the four sub-scales of the Group Environment Questionnaire. No significant correlation was found between the two results. This is in contrast to the trend within sport cohesion research, where studies have shown a positive relationship within coacting and interacting teams, as well as exercise groups.

THE RELATIONSHIP BETWEEN COHESION AND PERFORMANCE IN INDIVIDUALY COMPETING SPORT TEAMS

The field of Sport Management is concerned with many types of research. One aspect of sport management is the effectiveness of groups within the sports organization. From the team on the playing field to the marking research team, sport management must investigate how they are formed, get organized, and function throughout the industry. One method for investigating these team traits and interactions is through the study of Group Dynamics.

Within Group Dynamics, one commonly studied group trait is cohesion. Kurt Lewin (1935) stated that every group has two traits, cohesion and locomotion. He further stated that cohesion was the more important of the two because without cohesion there can be no locomotion. Intuition leads one to believe that groups with high cohesion will be more effective. This notion has lead many researchers to investigate the relationship between cohesion and performance (Mullen & Copper, 1994). Several studies on group cohesion have been conducted in industry, the military, and even sport.

Within sport, cohesion research has historically been limited to interacting and coacting sports. Recent research has included exercise classes. Cohesion within sports where team members compete as individuals has not been researched.

Purpose of the Study

The purpose of this study is to determine the relationship between the level of team cohesion as measured by the Group Environment Questionnaire and final tournament placement for individually competing team members. This study will also further examine the relationship by comparing the results between each of the three fencing events; foil, epee, and saber. Finally, the results will be compared across genders.

Hypotheses

It is hypothesized that:

1. There is a positive relationship between the level of team cohesion as measured by the Group Environment Questionnaire and final tournament placement for individually competing team members.
2. There will be no difference in the relationship between the level of team cohesion as measured by the Group Environment Questionnaire and final tournament placement between the three fencing events; foil, epee, and saber.
3. There will be no difference in the relationship found between genders.

Delimitations of the Study

This study will be delimited as follows:

1. Fencers competing in the open, senior events of the Poujardieu Memorial Fencing Tournament, a sanctioned tournament of the United States Fencing Association.
2. Results from the mixed and women's only events will be used.

Definition of Terms

1. U.S.F.A.: The United States Fencing Association
2. Individually Competing Sport: a sport in which all competitors are competing against all other competitors regardless of team affiliation. No team results are awarded.
3. Control: The equipment checking station for the tournament. Each competitor will need have items of their equipment checked by the tournament organizing committee for compliance to official U.S.F.A safety regulations.

Significance of the Study

Currently researchers are unable to answer the most basic question from the coach of a team competing as individuals: "Is a more cohesive team more productive during competition?" Several studies within interacting and coacting sports have answered the question with a significant relationship between cohesion and performance. The Group Environment Questionnaire has not only been used to show a positive relationship in those sports but also in exercise classes in relation to attendance.

Research to determine the relationship between cohesion and performance in individually competing teams are extremely necessary. The direction of coaches in a large variety of sports will be effected by the results of such a study. For example, should a triathlon coach welcome a new, disruptive athlete onto the team? Should the

other athletes be encouraged to dislike the disruptive member and rise to outperform him or her? We cannot give a scientifically based answer.

All other areas of sports cohesion would benefit from such research. Comparisons between interacting, coacting and individual teams are impossible without such a study. Having individual team data for comparison would strengthen future studies focusing on interacting or coacting teams. The entire field of literature is weakened by the lack of knowledge in this area. These questions must be answered before we can continue to advance our knowledge of the relationship of cohesion and performance.

CHAPTER II

REVIEW OF THE LITERATURE

The field of Sport Management is concerned with many different aspects of the sport world. Research specialization is taking place in many different areas of sport management including marketing, law, management, and behavior. A central theme to all of these areas is the presence of groups. Ranging from the team playing the game, to the grounds maintenance crew, groups are a daily fact of life for the sport manager. It is imperative that group interaction within sports is investigated in order to better manage resources, increase attendance, and maximize performance.

Group Dynamics is the study of interaction within groups. Kurt Lewin's (1935) theories in Group Dynamics were based on the principle that all groups contained two main traits: cohesion and locomotion. He further stated that cohesion was the most important of the two because without cohesion there can be no locomotion. This basic theory has expanded to include an explanation of many different group traits such as leadership, norms, efficacy, and goals. However there remains a great interest in the basic trait of cohesion because of its central position within groups.

Groups formed to complete a specific purpose are very concerned with their performance. Military units are concerned with taking the objective, industry production is concerned with reaching quota, and sport teams want to best all of their opponents. This focus has led to a substantial body of research investigating the effect of group traits

on performance (Mullen & Copper, 1994). The relationship between cohesion and performance has drawn more than its share of studies of this nature.

The existence of a significant relationship between cohesion and performance has received mixed results (Mullen & Copper 1994). Many researchers have returned a positive relationship; others have shown no relationship at all. All of this research suffers from the same doubts as to the direction of the influence, i.e. from cohesion to performance or performance to cohesion.

Sports studies on cohesion and performance have attempted to determine this relationship within sports teams (Mullen & Copper, 1994). These studies have used the amount of interdependence required of team members during play as delimitations for the subjects. For example, only interactive sport teams such as ice hockey (Slater & Sewell, 1994), football (Stogdill, 1963), and basketball (Matheson, Mathes, & Murry, 1995) were chosen in most studies. These types of teams require a group effort to reach a shared outcome. Less studied are coacting teams such as golf (Widmeyer & Williams 1991), swimming (Everet, Smith, & Williams, 1992) and shooting (McGrath, 1962), which contribute individual efforts to a group outcome. Even exercise groups, which have no competitive component have been examined in cohesion-adherence studies (Annesi, 1999; Carron, Widmeyer, & Brawley, 1988; Spink & Carron, 1992; Spink & Carron 1994). All of these groups have returned positive relationships concerning high cohesion levels with the group (Mullen & Copper, 1994).

There is one sport group delimitated by the amount of interaction required during play, which has yet to be studied. The teams that practice together yet compete as individuals are still sport teams and will contain a relationship between cohesion and

performance. These teams train, travel, and compete together as do all other teams. However in the end they do not share an outcome like interacting and coacting teams. Previous research has failed to determine whether this difference changes the interactions of the team enough to differentiate their cohesion-performance relationship from other sports teams. The question in this case is whether the long hours of practice and travel influence cohesion or whether it is dominated by the individual nature of competition day.

