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**Examining the Relationship Between Life Stress, Skating Specific
Stress and Figure Skating Performance**

 by Kavita Prakash

THESIS

**Submitted to the School of Graduate Studies and Research in partial fulfillment of the
requirements for the degree of Master of Arts in Human Kinetics**

**School of Human Kinetics
University of Ottawa
1998**



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ABSTRACT

The purpose of this thesis was to examine the impact of life stress and skating specific stress on the performance of figure skaters. Two separate experiments were conducted to examine this relationship during two different time frames-the first transpired during the summer skating season and the latter was conducted during the fall skating season. Thirty-one and thirty competitive figure skaters participated in experiments one and two, respectively. Repeated measures of daily hassles and skating specific stress were obtained as well as single assessments of major life stress, social support and coping abilities. Practice performance for both studies was assessed by the coaches. Competitive performance was also assessed by the coaches in both experiments, but an added feature of the second study was the judges' scores. The findings revealed that during the summer, stress did not negatively impact either type of performance, whereas in the second study, strong negative correlations and predictions were obtained. Both studies found that task coping predicted greater performance levels. These results are discussed in terms of the significance of the time of year studied, as well as the implications for psychological interventions and future research.

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CHAPTER I

GENERAL INFORMATION

In a document by Felsten and Wilcox (1993), it was made clear that there was little known about how life stress affected athletic performance. Rather, the emphasis of the research has been placed on anxiety in sport, and more specifically, in the competition setting. However, anxiety is the emotional reaction to stress (May, 1993) and by solely emphasizing on such reactions, we are not identifying the stressors, or events, which could have a negative impact on how our athletes perform. By learning more about these stressors, sport psychology consultants, coaches and parents could help athletes to deal with the sources of stress which arise from life in general, rather than limit themselves to the competitive environment. Thus far, research which has examined the relationship between life stress and athletic performance have yielded inconsistent findings. The purpose of this thesis was to examine the stress-athletic performance relationship with a more rigorous methodology that addressed many of the limitations which existed in previous studies.

The remainder of this thesis is organized in the following sections: First, the introduction that was presented for my thesis proposal has been revised and serves to review the pertinent literature on this topic in greater detail than that provided by the articles. Following this, two articles are presented. The first article entitled, *Examining the Relationship Between Life Stress and Skating Specific Stress on Figure Skating: Performance During the Summer Season* was completed in the summer months of 1997.

Following that study, different skaters were recruited to participate in a similar study that occurred in the fall months of 1997, a time frame that was crucial to these skaters since it included their competitive season. This second article is entitled *Examining the Relationship Between Life Stress and Skating Specific Stress on Figure Skating: Performance During the Competitive Season*. Following these two articles, a general discussion will be presented to discuss the findings from both articles. Lastly, Appendices will be inserted to illustrate the contribution of collaborators, the individual questionnaires utilized in both articles, and the approval provided to the researchers by the Ethics Committee of the University of Ottawa.

CHAPTER II

REVISED INTRODUCTION

Organization of the Introduction

The following is a revised version of the original thesis proposal introduction. As suggested by committee members, Dr. Michelle Fortier and Dr. Pierre Trudel, changes related to the clarity of expression of the material, the inclusion of material relevant to the thesis topic and the introduction of subheadings have been made. This introduction will provide definitions of stress and related terms, as well as a review of stress research in other domains. As will be evident, the research literature contains ample information pertaining to the detrimental effects of stress in the areas of physical illness and athletic injury occurrence, yet little is known about how life stress impacts athletic performance. This gap in the literature is used to justify the need for the present thesis. The limited methodologies of previous stress-athletic performance research is also used to justify the present thesis.

Stress: General Information

Stress is something that we have all experienced. The multitude of stress management courses available, as well as the many self-help books written to offer ways to reduce stress, are just a few of the indicators of how the topics of stress and stress management have become prevalent in today's society. One issue that has received minimal attention within the field of sport psychology is whether or not stress affects athletic performance.

In order to address this issue, an overview of the stress literature is provided commencing with a discussion of stress in general. Following this, there will be a brief overview of the stress-illness relationship, as well as the relationship between stress and athletic injury. Finally, a rationale for the possibility of the relationship between stress and athletic performance is reviewed in conjunction with a proposal for how this relationship can be studied further. More specifically, this proposal deals with the study of competitive, adolescent, female, figure skaters and the sources of stress that may impact on their athletic performance in practices and competition.

Definition of Stress and Related Terms

Stress has been defined in numerous ways. For the purposes of this study, life stress was considered as the process that involves a perceived imbalance between one's environmental demands and one's response capabilities (Lazarus, 1966; Lazarus & Folkman, 1984; Martens, Vealey & Burton, 1990; McGrath, 1970; Spielberger, 1989). That is, cognitive appraisal of external factors, or the environmental demand occurs, which includes an evaluation of the potential consequences and of the resources of the person and the situation. If in fact, this appraisal results in the conclusion that the environmental

demand exceeds the ability to cope, that demand is perceived as 'stress'. This stress heightens our physiological arousal, thus disrupting our homeostasis (Pargman, 1986). This stress reaction may be followed by various emotional reactions, such as anger, fear, or anxiety.

A common error in stress research is to use the terms anxiety and stress interchangeably (Felsten & Wilcox, 1993; Jones & Hardy, 1997). As already mentioned, however, anxiety is one possible emotional reaction to stress. Specific to the athletic domain, the anxiety and sport literature is markedly dissimilar to pertinent stress and athletic performance research, which will be discussed later (for a review of anxiety and athletic performance, see Jones & Hardy, 1997; Martens, Vealey & Burton, 1990). Specifically, competitive anxiety is a multidimensional construct (Jones & Hardy, 1997). That is, it can be examined from a trait or state perspective, and competitive state anxiety can be further segregated into cognitive and somatic anxiety. Cognitive anxiety is characterized by negative expectations, lack of concentration and images of failure, while somatic anxiety refers to the perception of physiological symptoms such as sweaty hands or tension (Jones & Hardy, 1997; Martens, Vealey & Burton, 1990).

Jones and Hardy (1997) recently discussed the tendency for researchers to rely on the inverted-U theory of anxiety and arousal to interpret the stress-athletic performance relationship. The relationship between stress and athletic performance, however, is much more complex due to the interaction between the nature of the environmental demand, the cognitive and motor demands of the task to be performed and the psychological characteristics of the individual performing the task (Jones & Hardy, 1997). Indeed, anxiety in general terms relates to an internal, personal, emotional reaction, whereas stress

refers to the cognitive process pertaining to an external, environmental problem (Pargman, 1986). Thus, when attempting to understand the concept of stress in any domain, it is important to note the difference between stress and anxiety. From this point on, the literature review will focus on stress, and not on anxiety.

An understanding of stressors is necessary when addressing the concept of stress. Stressors are those factors, either real or imagined, that are precursors of stress (Robbins, Powers, & Burgess, 1994). Individuals may respond differently to the same stressor. For example, a stressor deemed to be undesirable to one person, such as speaking in public, may be viewed as desirable by another. Thus, this same stressor may exceed the ability to cope for one person, but may be viewed as a challenge that is within the capabilities of another. The two main types of stressors are physical stressors and psychosocial stressors. *Physical stressors* are physical demands that are placed on the body that elicit a physiological and psychological stress response (Peurifoy, 1995). Examples of physical stressors include accidents, illness, chemical toxins, heat, cold, and noise (Peurifoy, 1995; Robbins, Powers, & Burgess, 1994).

Psychosocial stressors, also referred to as *life stressors*, are socially-induced stressors that bring about a psychological process (Kaplan, 1996). Examples of psychosocial stressors include final exams, holidays, divorce, and marriage (Robbins, Powers, & Burgess, 1994). These stressors can be further subdivided into major life events and hassles. *Major life events* have been operationally defined as major stressors that occur infrequently and are typically measured over a one- or two-year time frame (Miller, 1996). In the interest of accuracy, however, Miller (1996) suggested that a six-

month time period would be preferable for assessing these infrequent events. Examples of major life events include the death of a parent, or the birth of a sibling.

Hassles are the events or interactions that occur in daily life that may be bothersome, annoying, or negative in some way (Robbins, Powers, & Burgess, 1994). Hassles, therefore, are frequent stressors that are typically measured over one- or two-week time frames (Miller, 1996). Examples of hassles include fighting with a friend on a regular basis, or having too many things to do at once. Although physical stressors are likely to occur in figure skating, in this study, only psychosocial stressors are of interest. Psychosocial stressors are important because they do elicit what is known as the stress response.

The Stress Response

Hans Selye, the 'father' of stress research, was the first to describe the stress response. In brief, the sequence is as follows: when we are exposed to potential stressors the fight or flight response in the body becomes activated. This reaction causes powerful stress hormones and steroids (stress products) to be pumped into the blood stream in order to prepare the body to either fight or flee from the stressor. For example, if a person was crossing the street and observed a car approaching fast, this fight-flight response is what allows them to instinctively tense their muscles and jump back on the curb. A few minutes after the frightening event, the body returns to its normal physiological state (Peurifoy, 1995; Robbins, Powers, & Burgess, 1994; Selye, 1956). This process has evolved over the centuries to help us survive dangerous occurrences, such as fighting in wars. It works best when the danger is clear, well-defined, and short-term, that is for acute situations as opposed to those that are chronic.

In modern society, however, our stressors are chronic and are not as dangerous as they used to be. For example, we no longer have to fight to survive or to gather food. Rather we are faced with the psychosocial stressors associated with modern times, such as trying to get a computer to work properly. Regardless of the nature of the stressor, this fight or flight reaction still transpires and serves to prepare us for swift action, whether it is needed or not. The downfall of this reaction is that these chronic stressors elicit the stress response many times a day, with the body repeatedly responding as if it were experiencing real emergencies. That is, the stress products which are distributed into our bloodstream and subsequently build up during this response have no physical outlet. Consequently, the body suffers excessive wear and tear which results in the negative repercussions of stress (Robbins, Powers, & Burgess, 1994). These negative repercussions have been revealed in examinations of the stress-illness relationship as well as stress and athletic injury

Stress and Physical Illness

It is now considered common knowledge that stress can lead to physical illness (Miller, 1996). Some of the factors leading to physical illness, for example, were described in the explanation of the stress response. Recently, direct connections between stress and various functions of the immune system have been found (e.g., Glaser & Glaser, 1991). Studies have also found that psychosocial stressors increase the risk for upper respiratory disease (e.g., Graham, Douglas, & Ryan, 1986). Additionally, stressful life events have been shown to increase susceptibility to the common cold (e.g., Cohen, Tyrrell, & Smith, 1993). Therefore, the evidence supporting the influence of stress on physical illness appears to be substantial (Miller, 1996).

Stress and Athletic Injury

These strong, empirical findings concerning this relationship promoted a different area of interest in the sport psychology research literature involving the examination of the relationship between psychosocial stress and the occurrence of athletic injuries (Williams & Roepke, 1992). Athletic injury is quite common within the context of sport and recreation. Estimates as high as three to five million injuries among children and young adults have been reported (Kraus & Conroy, 1984). Certainly, many of these injuries are due to physical factors such as equipment failures, overtraining, bodybuild, and level of conditioning. However, psychosocial factors (i.e. life stress) have also been shown to contribute to injury vulnerability and resiliency (Williams & Roepke, 1992).

The stress-injury relationship is the most extensively researched area in the psychology of injury. Past research has established a positive relationship between life stress and injuries in football players (Cryan & Alles, 1983; Blackwell & McCullagh, 1990; Bramwell, Masuda, Wagner & Holmes, 1975; Passer & Seese, 1983), alpine skiers (May, Veach, Reed, & Griffey, 1985), physical education students (Lysens, Auweele, & Ostyn, 1986), and female gymnasts (Petrie, 1992). Investigations of other athletes, however, have yielded contrasting results (Rider & Hicks, 1995). For example, Williams, Tonymon, & Wadsworth (1986) did not find a relationship between life stress and injury occurrence in volleyball players. Williams & Roepke (1992) argued that these inconsistent findings were the result of differences in moderator variables and measurement tools and because of their potential influence, will be discussed next.

A moderator variable can be defined as a qualitative or quantitative variable that affects the nature, directions, or the strength of a relation between an independent variable

and a dependent variable (Smith, Smoll & Ptacek, 1990). The moderator variables of interest in the stress-injury research literature include locus of control, social support and coping abilities. The presence of these moderator variables are thought to buffer the potential detrimental effects on injury occurrence. For example, increased social support and greater coping skills seem to decrease vulnerability to injury when there are increases in life stress (Williams & Roepke, 1992). Alternately, Williams & Roepke (1992) also stated that moderator variables could increase our vulnerability to injury with their absence. Numerous studies have found that moderator variables, such as lack of social support and/or poor coping skills, increase vulnerability to the impact of major life events and cause subsequent injury (e.g., Petrie, 1992; Smith et. al. 1990). Past studies which yielded weak and inconsistent results neglected to identify such moderator variables that might have affected the nature and magnitude of the relationship between life stress and injury (Smith et. al. 1990).¹

Numerous assessment tools have been utilized to assess life stress in the stress-illness relation and in the stress-injury relation (e.g., Bramwell, Masuda, Wagner & Holmes, 1975; Passer & Seese, 1983). The poor developmental procedures of some of these assessment forms have been questioned, and have been argued to be a contributing factor to contrasting findings across studies (Petrie, 1992). The process of creating new assessment forms, or modifying existing ones, must be done in a systematic and empirical way. This process is to ensure that any findings pertaining to the stress-injury relation, or

¹ This proposal did not incorporate the use of potential moderator variables in its methodology. However, after reading this section on how these variables may buffer detriments associated with stress, the thesis committee strongly advised the inclusion of measures for social support and coping abilities. These were included and their measures are described in articles 1 and 2.

any other relations with stress, prove valid, reliable and generalizable. Not all of the studies, however, have met this rigorous standard. Two studies which have, include one by Dise-Lewis (1988), in which a life stress inventory was created for adolescents, and another by Petrie (1992), in which an inventory was created to assess the stress-injury relationship in athletes. The procedures these authors used relied on similar principles and will be discussed in some detail given that the present study required a modification of an existing stress inventory as well as the creation of a new Sport-Specific Stress Inventory. Both the modification and the creation of these inventories were guided by Dise-Lewis' (1988) and Petrie's (1992) procedures.