This review will discuss the research literature on the relationship between sport group cohesion and performance within teams where members compete as individuals. First a general view of the growing field of sport management is presented. Following is a review of Group Dynamics, a method of studying groups. Next will come the group trait of cohesion with its definitions and techniques for measurement. Finally this review will focus on cohesion and performance research within sporting teams of all types. The required direction of future research concludes the review.

Sport Management

The field of sport management is a relatively new academic and professional distinction (Parks, Zanger, & Quarterman, 1998, p.3). Although the tasks now associated with it have been performed throughout the ages, only during the past few decades has sport management emerged into its own. A letter from baseball owner Walter O'Malley written in 1957 to James Mason at Ohio University simulated the creation of the first graduate program directed at private sport enterprise. It asked:

> Where would one go to find a person who by virtue of education had been trained to administer a marina, race track, ski resort,

> auditorium, stadium, theater, convention or exhibition hall, a public camp complex, or a person to fill an executive position at a team or league level in junior athletics such as Little League baseball, football, scouting, CYO, and youth activities, etc.?

Ten years later in 1966, Ohio began the first graduate program for the preparation of sport managers. The number of programs has grown to over 200 graduate and undergraduate programs in the early 1990s (Stier, 1993).

Professionally, sport managers will find themselves in very diverse segments of the industry (Parks, Zanger, & Quarterman, 1998, p.101). The longest standing tradition of sport management is the administration of school athletic programs, both collegiate and high school. The private sector contains jobs in areas such as sport tourism, heath promotion, sport marketing, event and facility management, and of course, professional sports. Managers in non-sporting business will find themselves heavily involved with sporting events through sponsorship.

Academic pursuits within the field are still developing (Parks, 1992). A body of knowledge is growing from the increasing number of sport management academics in universities across the nation and around the world. The scope of sport management has been defined as "any combination of skills related to planning, organizing, directing, controlling, budgeting, leading, and evaluating within the context of an organization or department whose primary product or service is related to sport and/or physical activity" (DeSansi, Kelley, Blanton, and Beitel, 1990). This broad definition allows for a great amount of latitude when considering a subject for research.

Although many of the early academics were forced to be generalists within the field, today we see an increase in specialization (Chelladurai, 1992). Academics are beginning to create a unique body of knowledge within each aspect of the greater sport

management scope. For example many academics have began to specialize in Sport Marketing (Mahony & Pitts, 1998). This field is concerned with sports products, consumers, and marketing plans. Another developing field of specialization is behavioral aspects of sport. Behavioral investigation concentrates on the impact of culture on the sport within it, as well as the reciprocal impact of sport on culture. Management and Organization of Sport is the final example of academic specialization. This area is concerned with the typical management questions of resource allocation, personnel, and leadership.

Group Dynamics

Research specialization within sport management has led some academics to investigate the function of groups within sport institutions. Historically the study of groups received attention within psychology departments. Investigations into industrial groups, military groups, and even sport groups have been conducted. One area of group study is referred to as Group Dynamics.

Bonner (1959, p.4) stated, "A group exists whenever two or more individuals are aware of one another, when they are in some important way interrelated." Following his definition of a group, it is readily apparent that groups are a major part of daily life. The sport manager must deal effectively with groups regardless which industry segment entered. Coaches, board members, and marketing managers all require an understanding of groups in general, and their specific behavior in sporting situations.

Group Dynamics is the study of groups. A basic concept of Group Dynamics is that groups are never static. A group's "members are in a continuously changing and

adjusting relationship with reference to one another" (Bonner, 1959, p.4). Through the normal process of satisfying needs and reaching goals, all groups are in constant change.

> "Actually, a group is never static; it is a dynamic organism, constantly in motion. Not only is it moving as a unit, but the various elements within it are constantly interacting. A change in procedure will affect atmosphere, which will affect the participation pattern, which will affect cohesion, which will affect leadership which will affect procedure and so on. Actually, most of the research has to do with the dynamic interaction of these variables in groups in motion." (Knowles, 1972, p.59)

Kurt Lewin (1935) conceptualized this mass of interaction as a field similar to those found in physics. A group and all of its traits, goals, and processes behave similarly to an electromagnetic field. This method requires the investigator to analyze the situation as a whole and not to judge any single element as representative of the total. The group is never a sum of the individuals within it, but a system built of the interactions between its members (Bonner, 1959, p.22).

Group Dynamics research mostly investigates the relationship between group traits (Cartwright & Zander, 1960. p.47). For example group goals, efficacy, leadership, performance, or cohesion may be compared to any one of the others. For Lewin, cohesion was the most important variable because without cohesion there can be no group locomotion (Carron, 1982).

Definition of Cohesion

The definition of cohesion has been one of the most debated subjects in the study of cohesion. Festinger (1950) gave cohesion one of its first definitions as "the result of all of the forces acting to keep the group together." This definition is known as an attraction-to-group, which features the individual as the determining factor. Festinger also included

the notion that attraction was based on three separate factors, 1) the attraction to the prestige of the group, 2) the members of the group, and 3) the activities of the group (Festinger, Shachter, & Black, 1950). Despite this multi-dimensional view, most studies focused on the singular statement of attraction to the group (Carron, 1982).

Many researchers believe that group cohesion should not be based on the sum of the individual members (Escovar & Sim, 1974; Gross & Martin, 1952). A group trait should be measured as a group not individually. Gross and Martin (1952) stated that the group's ability to resist disruption during times of crises would be more appropriate. This definition has rarely been used due to the infrequent public display of disruption of entire teams. The manipulation of disrupting factors in groups would also be very difficult if not unethical. Lastly the definition of what is a disruptive event for the team would vary greatly from one group to another (Brawley, Carron & Widmeyer, 1988).

Carron (1982) presents a third definition of cohesion, which expands the attraction to group style definition to encompass several key issues. He defines cohesion as "a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its goals and objectives" (Carron & Hausenblas, 1998, p.229). The statement that cohesion is a dynamic process explains many study's results of low cohesion at a moment in time and high at another. The level of cohesion within the team will fluctuate throughout the existence of the group. Secondly this definition includes the notion of self-maintenance, an integral part of Lewin's initial definition for group dynamics (Murrell, 1992).

Measuring Cohesion

Two methods of measuring team cohesion are available. The first is direct observation of the group. This method requires independent observers to determine the cohesiveness of the group. The differentiating factor in studies of this kind is the ratings used by the observers (Grune, 1965). Some studies use independent judges, who simply rated the groups' cohesion. Others use objective classification of time spent on various tasks to determine cohesion of the group. Bakeman and Helmereich (1975) observed several groups of undersea scientists and classified all activity into categories like self-maintenance, maintenance of others, co-recreation, and marine science. Group cohesion in this study was rated by the number of hours spent in non-work related contact with the other scientists. This study benefited from a very restricted environment and continual observation via closed circuit cameras. Data collection like this would be difficult to reproduce in the open sports environment.

The second method of measuring cohesion is through the use of self-reported questionnaires. These questionnaires have been the mode for most cohesion studies (Mullen & Copper, 1994). The ease of writing several questions and rating the teams' responses has long been a favorite for researchers. However this factor has also been problematic. Research up to the mid 1980's used so many different methods for determining cohesion that it is difficult to justify comparing them. Of 23 studies conducted, 15 of them used different operational methods to determine cohesion (Mudrack, 1989).

The Group Environment Questionnaire (Carron, Widmeyer & Brawley, 1985) has become the standard in sport cohesion survey research (Matheson, Mathes & Murry,

1995). Since it's publication in 1985 it has been used in nearly every major sport cohesion study. Several studies have tested the questionnaire's validity (Brawley, Carron & Widmeyer, 1987; Li & Harmer, 1996; Matheson et. al., 1995) and it continues to be the only psychometrically sound survey available (Brawley et. al., 1987; Mullen & Copper, 1994). Because it is sport specific and written to address general cohesion issues it can be equally applied to any sport without needing to rewrite it (Matheson et. al.,1995; Slater & Sewell, 1994).

The Group Environment Questionnaire uses 18 items rated on nine point Likert scales. It divides cohesion into four subgroups, two centered on group tasks and two on group social interaction. Group Integration – Task is the measure of how much the group is focused on the tasks of the group. Attraction to Group – Task is the measure of the individual's attraction to the group's tasks. Group Integration – Social is the measure of the how the group is focused on the social side of the group. Attraction to Group – Social is the measure of the individual's attraction to the social aspect of the group (Carron, Widmeyer & Brawley, 1985). The results of the Questionnaire can be analyzed by the individual subgroups, or the total score, whichever is more applicable. This instrument provides a means for comparing results across different studies on different types of teams.

Antecedents of Cohesion

Several models of antecedents to cohesion are available, however the model introduced by Carron (1988) easily encompasses all of the others (Widmeyer & Williams, 1991). Carron breaks the antecedents down into several sub categories

including (a) environmental, (b) personal factors, (c) leadership factors, and (d) team factors. Environmental considerations include the size of the team. The amount of playing time will be affected greatly by the size of the team as will personal interaction between the team members. Each of these would contribute to lower cohesion among larger teams (Widmeyer & Williams, 1991). Personal factors like member satisfaction can both positively and negatively effect team cohesion. Although most interacting sports perform better with high levels of personal satisfaction, some studies have shown a negative relationship in coacting sports (Landers & Lueshen, 1974; Lenk, 1969; McGrath ,1962). Recognition of the importance of cohesion is one of the many leadership factors. If the coach of the team takes steps to develop cohesion in his team it will impact the cohesion level of the team (Carron, 1982; Ryska, Yin, & Cooley, 1999). One team factor is the history of success for the team. A positive relationship has been found between past success and high levels of team cohesion (Carron, 1982; Mullen & Copper, 1994). Communication between members is also a team factor, which will lead to high or low cohesion levels (Widmeyer & Williams, 1991). All of these antecedents are very important to the cohesion-performance effect. They will become the independent variables in future studies attempting to improve cohesion and consequently improve performance outcome.

The Cohesion-Performance Effect

Sports cohesion studies have some common characteristics. Most researchers differentiate teams according to the amount of interaction required by the sport. Intuition leads to the conclusion that highly interactive teams such as football or soccer, would

benefit from high levels of cohesion. The same intuition leads one to believe the opposite would be the case for coacting teams. The results here are mixed over the effect of cohesion to performance. Once again the major roadblock arises from a changing definition of cohesion and poor operational designs.

Interacting Competition Teams

A cause-effect relationship between cohesion and performance in interacting teams has long been suspected (Mullen & Copper, 1994). Highly interactive team sports such as football, hockey and basketball require teammates to each execute their roles in order to achieve the team's goals (Carron, Widmeyer, & Brawley, 1985). Getting the team to perform like a well-oiled machine has long been seen as a determining factor for success. The research in this field has also found a positive relationship between high cohesion and high performance (Carron, 1982; Mullen & Copper, 1994).

Men's sports have received plenty of attention. Numerous studies have been conducted on teams such as ice hockey (Carron & Ball, 1977), basketball (Shanhi & Carron, 1987), and football (Stogdill, 1963). Each of them returned a positive relationship between cohesion and performance. The findings have been validated since the introduction of the Group Environment Questionnaire with similar positive results from studies on ice hockey (Slater & Sewell, 1994) and rugby (Prapavessis & Carron, 1997).

Women's interacting team sports have also been the focus of many cohesion studies. Prior to the introduction of the Group Environment Questionnaire, Williams and Hacker (1982) studied women's field hockey teams and found a positive relationship

between cohesion and performance outcome. Matheson (Matheson, et. al., 1995) used the G.E.Q in a study involving women's lacrosse and basketball and not only to verified the cohesion-performance effect found by Williams, but also studied teams across an entire season, making it one of only a few longitudinal cohesion studies.

Coacting Competition Teams

Coacting sports consists of sports where the performances of several individual team members are summed to get the final team results. Hence, a high level of interdependence is not required in order to perform the tasks necessary to win. The research on whether highly cohesive coacting teams actually perform better is split across both gender and time lines.

Men's coacting sports were the subjects of several cohesion studies through the sixties and seventies (Landers & Leushen, 1974; Lenk, 1969; McGrath, 1962). These studies concluded that a negative relationship existed between cohesion and performance. McGrath (1962) found that higher social orientation led to less task focus. One study of bowling teams found that the highest performing teams spoke more with spectators than with teammates (Landers & Leuchen, 1977). It was concluded that intra-team rivalry was the factor that caused the low cohesive team members to try harder and succeed (Matheson, Mathes, & Murray, 1995).