Dise-Lewis (1988) created the Life Events and Coping Inventory (LECI) to assess stress in adolescents. This inventory was created because other stress measures used for this age group did not reflect the adolescents' experience of stress because they were 'adult-centered'. The LECI was developed in a series of phases. The first phase involved the generation of stressful items, as well as coping strategies to these items, by 104 seventh and eighth graders. These items were then organized into an inventory format. In the second phase, 90 subjects in the same school grade refined the generated items and coping strategies based on item overlap, ambiguity and wording. Additional subjects completed the LECI in a test-retest fashion by indicating which stressors occurred to them in the past year, rating the effect of that stressor and then indicating whether or not they would use a particular coping strategy for that stressful situation. This systematic procedure created an inventory that was found to be both valid and reliable for assessing life stress in adolescents.

Petrie's (1992) study of The Effects of Life Stress and Social Support on Female Collegiate Gymnasts outlined a similar, systematic procedure utilized to develop the Life Events Scale for Collegiate Athletes (LESCA). The LESCA was also developed in a series of phases. The first phase involved varsity athletes generating a large sample of relevant and meaningful life events. During the second phase, experts indicated which of the generated items, created in the initial phase, were the most relevant for the age group to be assessed. These remaining items were then scanned for ambiguities or confusion due to the phrasing of the items. The format of the LESCA was established during the fourth phase. In the final phase of this procedure, randomly selected collegiate athletes completed the LESCA in a test-retest fashion to ensure for validity and reliability. Due to the systematic procedure used to create the LESCA, it was found to be a reliable measure of life stress, and it was also shown to be a better predictor of athletic injury than previous scales.

The general findings in the vast amount of documents concerning life-stress injury relations with the inclusion of moderator variables have mostly demonstrated that there is a positive relationship between life stress and injury (VanMechelen, Twisk, Molendijk, Blom, Snel, & Kemper, 1996). Why this relationship exists, however, warrants an explanation. Both, cognitive and somatic explanations have been created to explain why life stress may result in injury occurrence (Smith et. al. 1990). Authors that propose the *cognitive explanation* assert that stressful life events, and their possible negative consequences, could narrow an athletes attention. The less attentive athlete then has an increased risk of accidental injury (Smith et. al, 1990). Authors that propose the *somatic explanation* assert that life stress increases physiological arousal which subsequently

increases muscle tension. The increased muscle tension reduces motor coordination and fluidity of motion, leading to increased risk of injury. Another factor is that this muscle tension could occur simultaneously in agonist and antagonist muscle groups, often referred to as bracing, which could also increase the risk of injury (Heil, 1993).

The abundance of information and findings in the research literature concerning the life stress-injury relationship have succeeded in reducing the number of athletic injuries associated with psychosocial stress factors (Heil, 1993). Specifically, findings that injury occurrence were related to increased levels of psychosocial stress, as well as the lack of certain moderator variables, promoted various researchers to implement psychological intervention programs to assist in reducing injury occurrence. These interventions have undergone systematic investigations. The findings from these studies have been encouraging. For example, Murphy (1988) implemented a psychological intervention program which consisted of relaxation sessions following every workout. All twelve athletes who participated in this study competed without any injuries arising. Similarly, Davis (1991) reported that progressive relaxation combined with imagery strategies during team workouts resulted in a 52% reduction in injuries in swimmers and a 33% reduction in football players as compared to seasons prior to this intervention. Additionally, Smith et. al. (1990) proposed that resiliency to athletic injuries could be increased by either teaching athletes psychological coping skills or by increasing social support in the athlete's life. These findings have resulted in the emphasis being placed on the need for the development of new strategies being offered by coaches, parents, and consultants to athletes to reduce the occurrence of athletic injuries (Williams & Roepke, 1992).

Stress and Athletic Performance

Given the plethora of information on life stress-illness and life stress-injury relations, the next logical question of 'How does psychosocial stress affect athletic performance' emerges. Past research has shown that stress can interfere with performance in the workplace (e.g., Bhagat, 1983) and that stress can also interfere with academic performance (e.g., Dubois, Felner, Brand, Adan, & Evans, 1992). Additionally, studies have confirmed that life stress has the potential to consume scarce cognitive resources and consequently results in decrements in problem solving (e.g., Klein & Barnes, 1994). Certainly, it is not preposterous to hypothesize that the findings concerning stress-illness relations, stress-injury relations, and stress-performance relations would also exist within the athletic domain. Specifically, increased levels of psychosocial stress may elicit the stress response which may subsequently alter our cognitive processes and/or our physiological arousal levels. Similar to how stressors result in an increased susceptibility to illness or vulnerability to injury occurrence, stressors may also cause a deterioration in athletic performance. The first step that must be taken prior to answering this question would be to demonstrate that psychosocial stressors are a factor during athletic performance.

Interestingly, the emotional reaction to stress, or anxiety, has been investigated in numerous studies concerning athletic performance (Felsten and Wilcox, 1992;1993). The problem in such an investigation, however, is that the concepts of anxiety and stress were used interchangeably. As mentioned previously, however, anxiety is the emotional reaction to stress and is therefore not a synonymous concept (Jones & Hardy, 1997; May, 1993; Williams & Roepke, 1992). By focusing on this reaction to stress, we are using a

narrow focus of only one emotional reaction to stress and more importantly, we are not determining the sources of stress that may be responsible for poorer athletic performance. Indeed, the findings from research conducted on competitive anxiety has provided us with a wealth of information pertinent to athletic performance (see Jones & Hardy, 1997; Martens, Vealey, & Burton, 1990 for a review of competitive anxiety), but this type of research needs to be broadened in scope.

In this vein, Scanlan, Stein, and Ravizza (1991) stated that while there has been substantial research on the emotional reaction to stress, investigations on the sources of stress in athletic performance have been lacking. Thus, they conducted an in-depth study of retired, former elite figure skaters and identified the sources of stress that were encountered during their competitive career, extending from their adolescent years to their years as an elite competitor. The skaters in this study were asked, via qualitative interviews, to recall the stressors that were associated with their entire sport experience. This included stressors associated with competition, lessons, practices, skating tests and relationships with significant others. This was a means of determining whether these skaters experienced life stress during the time in which they trained and competed. The results from this study are significant to the proposed study to be described here and thus will be elaborated upon in the next section.

Scanlan et. al. (1991) transcribed the qualitative interviews and identified and grouped the sources of stress into themes. The main themes identified were negative aspects of competition, negative significant other relationships, demands/costs of skating, personal struggles, and traumatic experiences. Numerous stressors were cited within each theme. Although the stress pertaining to the aspects of competition were heavily

weighted, and included things such as worrying about falling in front of a crowd and worrying about what others may think and say about their skating, events outside of competition were also noted. As an example Scanlan et. al. (1991) reported that skaters experienced

Stressors falling outside the competition milieu (negative significant-other relationships, demands or costs of skating, personal struggles, and traumatic experiences). Further, the non-competition-specific sources encompasses both daily hassles and major life events (cf. Lazarus & Folkman, 1984). For example, stressors such as time demands or costs, performance criticisms or lectures, and perfectionism typify daily hassles producing frequent stress episodes; death and family disturbances characterize major life events inducing intense stress experiences. (p. 117)

In sum, their study did find that competition was a significant source of stress for competitive figure skaters, furthermore, they ascertained that elite and youth sport athletes have similar competition-related stressors. Additionally, some of the sources of stress listed were sport- specific. More specific to the interest of the present study, however, was the finding that life stress also appeared to be factor involved in the athletes' experiences of stress. The authors stated that future research should examine whether stressors outside of competition, such as interpersonal conflict or time and financial demands could be generalized to the youth sport athlete.

Similar findings were also reported in another study which examined the sources of stress in national champion figure skaters (Gould, Jackson, & Finch, 1993). Specifically, the authors stated that “elite athletes experience stress from both competition and noncompetition sources, and hence the totality of the skater’s experience must be considered when studying stress and stress sources” (p. 156). Thus, life stress is a factor in athletic performance and both studies called for further investigation on the topic. Both of these studies, however, dealt with elite performers and did not deal directly with youth sport. In addition, they were qualitative in nature, investigating only the potential sources of stress. Research did not extend into the question of whether these sources of stress directly affected performance. The research to be proposed here will deal with youths and it will investigate more directly the link between life stress sources and athletic performance. First, a review of the limited research on that more specific link will be presented.

Indeed, Felsten and Wilcox (1992) acknowledged the gaps stated above and questioned why life stress-athletic performance relations have been ignored in the research literature. Subsequent to reviewing the research literature, they suggested that there was no reason to believe that athletes do not experience the same range of life stressors that non-athletes experience and that their response to these stressors could easily affect their athletic performance. To date, there have only been three studies which have examined the relationship between life stress and athletic performance.

The first study which attempted to examine this relationship was conducted by Popkin, Stillner, Pierce, Williams & Gregory (1976). This study found that in sports, life stress was negatively correlated with the order of finish in the Iditarod Trial International

Sled Dog Race. However, this study was criticized by McCutcheon, Lummis & Ellis (1989) for ignoring the fact that the principle athletes during the race were the dogs, as well as for using a relatively insensitive life events survey. Subsequently, McCutcheon et al (1989) found that life stress was not significantly related to race times in half-marathon runners. They attributed their findings to the psychological hardiness of the runners as well as the stress buffering effects of running. Felsten and Wilcox (1993) ascertained that it was impossible to draw conclusions based on only two studies and attempted to re-examine this relationship by assessing major life events, daily hassles, and sport-specific stress in figure skaters.

In that study, skaters with higher levels of stress experienced detriments in performance more so than skaters with lower stress levels. That study, however, had several limitations. First of all, when considering the sample, a number of issues arise. One is that only thirteen female, figure skaters were examined. Such a small number of participants lessens the amount of confidence in these findings as well as the population generalizability. In addition, the participants' age ranged from eight to seventeen years. Individuals of different ages experience very different life stressors and sport-specific stressors from one another. For example, an eight-year old skater may experience daily hassles such as having a fight with a best friend whereas a seventeen year old skater may experience hassles such as deciding whether or not to drink at a party with friends the night before a practice. The differences in age, then, determines differences in stressors and possible responses to stress. A second limitation of this study was that it only examined the stress-performance relationship for four weeks. Additional measures are

needed in order to obtain stronger, empirical evidence that such a relationship does exist in sport.

Finally, and perhaps more importantly, the four measures obtained by Felsten and Wilcox (1993) were collected during the summer months, which results in two areas of weakness. First, the figure skating competitive season runs from October to March and thus, those researchers missed this critical period. This relationship should be examined during the competitive season since it is ultimately the competitive performance that such research could benefit. Secondly, the athletes could experience very pertinent stressors during school that could have a negative effect on performances in practices and competition. These authors omitted school-related stress from their study by collecting data outside of the school year. However, various researchers have highlighted the numerous potential stressors that accompany the school environment (e.g . Foreman, 1993; Phillips, 1978;1993). Certainly, the impact of these school stressors on adolescent, athletic performance warrants an investigation.

Justification and Purpose of Thesis

The findings of these three studies leave a myriad of gaps in the literature concerning the life stress-athletic performance relationship. Arriving at any sound conclusions based on these studies is difficult. For example, McCutcheon et. al. (1989) found no evidence of such a relationship with the half-marathon runners, but these findings can not be generalized to all sport domains. A major reason for why their findings can not be generalized to all sports concerns the running technique. Running is a repetitive gross motor skill and as such, is a consistently performed skill. When comparing such demands to those involved in figure skating, for example, a different profile is seen. Figure skating

is more of a 'one shot' performance, where the skaters have only one or two chances to successfully complete each element and must do so with a certain level of artistic ability. In fact, Felsten and Wilcox (1992) postulated that life stress would more likely interfere with sports requiring high concentration and fine motor coordination, such as gymnastics, diving, and figure skating. In addition, although Felsten and Wilcox (1993) did succeed in finding evidence for this relationship, the limitations of their study were many and additional research is necessary to gain a better understanding of the relationship between stress and athletic performance.

The purpose of the present thesis then is to examine such a relationship in young, adolescent, figure skaters during practices and competitions. This study will consist of two separate experiments. Both investigations are designed to treat certain limitations of Felsten and Wilcox's (1993) study, as well, other factors are incorporated in the design to broaden our understanding of this issue. Specifically, the first experiment is designed to examine the stress-athletic performance relationship during the summer training season. This study should not be considered a mere replication of Felsten and Wilcox's (1993) study since it will include noted improvements from their methodology. The second experiment will re-examine the stress-athletic performance relationship during the athletes' peak, competitive season. It will treat the limitations of all the studies discussed thus far, as well as any limitations unveiled in the first experiment.