Women's coacting sports have only received attention recently (Mullen & Copper, 1994). The results of these studies are completely contrary to those performed on men's coacting sports in earlier studies. A study of women's golf teams competing in an NCAA tournament found that teams scoring high cohesion, as measured by the Group

Environment Questionnaire, related to higher placement in the tournament (Widmeyer & Williams, 1991; Williams & Widmeyer, 1991). Matheson (Matheson, et. al., 1995) also found while studying swimming and gymnastics NCAA division III teams throughout an entire season that there was a positive relationship between high cohesion and success.

Exercise Groups

Recent research has focused on cohesion in exercise groups (Spink & Carron, 1992; Annesi, 1999). These studies have focused on cohesion and attendance within the program. Exercise groups fulfill the definition of a group due mainly to the member's self-designation as a group. They are included here as a sporting group with no competitive component. Exercise groups resemble other sports teams during their practice phase. The groups will develop norms and goals during their existence, and are influenced by the leadership of the class instructor (Spink & Carron, 1994).

These studies examined the effect of higher cohesion on the attendance (exercise adherence) of the students within the classes. A positive relationship was found between high levels of cohesion, as measured by the group environment questionnaire, and higher levels of attendance (Spink & Carron, 1992).

Individual Competing Teams

Individual competition has received scant attention at the group level (Smith, 1998). Researchers have used the term "individual sport" within their studies to describe events which are in fact coacting team competitions (Coleman & Carron, 2001). Cohesion of truly individual competing teams has yet to be investigated.

Critique

The field of sport management is highly concerned with the administration of teams, work units and organizations. In short, it is concerned with groups and their effectiveness. Group Dynamics gives the sports management researchers a tool with which to study sports groups.

Cohesion has been a central component to the study of Group Dynamics. Kurt Lewin stated that without cohesion there could be no locomotion. Studies within industry, military and sport have all supported this statement. Cohesion and performance have been positively linked. This is ample evidence that cohesion is worthy of concern by leadership and members alike who value success.

Within sports, the value of cohesion on performance has been demonstrated in each of the three types of sport teams studied in the past. Interacting teams have returned strong results throughout the century linking high team cohesion to increased performance. Coacting teams have shown a relationship when the only psychometrically proven measure, the GEQ, is used to study this type of competitive team. Even exercise groups have shown a positive effect of high cohesion. The lack of a competitive element limits study in exercise groups to one of their most important goals: attendance.

No doubt, the individual nature of competition has caused researchers to pass over studying cohesion within individual competition teams. These teams however, train, travel, and self-identify as a group, much the same as interactive and coacting teams. Cohesion is a basic component of all groups and individual competing sport teams are

strong groups within our society. Future studies must attempt to ascertain if a cohesion-performance effect exists in individual competing teams.

CHAPTER III

METHODS

The purpose of this study is to determine the relationship between the level of team cohesion as measured by the Group Environment Questionnaire and final tournament placement for individually competing team members. This study will also further examine the relationship by comparing the results between genders and each of the three fencing events; foil, epee, and saber. This chapter will detail the methods for collecting the data for this study.

Subjects

The subjects for this study will be participants in the Poujardieu Memorial Fencing Tournament, a sanctioned tournament South Texas Division of the United States Fencing Association (U.S.F.A.). This tournament includes junior and senior, mixed and women only events. The junior only events will not be examined in this study. Each team will enter a variable number of athletes. Based on past entries, approximately 25 teams totaling 150 athletes should be entered in the tournament.

The participants on these teams represent a very large subject pool. The event is open to any U.S.F.A member from any U.S.F.A. club. The teams will be made up of members representing a wide variety of ages, socioeconomic status, occupations,

experience levels, and cultural backgrounds. The only restriction is gender for the women only events.

Informed consent will be obtained at one of two opportunities. First the coach of each team will be contacted by phone and asked to allow the team to participate in the study. With the coach's approval, each team member will be sent an information packet about the study. This information packet will include an informed consent form for the team member to complete and return. The second opportunity will be at the tournament site. This will allow the research team to obtain informed consent from all participants who do not respond by mail.

Instruments

This study will make use of the Group Environment Questionnaire (Carron, Widmeyer, & Brawley, 1985). It is the only psychometrically proven measure of team cohesion available (Brawley, Carron, & Widmeyer, 1987; Mullen & Copper, 1994). It is comprised of 18 questions answered on 9-point Likert scales. Each scale is composed of positive and negative answers. The questions help measure one of the four components of cohesion (a) attraction to group – task (b) attraction to group – social (c) integration to group – task, and (d) integration to group – social. The team score is comprised of the average score of all members on the team (Carron, Widmeyer, & Brawley, 1985).

Procedures

The study can be divided into four subsections. The first is obtaining consent from the organizing committee of the Poujardieu Memorial to conduct the study during the

fencing tournament. This permission will be sought via phone contact with the tournament organization committee and the South Texas Division executive committee if necessary. After receiving verbal consent, written confirmation will be obtained by mail from the appropriate committee members.

Second is contacting the teams prior to the competition weekend. Initial contact will be to the coaches by telephone. The study will be explained and consent to contact the team members will be sought. Each of the team members and coaches will then receive an information packet by mail explaining the study and what will be involved as a participant. An informed consent form will be included in the packet with a self addressed, stamped envelope for return to the research team.

The third stage of the study will take place at the tournament venue. Each participating team is required to report to Control prior to the event with all equipment to be used in the competition. Here, the athletes are officially checked in to the tournament and all of their equipment is subjected to tests for conformity to U.S.F.A. rules. A station will be set up near the waiting area for athletes whose equipment is undergoing testing.

This station will have seven chairs set up in a "U-shaped" pattern facing away from the waiting area. Each team member will be given a pencil, clipboard, and Group Environment Questionnaire. Athletes wishing to participate who have not completed an informed consent form will also receive this form with the other materials. The team will be read instructions about filling out the questionnaire and a reminder of the confidentiality of their answers. After each athlete completes the questionnaire it will be collected and the individual directed to the waiting area. After all questionnaires are collected, the next group will be brought into the research station.