Findings from this thesis will provide, empirical insight into a relatively new area of sport psychology which would exemplify the need for acknowledging the effect that life stress and sport-specific stress can have on figure skating performance. Coaches and parents will have to look at these stressors differently. Moderator variables, such as social

support, will have to be considered as a means to reduce the negative impact of stress on athletic performance, as is presently being done to reduce the occurrence of athletic injury. In a recent conference for the Advancement of the Association of Applied Sport Psychology (AAASP), C. Boterrill (personal communication, October 19, 1996) emphasized the importance of perspective and emotion. He suggested that sport psychology needs to look beyond the tip of the iceberg and deal with the person as a whole, which includes their life outside of sport. Instead of athletes coming to practices with life stressors occupying their minds and interfering with their performances, the athlete needs to be guided in *how* to deal with their life stress, rather than being told to simply 'leave it outside'. This study could also provide insight to sport psychology consultants to pursue this issue and subsequently help the athlete to cope with the numerous stressors which they are having to deal with and then are expected to simply forget about when it is time to perform. Ultimately, the findings from this thesis should help the athletes perform optimally at both practices and competitions.

CHAPTER III

ARTICLES

Presentation of the Articles

In the next section, two articles are presented that have been written in APA format. My intent is to submit article 1 to the Journal of Sport and Exercise Psychology and to withhold the findings of study 2 at that time. After receiving the reviewers' comment and the editor's discussion, I will know if both studies should be combined for a single paper, or if the second study can be submitted separately as another article. For the purposes of this thesis, I have decided to present them as two single articles.

Running head: STRESS AND FIGURE SKATING

Examining the Relationship Between Life Stress, Skating Specific Stress and Figure

Skating: Performance During the Summer Season

Kavita Prakash & Diane Ste-Marie

University of Ottawa

Abstract

This study examined the relationship between stress variables and figure skating performance during practice and competition. Participants were thirty-one , pre-novice and novice competitive figure skaters. Measures of hassles, skating-specific stress, major life stress, social support and coping abilities were obtained during a six week time frame. Coaches provided evaluations for both practice and competition performance. The results revealed that utilizing task coping methods significantly predicted better total practice performance levels (R^2 increase = .42, $p < .05$), whereas the use of avoidance coping methods was linked to poorer performance levels during practices ($R^2 = .40$, $p < .05$) and competition (R^2 change = .20, $p < .05$). Total hassles and total skating stress were positively correlated with competitive performance. This finding was contrary to stress theory, but was attributed to the characteristics of the summer skating season. The results are discussed in terms of their importance to sport psychology consulting and suggestions for future research.

Stress is something which everyone has experienced. The multitude of stress management courses offered, as well as the many self-help books containing suggestions to reduce stress levels, are just a few indicators of how this topic is prevalent in today's society. One area of application that has received minimal attention, however, is within the athletic environment concerning whether or not stress affects athletic performance. Thus, the purpose of this study was to examine the relationship between life stress and sport-specific stress on practice and competitive figure skating performance.

Stress has been defined in numerous ways. For the purposes of this study, life stress was considered as the process that involves a perceived imbalance between one's environmental demands and one's response capabilities, and the subsequent response to this (Lazarus, 1966; Lazarus & Folkman, 1984; Martens, Vealey & Burton, 1990; McGrath, 1970; Spielberger, 1989). That is, a cognitive appraisal of the stressor (environmental demand) occurs, which includes the evaluation of potential consequences and the resources of the person and the situation. A stressor that is perceived as exceeding one's ability to cope elicits increased physiological arousal, or what is better known as the 'fight-flight response' (Heil, 1993; Powell, 1997).

The fight-flight response is characterized by a surge of steroids and hormones, also known as stress products, that rush into the bloodstream and prepare the body to either fight or flee from danger (e.g., Robbins, Powers & Burgess, 1994). Further, proponents of stress theory posit that only those stressors which are perceived as negative will overtax our psychological resources and bring about this fight-flight reaction (Brown & Harris, 1978; Thoits, 1983), as opposed to events that are perceived more positively. Such positively perceived events are often referred to as 'eustress' (Powell, 1997). Our

research interests, however, pertain to the potential negative effects of stress, thus eustress is not of interest here. Therefore, the stressors which will be mentioned from this point forward pertain to stress perceived as being negative, or what is commonly referred to as 'distress'.

Stressors that we are exposed to can be categorized as being major life events or hassles. Major life events occur infrequently, but their affect may be long lasting (Miller, 1996). Examples would include moving to a new home or the death of a loved one. Hassles, on the other hand, are events that occur frequently during our daily lives that may be negative, bothersome, or annoying (Kanner, Coyne, Schaefer & Lazarus, 1981; Robbins, Powers & Burgess, 1994), for example, getting stuck in a traffic jam. Both major events and hassles can elicit the stress response. Further, the physiological changes that accompany this stress response have been shown to affect other dimensions of a person's well-being, such as one's susceptibility to illness and injury. A brief review of these areas will be provided next.

It is now considered common knowledge that stress can lead to physical illness (Miller, 1996) if the stress products accumulate within the body and then lack a physical outlet (Powell, 1997). Demonstrations that this accumulation leads to wear and tear on the body, which subsequently lead to detriments in immune system functioning have been shown in various studies. For example, it has been found that stressors increase the risk of upper respiratory disease (e.g., Graham, Douglas, & Ryan, 1986) and susceptibility to the common cold (e.g. Cohen, Tyrrell, & Smith, 1993). Other bodily reactions to prolonged stress include high blood pressure, migraines, asthma (Powell, 1997) and irritable bowel syndrome (Levy, Cain, Jarrett & Heitkemper, 1997).

These strong empirical findings prompted an interest in the relationship between stress and the occurrence of athletic injuries and this topic has since been recognized as the most extensively researched area of sport psychology (Williams & Roepke, 1992). Within that research, it is postulated that the cognitive and physiological elements of the stress response influence the likelihood of injury, especially in the already stress-inducing athletic domain (Heil, 1993). Specifically, if athletes cognitively appraise their stressors as exceeding their ability to cope, they may experience a narrowing of the visual field or increased distractibility, two factors that are related to the attention characteristics of an athlete. The less attentive athlete is then said to have an increased risk of accidental injury (Heil, 1993; Williams & Roepke, 1992). In addition, at the physiological level, stressors may increase muscle tension which subsequently reduces motor coordination and fluidity of motion. Both of these factors can then lead to an increased risk of injury (Heil, 1993).

These postulations have been supported in the literature examining the stress-injury relationship. A positive relationship between life stress and injuries have been found with football players (Cryan & Alles, 1983; Blackwell & McCullagh, 1990; Bramwell, Masuda, Wagner & Holmes, 1975; Passer & Seese, 1983), alpine skiers (May, Veach, Reed & Griffey, 1985), physical education students (Lysens, Auweele & Ostyn, 1986), and female gymnasts (Petrie, 1992). Although the majority of studies have found this positive relationship, others have yielded contrasting results (Rider & Hicks, 1995). For example, Williams, Haggert, Tonymon and Wadsworth (1986) did not find a relationship between stress and injury occurrence in athletes from variety of sports.

Williams and Roepke (1992) argued that the source of such inconsistent findings may be the result of the influence of moderating variables, such as social support and/or

psychological coping abilities. These two variables are thought to buffer the potential detrimental effects of stress on injury occurrence. Thus, some of the past studies which yielded weak support, or none at all, for the stress-injury relationship neglected to identify such moderator variables. This neglect might then have affected the nature and magnitude of the relationship (Smith, Smoll & Ptacek, 1990). For this reason, the experiment described here incorporated both a measure of social support and a measure of coping and the subsequent section further justifies their inclusion.

Social support refers to functions performed for an individual by significant others, such as, family, friends, or co-workers (Thoits, 1995). Thoits (1995) stated that an individual's perception or belief that support is available is more important than its actual receipt, hence surveys that evaluate this self-perception are more valid as measures of social support. Additionally, the perception that one has greater social support has been connected with enhanced well being (e. g., Cohen & Syme, 1985). While social support deals with the perception of external sources of help, psychological coping skills pertain more to the strategies that an individual uses themselves in varying situations.

These psychological coping skills are introduced as the second potential moderator variable of interest. Coping skills are sets of information and learned physiological, social, cognitive, and/or effective behaviors that we use when we experience stress (Thoits, 1995). These skills can be effective or ineffective. Task coping is considered an effective coping style since it utilizes cognitive or behavioral means to modify stress and tends to be linked with a more positive adjustment (Endler & Parker, 1990; Herman-Stahl & Petersen, 1996). Examples of task coping skills would include adjusting one's priorities or focusing on the problem with the goal of generating potential solutions.

Ineffective coping styles, in contrast, have been linked to less desirable outcomes (Endler & Parker, 1990; Herman-Stahl & Peterson, 1996), such as depressive symptoms. One method of ineffective coping involves avoiding the stressor. This type of coping is referred to as avoidance coping. Some examples of this would include a person going to a movie, or taking out their frustration on other people, as opposed to actively dealing with the stressor. A second ineffective coping strategy involves focusing on the existing emotional state accompanying the stressor, rather than actively dealing with that stressful event. A person who focuses on their general inadequacies or becomes very tense when faced with a stressful situation, is one who uses emotional coping tactics.

Heil (1993) discusses the importance of athletes having adequate social support and coping abilities when they are training and/or competing. In terms of worsening the effects, studies have found that a lack of social support and/or poor coping skills increases vulnerability to the impact of stress and hence, subsequent injury (e.g., . Petrie, 1992; Smith, et. al., 1990).

Given the plethora of information supporting stress-illness and stress-injury relationships, a logical question that follows is “How does stress affect athletic performance?”. Certainly, other areas of performance have been shown to be negatively affected by stress. Bhagat (1983) for example, revealed that stress interfered with performance in the workplace and Dubois, Felner, Brand, Adan & Evans, (1992) have also shown that academic performance decreases with increased levels of stress. Thus, the hypothesis that performance decrements, as a function of stress, would extend to the athletic domain is tenable.

Interestingly, stress in sports is generally regarded as heightened anxiety related to a specific athletic event (Martens, Burton, Vealey, Bump & Smith, 1990). Thus, sport stress tends to be assessed by measures of state anxiety administered shortly before a competitive event to examine the relationship between anxiety levels and that particular performance (e.g. Martens, Vealey & Burton, 1990). Stress outside of the sport domain, on the other hand, is typically assessed by major life events and hassles questionnaires (e.g., Levy, et. al., 1997). Thus, anxiety and stress have been used interchangeably in previous studies, however, stress and anxiety are not synonymous (May, 1993). May (1993), for instance, stated that a stressor is a threat to which the individual may react with emotion, while anxiety is just one of many emotional reactions to stress. Examples of other possible emotional reactions to stress include depression, guilt, shame, jealousy, and loneliness (Powell, 1997). This is further emphasized by May's statement that "In using stress as a synonym for anxiety, we cannot adequately distinguish between the different emotions that often are reactions to stress" (1993, p. 39). The essence of this point is that by only focusing on the anxiety-based reactions to stress, researchers do not tap into the actual sources of those negative emotions. Moreover, we feel that this is the real issue to tackle. That is, we need to focus on the aspects of an athlete's life that may be causing them stress, regardless of whether or not such sources exist within the athletic domain. By focusing on the actual stressors, we can then implement an intervention to reduce their prevalence and hopefully prevent any of the negative repercussions of stress from occurring, including some of the less favorable emotional reactions.

Determining whether general life stress, as measured by major life events and hassles, influence athletic performance is at present a limited topic of study. When one

considers the athlete, however, the question is why? As Felsten and Wilcox (1992) emphasized, athletes encounter the same range of life stress as non-athletes and their responses to such stressors should not be any different from those of non-athletes. In fact, committing to athletic training and competing, as well as enduring life stress, may result in very high levels of stress for the athlete population. Interestingly, the sources of stress perceived from these various facets of life have been documented in qualitative studies which focused on figure skating (Scanlan, Stein & Ravizza, 1991; Gould, Jackson & Finch, 1993). Finally, much of the athletic population are also adolescents. This is of particular relevance because that age group is characterized by their exposure to a tremendous amount of potential life stressors. Specifically, adolescence is a period of life which is plagued with numerous stressors as it is a time when dependency is broken and independence is attempted to be established (Powell, 1997). As well, Rutler and Smith (1995) have suggested that “young people today have a greater number of stress experiences than their counterparts in the past” (p. 801). Taken together, all these factors converge on the point that the adolescent athlete is an individual faced with numerous stressors, each of which could affect their performance.

Thus far, three of the studies that have examined the impact of life stress on athletic performance have focused on the adult population (McCutcheon, Lummis & Ellis, 1989; Popkin, Stillner, Pierce, Williams & Gergory, 1976; Segar, Pedersen, Hawkes & McGown, 1997), while only one has used adolescents (Felsten & Wilcox, 1993). Thus, continued research in this domain should consider this population, and this recommendation is followed here as our population of interest is adolescent figure skaters. It is important to indicate that the negative repercussions of stress that have been

researched in other areas have also been shown to prevail in this younger age group. That is, stressful events in the adolescent life have been linked to the onset of illness (i.e. Meyer & Haggarty, 1962; Greene, Walker, Hickson & Thompson, 1985) and to the increased occurrence of athletic injury (i.e. Blackwell & McCullagh, 1990; Van Mechelen, Twisk, Molendisk, Blom, Snel, & Kemper, 1996). Thus, there is reason to believe that the findings in the stress-athletic performance literature could also be relevant to the adolescent athlete.