The final section of the study is collection of the final placement results. This will be taken from the official results posted on the tournament notification board the day after the event. This posting contains the final results after any protests have been filed and resolved.

Design & Analysis

The dependant variable in this study is the final tournament placement of the individual competitors grouped as teams. These tournament placements will be determined by each competitor's best placement converted to a percentile within that event. The mean of these individual percentage placements within each team will determine the team's final placement.

The independent variables in this study are:

1. Level of team cohesion as measured by the Group Environment Questionnaire,
2. Gender,
3. Event (Foil, Epee, and Saber)

The dependant and independent variables will be analyzed with Pearlson-Product-Moment correlation coefficients comparing measured level of cohesion with the final individual placement in the tournament by team. The two genders' relationships will also be compared for differences in cohesion

CHAPTER IV

RESULTS

The purpose of this study was to determine the relationship between the level of team cohesion as measured by the Group Environment Questionnaire and final tournament placement for individually competing teams. This study also examined this relationship by comparing the results between each of the three fencing events; foil, epee, and saber. Finally, the results were compared across genders.

Descriptive Data

192 competitors representing 28 teams participated in the competition. There was a 56% return rate overall for the Group Environment Questionnaire. Twelve surveys were returned incomplete and were subsequently excluded. Only the questionnaires from competitors who completed the GEQ were used in the analysis.

In order to better compare data in the present study to that of coacting and interacting teams, the minimum team size of three was used to calculate team cohesion scores. Team competitions in fencing consist of three competitors per team. For this study only teams fielding three or more competitors who completed the Group Environment Questionnaire were used in any calculations. This yielded a final pool of 95 fencers representing 13 teams.

The average number of competitors was 4.5 members per team for included teams. These members also had an average of 33.44 months of experience practicing with

their respective team. The participants may have had many more years of experience competing in the sport, but this was the mean reported time with the team of record.

The men's-only events were replaced with a mixed gender format for all three events. The researchers were unaware of the change in format for the tournament until just before tournament registration began. This precluded any analysis between genders. Also the women's saber event was canceled due to low turnout, further complicating the issue of gender differences in cohesion.

Tournament Placing

Each competitor's tournament rankings were converted to a percentage placement within the event. Where competitors participated in more than one event, the best result was used for interpretation and the others disregarded. Within the sport of fencing it is common for a competitor to enter not only their strongest event, which they have prepared for during practice session, but to also enter anther event for warm-up or simple enjoyment. Thus, their best achievement is assumed to be within the event in which they have dedicated more practice time and effort. The means and standard deviations for each major event are displayed in Table 1. Also displayed are the means and standard deviations for the amount of time each competitor has spent practicing with their current team.

Table 1 Mean Percentile Placement by Event

	% Placement		Time (months)	
	M	SD	M	SD
All	60.4%	20.2%	41.63	2.35
Foil	56.9%	23.5%	30.23	1.22
Epee	62.2%	16.7%	54.72	3.49
Saber	66.7%	25.3%	20.14	1.13

Cohesion Scores

Table 2 reports the mean and standard deviation of each of the four cohesion subscales for each major event. Normative data for team events and coacting events is also provided. The norms for individually competing teams are similar in most instances

Table 2 Mean Cohesion Scores by Event

	ATG-T	StDev	ATG-S	StDev	GI-T	StDev	GI-S	StDev
All	28 20*	6.33	31.52	5.40	28.82**	4.41	22.26***	4.53
Foil	25.00	6.99	29.90	6.14	25.24	5.11	21.05	4.64
Epee	30.47	6.34	32.71	4 61	31.70	4.21	23.32	4.25
Saber	30.57	2.99	32.43	6.50	29.43	2.15	22.00	5.69
Norms#								
Coacting	30.21	5.67	31.44	7.65	29.90	6.70	24.22	6.79
Interacting	26.23	6.68	31.25	6.84	31.38	6.93	22.27	6.41

*p<.05 for differences with both coacting and interacting teams.
**p<.05 for differences with interacting.
***p<.05 for differences with coacting.
#Widmeyer, W.N., Brawley, & L.R Carron, A.V., 1985.

to coacting and interacting teams. However, within the ATG-T subscale the individually competing team mean (28.20) is significantly higher (p=0.0018) than the interacting teams norm (26.23) and significantly lower (p=0.0182) than the coacting team norm (30.21). The individually competing teams mean GI-T (28.82) is also significantly lower

(p=0.0002) than interacting teams norm (31.38). Finally, the individually competing teams mean GI-S (22.26) was significantly lower (p=0.0002) than the coacting team norm (24.22)

Correlations

Correlations between placement and the four subscales of cohesion were calculated for foil, epee, and all-teams combined. The saber event only contained one team with enough members for analysis and so it is only included within the all-teams calculations.

The comparison between placement and cohesion contained several correlations over 0.4. However because of the low number of team scores per event (foil n=5, epee n=7, all n=13) none of these correlations were significant (p>.05). Team cohesion appears unrelated to performance for individually competing sport teams.

Table 3 Correlation between Performance and Cohesion

	ATG-T	ATG-S	GI-T	GI-S
All	-0.20	-0.07	0.06	-0.47
Foil	-0.34	-0.48	0.21	-0.03
Epee	-0.47	0.02	-0.28	-0.70

CHAPTER V

DISCUSSION

The results did not confirm the hypothesis that high cohesion scores would relate positively to high performance within individually competing team members. Cohesion scores did compare with published norms for interacting and coacting types of teams. There was a high but non-significant positive relationship between time with the team and performance within the foil event. These results suggest that although individually competing teams are similar to other teams in many ways, different traits exist which fundamentally affects their outcomes.

Cohesion

The cohesion scores were similar to published norms for coacting and interacting teams. However the individual nature of the events did influence the variability within the overall scoring. Attraction-to-Group - Task scores (28.20) were significantly higher ($p<0.05$) than published norms for both coacting (31.44) and interacting (26.23) teams (Widmeyer, Brawley, & Carron, 1985). Attraction-to-Group – Social scores were higher than coacting (31.44) interacting teams (31.25) but not significantly. This variation within Attraction-to-Group scores may be due to the ability of the individual to change teams more easily, eventually finding one more suited to individual liking. This is in contrast with coacting or interacting teams in which roster changes have a greater effect on the team as a whole (Matheson, et. al., 1995, Williams & Hacker, 1982). Also playing time is not an issue for individual competitors where a coating or interacting player may be

benched by a new team for several games. These low change factors would support individual competitors finding satisfactory teams, which translates to higher Attraction-to-Group scores.

Individually competing teams' Group-Integration – Task scores (28.82) were lower than those of coacting (GI-T 29.90) and significantly lower ($p<.05$) than interactive (GI-T 31.38) sports. Group-Integration – Social scores (22.26) were significantly lower than coacting scores (24.22). These variations may also be due to the high flexibility within teams. Players' ability to move from one team to the next may make group integration very hard to attain. Also the individual nature of game day may promote many different strategies of preparation dependant upon the player's abilities, not the team's. These factors make high Group-Integration scores difficult to attain within a team competing as individuals.

Fencing specific analysis shows higher results in all four subscales for the epee event than the foil event. Foil requires more cooperative interaction during practice than the epee event and so it suffers more when considering the flexibility issues discussed above. Foil fencers operating within a structured, controlled team environment would most likely attain cohesion scores equal to the epee team scores.

Cohesion-Performance Correlation

The correlations between cohesion and performance in teams competing as individuals were not significant. This is in direct contrast to results within sports cohesion research (Mullen & Copper, 1994). Studies (Carron & Ball, 1977; Stogdill, 1962; Widmeyer & Williams, 1991) using the Group Environment Questionnaire have

consistently demonstrated a positive relationship between cohesion and performance. This difference is most likely due to the single differing trait of game-day fate. Carron's (1982) definition of a team includes the concept of a shared fate. This implies that within sport the group must share the win-loss record to be a team. However, teams share many fates, of which game day results are only one. The team will share the wrath of an upset coach, share the loss of a practice facility, and share the benefits of new equipment. These fates are the same for all types of teams including coacting, interacting, and individually competing. However within coacting and interacting sports, the team as a whole is declared the winner or loser of a match. The individual performances will contribute to success but will not by themselves determine victory or defeat. The performance of all teammates is linked to a shared game-day fate.

Conversely, teams competing as individuals do not share a game-day fate. One member of a team may win the event while all other teammates finish near the end. This lack of a shared fate probably changes the cohesion-performance relationship. Consequently the relationship in this study was not significant.

This study found no relationship between cohesion and performance within teams competing as individuals. This result is inconsistent with research demonstrating a positive relationship within exercise classes (Spink & Carron, 1992; Annesi, 1999). Just as with all other sports groups, these two types of sports share many of the same traits and fates. There is no game-day fate for exercise groups. Individually competing teams have this game-day trait in addition to all others in common with exercise groups. Again, it must be this one factor that negates the relationship that would be present if these fencing teams met only for the benefit of exercise.

Conclusions

Based on the results of this study the following conclusions can be made:

1. There is no significant relationship between cohesion and performance within individually competing sports teams. This may be due to the lack of a shared fate on game-day for all teammates of these teams.
2. There is a significant relationship between amount of time with a team and performance within the foil event of fencing. This may be due to the higher cooperation required during practice of foil.
3. There are significant differences in cohesion scores between individually competing teams and norms for coacting teams within ATG-T and GI-T subscales. There are also significant differences in cohesion scores between individually competing teams and norms for interacting teams within ATG-T and GI-S subscales.

Recommendations for Future Research

1. Similar studies should be conducted with a greater sample size. The low numbers within this study affected the significance of the correlation between cohesion and performance.
2. Gender differences within individually competing teams must be researched. The present study was unable to separate the performance by gender and thus could not analyze the relationship between cohesion and performance based on gender.
3. Further analysis of the affect on other team processes due to the lack of a shared game-day fate must be studies. The team processes such as communication, goal

setting, and status, as well as others, must also be affected by the game-day focus of the sport, be it coacting, individually competing, or interacting.

4. The average age of the team may also affect the cohesion-performance relationship. There are many differences between high school age teams and masters age teams and how these relate to team cohesion and performance should be explored.

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Appendix A

Raw Data: Descriptive and Competition Results

Subject #	Team#	Age	TimeTotal	Result-MxFoil	Result-W Foil	Result-MxEpee	Result-W Epee	Result-MxSaber	Result-W Saber
1	A	24	9			101	12		
2	A	30	72			1			
3	A	26	63			38			
4	A	28	24			12			
5	A	27	60			21			
6	A	28	60			14			
7	B	32	6					27	
8	C	25	12	12					
9	C	22	24			37			
10	C	25	12	43					
11	C	41	108	18	3				
12	C	46	112				9		
13	C	28	12	42					
14	C	15	30	47					
15	C	26	26	1					
16	C	15	18	49	14		16		
17	C	32	42			20			
18	C	30	24	2					
19	C	58	36	5		44		5	
20	C	16	24		18		13		
21	C	16	55	31		81			
22	D	44	18			23			
23	D	38	2			30			
24	E	46	96	33		24			
25	E	24	12	41					
26	E	49	36	51					
27	E	18	14	30					
28	E	59	24	56		104			
29	E	56	36			25			
30	E	48	39		20				

Subject #	Team#	Age	TimeTotal	Result-MxFoil	Result-W Foil	Result-MxEpee	Result-W Epee	Result-MxSaber	Result-W Saber
31	F	16	36					3	
32	F	15	24					11	
33	F	16	24					16	
34	F	16	23					1	
35	F	16	6					12	
36	F	15	24					7	
37	F	14	4					20	
38	F	15	6			83			
39	G	38	24						
40	G	34	48	3					
41	G	14	15	17					
42	G	21	48			10			
43	G	14	36	38	13				
44	G	40	48			45	8		
45	G	42	48		3				
46	G	40	13	55	21				
47	G	30	12			77	17		
48	H	15	16			93			
49	H	15	4					22	
50	H	16	15			98			
51	H	16	18			76			
52	I	16	63			69			
53	J	35	15		10		28		
54	K	19	5	32		52		6	
55	K	16	6	25	22				
56	K	15	0	35	12				
57	L	20	4					20	
58	M	22	60			32			
59	N	46	0	14					
60	O	19	14	26		85			