Although brief, a review of the research which has examined how stress experienced in general life situations impacts on athletic performance will be presented. This will serve to introduce some of the methodological limitations that we have addressed on our design. The first study examining this relationship was conducted by Popkin, Stillner, Pierce, Williams, and Gregory (1976). This study found that in sports, life stress was negatively correlated with the order of finish in the Iditarod Trial International Sled Dog Race. However, (McCutcheon, et. al., 1989) criticized that study for ignoring the fact that the principle athletes during the race were the dogs, as well as for using a relatively insensitive life events survey. Subsequently, McCutcheon et. al. (1989) studied the relationship in half-marathon runners and found that life stress was not significantly related to race times. They suggested that their findings may have been the result of the athletes' psychological hardiness associated with exercise. However, strong evidence of this buffering effect was not obtained due a small sample size. Felsten and Wilcox (1993) ascertained that it was impossible to draw conclusions based on only two studies and attempted to re-examine this relationship. A noted improvement in their study was the

wider spectrum of stressors tapped into, specifically, that of major life events, daily hassles, and sport-specific stress in figure skaters.

In that study, skaters with higher levels of stress experienced detriments in practice performance more so than skaters with lower stress levels. That study had several limitations, however, such as a small sample size, a broad age range, and a broad competitive range of the participants involved. Furthermore, the measure of skating stress used contained very few items that might not have captured the numerous possible stressors which could exist within the domain of competitive figure skating. Thus, it becomes necessary to consider generating a different sport-specific measure that incorporates sources of stress relative to the sport of study so as to remain consistent within the broad framework of stress. This research has taken this consideration into effect and includes a Figure Skating Stress Questionnaire.

Additional evidence for a negative relationship between stress and athletic performance was obtained when Seggar, Pedersen, Hawkes, and McGown (1997) had tennis players, gymnasts, and basketball players complete their Athlete Stress Inventory. Their findings showed that four days prior to a competitive event there was significant, negative correlations between various scales of the stress measure and competitive performance. However, this study also had a small number of athletes within each sport-type, they only assessed competitive performance, and only one survey was used to assess stress levels.

In summary, some studies have shown negative relationships, but each with their own limitations. The purpose of the present study then was to examine the relationship between stress and athletic performance in figure skaters during both competitions and

practice sessions using a methodology that addressed the limitations mentioned above. The time frame examined was one in which the skaters were not attending academic school and were scheduled to compete in one competition. This time frame coincided with the training program that proceeded throughout the summer months.

Initially, this may seem like a mere replication of Felston and Wilcox (1993), however, there are a number of additional factors included that are outlined next. Thus far, the research pertaining to stress and athletic performance have examined either practice performance or competition performance, but none have examined both. However, in order to obtain a more accurate picture of this relationship, both types of performances warrant an examination. In addition, it is important to include measures that tap into the various sources of stress, including major life stress, hassles and sport-specific stress. This study contains all three types. Furthermore, in light of the previous comments concerning sport-specific stress, the inventory generated here included sources of stress in figure skating cited by Scanlan et. al., (1991) and Gould et. al., (1993). These sources of stress were more reflective of hassles in the sense that they were ongoing, daily occurrences within the skating arena and were not specific to anxiety-based emotions. Of further importance, this study also included the Social Support Survey (Richman et. al., 1993) and the Coping Inventory for Stressful Situations (Endler & Parker, 1990). These measures will allow us to investigate the moderating influences of these two factors. Lastly, a greater number of figure skaters were also examined.

It is hypothesized that increases in stress levels will result in decrements in performance during practice and competition. A second hypothesis is that the use of effective coping styles will have a positive impact on performance, while ineffective coping

styles will negatively impact performance. Findings from this study may provide empirical insight into a relatively new area of sport psychology. If a relationship is found, it would exemplify the need for acknowledging the effect that stress variables can have on figure skating performance. Coaches and parents will then need to look at stressors differently than they have in the past. Athletes may no longer be told to 'leave their problems outside'. Rather, this study may encourage sport psychology consultants to help athletes learn how to cope with stressors in all aspects of their lives, allowing them to perform optimally at both practices and competitions.

Method

Participants

Thirty - three female, adolescent, pre-novice and novice competitive figure skaters (age range = 11 - 16 years of age; average age = 15.7 years) from the Ottawa and Halifax regions were recruited to participate in this experiment. Because Palmer (1992) described these two competitive groups as being homogenous we grouped them together for the purpose of this study. In addition, twelve private coaches, with varying numbers of these competitive skaters, acted as performance evaluators for this study. In order to be eligible to participate in the study, each skater had to have been skating for the entire six-week duration of the study and had to be scheduled to compete in one summer competition. The coaches had a minimum of Level two full certification, as set by the National Coaches Certification Program (NCCP) of Canada. This level of certification is the minimum level required in order to train competitive pre-novice skaters.

Materials

Four questionnaires and two assessment forms were used in this study. Due to ethical considerations raised by the University of Ottawa's ethics committee, some of the standardized questionnaires required modification. A description of each questionnaire, the assessment forms, as well as their necessary modifications or development follows.

Life Events Checklist modified (LECM). The LECM (Johnson & McCutcheon, 1980) is used to assess major life stress in children and adolescents. The standard form of this questionnaire contains 46 items that are frequently experienced by children and adolescents. Only 38 items were listed for this study, due to the concerns raised by the University of Ottawa's ethics committee about questions pertaining to teen pregnancy or abortion. The first 18 items represented events over which participants have little or no control (e.g., the death of a family member). The remaining 20 items reflected major events which were potentially under the participants control (e.g., joining a new club). Beside each event was a rating of 'good' or 'bad', as well as a seven point Likert Scale (1 - 7) in place of the original four-point rating scale. Respondents were asked to indicate whether an event has occurred in the previous year, and ,if it has, to appraise the event as being good or bad and indicate the degree of stress they felt the event had on their lives (1=stress, 7=very high stress). Four open spaces were provided at the end of the questionnaire for participants to include any major life events that were not listed, but had occurred to them over the time frame. A total score was obtained for good stress as well as for bad stress. Scores on the LECM, for either good or bad stress, had a possible range of 0 to 294.

Life Events and Coping Inventory modified (LECIm). The Life Events and Coping Inventory (LECI) (Dise-Lewis, 1988) is a validated 125 item inventory designed to assess hassles and major life stress in adolescents. Similar to Felsten and Wilcox (1993), daily hassles were chosen from the more commonly experienced items in the LECI. The process used to filter out daily hassles is described below. A modified version of this inventory, the LECIm, was completed by the skaters.