Subject #	Team#	Age	TimeTotal	Result-MxFoil	Result-W Foil	Result-MxEpee	Result-W Epee	Result-MxSaber	Result-W Saber
61	P	14	16		11				
62	P	13	41		16		2		
63	P	41	120			61	3		
64	P	15	38	6					
65	P	15	48		7				
66	Q	43	111			13			
67	Q	17	96	8	2				
68	R	15	5	28					
69	R	28	48			34			
70	R	16	48	20					
71	R	25	12			87			
72	R	19	120			84	26		
73	R	15	36	53	17				
74	R	15	36	29	9				
75	R	19	18	27		105			
76	S	14	4			71	29		
77	S	27	18					2	
78	S	33	14	7					
79	S	16	42	9					
80	T	28	36	15	6		21		
81	T	34	30			11			
82	T	14	56						
83	T	38	180			9			
84	U	18	29	40					
85	V	43	12			31			
86	W	46	12			70			
87	X	21	31	50				23	
88	Y	20	27	44	19	100	32		
89	Y	17	53	3		60			
90	Y	17	15	48	24		24		

Subject #	Team#	Age	TimeTotal	Result-MxFoil	Result-W Foil	Result-MxEpee	Result-W Epee	Result-MxSaber	Result-W Saber
91	Z	49	84	13					
92	Z	34	48			68			
93	Z	18	72			5			
94	Z	16	36			62			
95	AA	33	48	36	23	86			
96	AA	34	204	16		35			
97	BB	15	15	46					
98	BB	47	0	24		52			
99	CC	36	48			66			
100	CC	19	12	52					
101	CC	19	12	23					
102	DD	16	48			50			
103	DD	18	60			40			
104	DD	17	36			29			
105	DD	50	300			18			
106	EE	19	10	45	15	94			
107	EE	19	39	22		22			

Appendix B

Raw Data: Questionnaire Data

Subject #	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18
1	6	1	3	1	2	2	9	2	2	9	2	8	1	1	6	7	2	2
2	1	1	1	1	9	1	1	1	6	9	3	7	1	1	7	4	1	1
3	7	1	1	1	8	1	5	1	8	7	3	5	1	1	8	7	1	2
4	1	1	2	2	2	5	2	3	2	3	3	3	2	2	7	7	2	3
5	5	2	8	2	9	2	2	2	9	9	5	8	1	3	8	6	2	5
6	2	1	2	1	8	1	6	1	8	9	4	4	3	2	6	4	3	3
7	2	2	3	2	5	2	5	2	4	4	3	6	4	3	5	5	3	3
8	2	2	2	2	8	2	7	2	5	7	7	4	7	2	6	8	6	5
9	8	1	7	2	1	2	9	1	2	4	7	3	8	3	2	5	2	3
10	1	1	1	1	4	1	5	1	3	5	2	2	9	1	1	8	4	1
11	3	2	1	3	5	6	6	2	2	4	8	4	8	6	6	8	5	4
12	2	1	1	1	7	1	5	2	3	5	7	8	9	5	5	5	5	6
13	1	5	1	1	7	1	5	1	7	8	7	4	9	1	1	9	7	6
14	4	2	4	3	9	2	2	1	2	7	3	5	7	3	1	7	8	2
15	3	1	1	1	9	2	4	2	3	7	5	9	3	3	7	7	5	3
16	1	1	1	2	9	1	5	1	9	8	4	5	6	5	7	7	4	5
17	2	1	3	2	8	2	6	1	8	3	7	2	8	2	2	7	6	3
18	2	6	3	2	2	6	5	5	6	5	4	5	5	4	5	6	6	4
19	2	8	2	7	9	6	5	1	8	7	2	8	2	2	2	6	7	2
20	1	1	1	1	9	1	0	1	9	9	2	1	8	1	5	9	3	1
21	3	1	4	1	9	1	2	2	3	6	3	5	1	5	9	4	8	2
22	8	8	7	2	2	7	8	2	2	2	8	2	9	9	1	7	8	8
23	1	7	2	6	2	2	1	7	7	8	4	5	3	3	7	7	4	7
24	1	3	2	5	6	3	5	2	7	5	6	2	4	7	4	7	3	5
25	9	4	3	7	4	7	9	6	9	5	5	2	6	5	7	5	4	3
26	9	9	9	9	1	9	5	9	1	9	7	1	5	9	1	5	5	9
27	9	1	3	2	9	2	5	0	3	9	8	9	3	2	8	9	8	2
28	4	4	4	4	4	4	6	4	7	6	5	5	7	7	3	6	7	4
29	9	2	6	2	3	3	7	2	5	7	1	5	2	2	8	8	2	6
30	1	6	1	1	6	1	1	2	8	8	3	4	6	6	4	4	2	1

Subject #	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18
31	5	3	5	5	5	5	5	5	5	4	5	3	7	7	4	5	6	2
32	3	3	6	9	7	5	7	8	4	3	4	6	5	5	3	7	6	4
33	5	3	7	3	4	5	9	4	1	3	9	1	9	3	5	3	5	5
34	1	3	1	2	6	2	5	1	5	3	6	3	4	1	6	7	4	5
35	0	2	2	2	5	0	0	2	5	3	5	5	5	5	5	5	5	5
36	5	4	1	3	1	4	1	3	1	6	3	7	8	6	3	6	3	7
37	1	1	1	4	3	5	8	2	2	3	6	4	9	5	7	3	6	2
38	1	3	6	8	1	3	5	3	9	5	5	2	3	6	7	5	6	4
39	2	1	2	2	5	1	0	1	5	8	3	1	3	2	3	7	3	2
40	2	1	2	1	9	2	3	2	9	8	3	7	2	3	5	8	2	3
41	1	1	1	3	9	1	1	1	9	2	5	4	1	1	9	5	1	1
42	1	2	1	4	7	2	2	2	8	7	5	6	2	2	8	8	3	3
43	1	1	1	3	7	1	7	2	4	7	5	2	4	2	3	8	7	5
44	2	3	1	4	3	1	2	1	7	7	7	9	4	2	7	7	8	5
45	1	1	1	1	7	1	2	1	8	7	6	5	2	5	7	6	4	5
46	4	4	2	4	9	1	7	2	4	7	5	2	4	2	3	8	7	5
47	1	1	1	1	8	1	1	1	7	6	1	6	1	1	6	6	1	1
48	1	1	1	1	6	1	5	3	6	8	1	3	7	3	2	3	4	6
49	4	5	7	2	7	6	8	5	4	8	3	4	6	5	5	7	5	4
50	2	4	4	2	6	3	7	2	2	7	2	6	7	2	4	7	4	3
51	1	1	3	2	6	4	5	4	3	7	3	4	8	3	5	7	3	3
52	2	5	2	4	7	3	3	4	8	6	3	6	2	5	7	6	2	4
53	1	1	2	2	5	7	6	2	2	6	3	5	7	2	6	6	3	4
54	1	1	1	1	3	2	3	2	9	9	1	6	5	2	9	0	2	2
55	1	1	1	1	9	1	1	1	6	9	1	8	5	1	8	9	1	2
56	1	1	1	1	9	1	1	1	9	9	1	1	2	1	9	9	1	1
57	1	9	1	9	5	5	5	6	5	4	5	5	5	7	5	9	6	5
58	9	7	9	6	4	7	1	5	5	5	5	5	8	7	4	5	5	7
59	9	9	5	7	9	7	7	1	9	1	6	8	3	8	5	5	5	5
60	1	1	1	1	1	1	9	2	3	7	2	3	6	2	5	6	4	3

Subject #	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18
61	1	1	1	1	9	1	1	1	9	9	1	9	1	1	9	9	1	1
62	1	1	1	1	8	1	5	1	5	8	5	8	3	1	7	7	1	5
63	6	4	8	8	7	3	7	6	3	4	6	2	7	7	3	4	6	6
64	8	9	2	6	7	4	5	1	7	7	6	5	4	5	7	8	2	4
65	1	1	1	1	6	1	5	2	4	9	5	5	3	3	7	6	3	5
66	1	1	0	2	0	1	1	1	9	4	2	8	1	5	9	9	2	9
67	1	1	1	3	2	1	1	1	3	3	6	3	3	2	1	7	1	2
68	4	3	6	2	7	3	9	2	3	4	5	5	6	2	5	4	5	3
69	2	6	0	3	6	5	5	5	7	7	5	5	5	3	6	6	5	4
70	2	3	3	4	4	2	2	2	6	5	3	4	4	6	4	5	3	3
71	2	2	2	2	5	3	2	2	7	6	4	4	5	3	5	7	4	4
72	3	3	3	2	4	6	0	2	4	3	7	3	8	5	6	5	6	4
73	9	6	5	7	8	6	8	7	6	5	4	6	6	5	8	8	7	9
74	1	2	1	2	7	2	2	2	9	8	6	9	5	5	8	7	3	4
75	1	2	1	3	2	3	2	2	5	7	3	6	4	5	7	8	1	3
76	1	3	1	1	1	1	4	1	6	5	4	4	6	1	8	5	4	4
77	7	1	2	1	7	1	3	1	3	2	3	4	4	3	4	6	3	3
78	9	1	1	1	9	1	5	2	7	5	4	4	5	1	4	3	5	3
79	6	1	3	1	5	1	7	2	5	7	2	7	5	5	3	5	6	4
80	3	2	3	3	3	7	5	5	5	6	7	2	6	7	7	6	6	5
81	3	3	3	2	5	1	1	1	5	5	5	4	5	5	4	5	5	5
82	6	7	7	2	1	8	1	1	7	7	2	7	6	2	5	6	2	3
83	9	2	7	9	2	8	8	3	2	2	7	2	8	8	5	2	8	6
84	1	5	3	5	7	5	6	4	6	4	6	5	4	6	6	4	5	5
85	3	2	1	6	9	3	5	3	5	4	6	5	5	5	2	4	5	4
86	1	1	3	7	9	1	5	3	3	3	5	1	9	6	1	9	5	2
87	1	1	1	1	9	1	5	1	9	9	5	9	5	1	6	9	1	9
88	1	1	1	1	6	1	0	1	9	9	6	2	9	2	3	8	3	3
89	6	1	2	5	9	2	9	2	9	7	3	3	7	8	6	3	6	6
90	1	1	2	3	1	2	3	3	5	8	5	4	7	2	8	7	6	5

Subject #	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	Q-10	Q-11	Q-12	Q-13	Q-14	Q-15	Q-16	Q-17	Q-18
91	2	3	3	8	7	2	5	3	7	8	5	5	5	2	5	8	5	5
92	2	3	1	2	1	2	3	3	1	4	5	5	3	5	2	8	5	5
93	1	1	1	3	5	2	5	1	8	5	3	7	3	3	6	5	5	3
94	1	2	1	1	1	1	5	1	5	5	5	4	6	6	5	4	6	3
95	2	5	4	6	6	5	5	3	5	4	3	2	4	7	5	5	3	7
96	1	6	1	3	5	6	3	3	5	7	4	8	3	6	3	7	3	2
97	9	1	1	1	7	1	1	1	9	9	1	9	6	1	0	9	1	9
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	2	3	3	2	3	5	3	7	7	4	4	2	2	4	4	2	4	4
100	9	2	9	3	9	2	5	3	8	8	5	3	3	3	9	5	2	3
101	4	3	3	3	5	2	4	3	8	7	4	7	1	4	6	6	3	3
102	1	1	1	1	8	2	6	1	9	9	7	3	7	1	8	7	2	3
103	4	4	4	4	4	6	8	4	4	8	7	7	6	5	5	5	5	5
104	5	4	2	3	9	5	6	3	9	3	9	1	1	5	1	1	8	7
105	1	1	1	1	9	1	1	1	1	5	5	9	1	1	9	9	1	9
106	1	2	2	2	7	1	0	3	7	8	1	8	3	6	8	5	3	5
107	2	2	2	3	2	4	5	2	3	6	5	3	9	2	4	6	6	4

VITA

Randall Griffiths was born in Missoula, Montana, on November 23, 1968, the son of Brian and Colleen Griffiths. He grew up in Spokane, Washington, attending North Central High School. Randall began fencing at the age of thirteen and after graduation this hobby led him to Texas and the Southwest Texas State University fencing program. During 1988 – 1989 Randall studied at the Ecole National De Maitre D'Armes in Dinard, France, attaining the fencing instructor title of Prevot D'Armes. He returned to Texas for a year before joining the U.S. Army during the Gulf War. Randall served as an infantryman for four years in Schweinfurt, Germany. After leaving the Army, Randall began undergraduate studies at Southwest Texas State University, San Marcos, Texas. He graduated in 1998 and continued with graduate studies at Southwest Texas State University.

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