The format for modifying the LECI was based on the procedures of Dise-Lewis (1988) and Petrie (1992). First, a small group selected the hassles from the LECI which they believed could be experienced by an adolescent during a two-week time frame. The hassles selected through this phase were separated from the original LECI and constituted the first draft of the modified version. This draft was then distributed to various adolescents between the ages of 11 and 16 years. Because hassles were defined as annoying or negative events that could occur on a frequent basis (Robbins et. al, 1994), usually over a two-week time frame, the adolescents were asked to indicate which items they felt would not occur to any adolescent over a two-week time frame. The hassles that remained following the screening process constituted the final draft of the LECIm and contained 81 items. At the end of the questionnaire were five blank spaces in which the participants could insert hassles that were not listed but had occurred to them over the time frame. The same rating scales and procedure as that of the LECm questionnaire were used with this questionnaire as well. A total score was obtained for good stress as well as for bad stress. Scores on the LECm, for either good or bad stress, had a possible range of 0 to 602.

Figure Skating Stress Questionnaire (FSSQ). This inventory was developed using the few sport-specific items included in Felsten and Wilcox's (1993) questionnaire, as well as a number of sources of figure skating stress cited in studies by Scanlan et. al (1991) and Gould et. al (1993). A simple procedure was then followed whereby this list of stressors was presented to various high level figure skaters to either filter out those items which they deemed as not being applicable to the sport of single, competitive figure skating, or to add in any items which they felt needed to be included. The restructured list was then presented to various figure skaters, between the ages of 11 and 16, who were asked to identify those stressors which they believed would not occur to any adolescent figure skater over a two-week time frame. The remaining stressors constituted the finalized version of the FSSQ. The FSSQ contained 44 hassles specific to the sport of figure skating. At the end of the questionnaire was an open space for participants to include items that were not listed on the questionnaire but had occurred to them over that time frame. The rating scales and procedure for this questionnaire was identical to those of the LECm and LECIm questionnaires. A total score was obtained for good stress as well as for bad stress. Scores on the FSSQ, for either good or bad stress, had a possible range of 0 to 343.

Social Support Survey (SSS): The SSS assesses social support as a multidimensional construct. Evidence for content validity, concurrent validity, construct validity, and test-retest reliability of the SSS were reported in Richman, Rosenfeld, & Hardy (1993). Rosenfeld and Richman (1977) demonstrated the usefulness of using this questionnaire for assessing student-athletes' levels of social support. The SSS assesses four sources of information for eight different types of social support. The four sources of

information obtained pertained to the (1) relationship for each person who provides the type of support which provides information concerning the number of people who provide support, as well as the composition of the social network, (2) satisfaction with the support received, (3) difficulty involved in obtaining more support, and (4) perceived importance of the support for the respondent's well-being. The eight types of social support examined were: (a) listening support, (b) emotional support, (c) emotional challenge, (d) reality confirmation support, (e) task appreciation support, (f) task challenge support, (g) tangible assistance support, and (h) personal assistance support. Definitions of each of these types of social support were provided throughout the inventory.

Coping Inventory for Stressful Situations (CISS): The CISS is a validated, self-report measure of adolescent coping which consists of 48 items with three scales, task coping, emotional coping and avoidance coping (Endler & Parker, 1990). Sixteen items assess task coping, 16 items assess emotion coping, and 16 items assess avoidance coping. There are two subscales for avoidance coping - distraction (eight items) and social diversion (five items). The CISS has been shown to have adequate internal alpha coefficients ranging from .78 to .92 (Endler & Parker, 1990). When completing the CISS, respondents were asked to rate each item on a five-point frequency scale ranging from (1) "Not at all" to (5) "Very much". Total scores were obtained for each type of coping.

Performance Assessment Form (PAF). This form was created by the researchers. It was based on the Evaluating System used by judges in the Canadian Figure Skating Association. Information pertained to how skaters performed in three areas: technical performance (i.e. jumps, footwork), spinning performance and artistic performance. Overall performance in these three areas were rated on a 7-point Likert scale ranging from

Needs Improvement (1) to *Excellent* (7). This range of evaluating figure skating (needs improvement to excellent) is an established judging scale set by the Canadian Figure Skating Association. Because the coaches were all level 2 certified, they had experience with this system of assessment. Coaches were asked to evaluate practice performance using the 7-point Likert scale. The scores for the PAF ranged from 0 to 21.

Competitive Performance Assessment Form (CPAF): This form was similar to the PAF, except that it was specific to competitive performance. The same scale and procedure used for the PAF was used for this form as well. The scores for the CPAF ranged from 0 to 21.

Procedure

All questionnaires were completed by the skaters either individually, or in small groups. When done in small groups, the skaters were asked to complete the forms by themselves and to not discuss them with any of the other participants. A researcher was always present when the skaters completed the questionnaires and was available to answer any questions posed by the skaters, as well as to ensure the independence of completing the task.

Skaters completed the LECm, SSS and the CISS once during the study, which occurred on the third week of the six week time frame. Skaters completed the LECIm, and FSSQ on a bi-weekly basis. The coaches completed their forms in conjunction with the skaters. That is, on the same days that the figure skaters completed these biweekly questionnaires, the coaches were asked to complete the PAF. Both the skaters and coaches were asked to refer to the previous two weeks when they completed their

respective forms. This procedure was repeated every second week for six weeks, which generated a total of three measures.

Competition evaluations were obtained by having the coaches complete the CPAF forms immediately after their skaters competed. Although the date in which the skaters competed varied throughout the study, all did compete in one competition and this occurred in the last four weeks of the study. After the six week time frame of data collection was completed, the data was analyzed and results were determined.

Results

Responses for all the stress measures were divided into two categories-those that the participants perceived as good and those that they perceived as bad. Total scores were then obtained for eustress and for distress for each stress questionnaire completed during the study. As mentioned previously, our analysis will only deal with measures of distress.

In order to tap into perceived social support, only question two of the SSS was analyzed. This question evaluated the participants' satisfaction with their perceived level of social support. The information from the remaining questions were not analyzed because their purpose pertained more to assessing social support with the intent of administering an intervention (Richman, Rosenfeld & Hardy, 1993; Rosenfeld & Richman, 1997). This was not a focus of the present study and was therefore not relevant to our hypotheses.

Preliminary Data Analysis

Tests for normality and linearity were done.² Tests for multicollinearity were also conducted.³ Following our tests for normality, one-way ANOVA's with repeated measures were conducted to determine if there were any significant differences between stress types and/or time frames. Results showed a main effect for time frames, $F(2, 60) = 13.97$ $Mse = 759.29$. Tukey Post hoc testing indicated that the hassles reported for the first time frame (Mean = 89.42) were significantly different from time frame 2 (Mean = 56.23) and time frame 3 (Mean = 47.83). which were not significantly different from one another. It was discovered after the fact, that participants were still in academic school for the first week of the first bi-weekly time frame. Because of this issue, all remaining analyses excluded time frame 1 and examined a four-week duration during which the skaters attended summer skating but were not attending academic school. As well, because the hassles and skating stress scores did not demonstrate any significant differences between the latter two time frames, we combined the distress scores reported for the four weeks to create the variables of Total Hassles and Total Skating Stress.

Correlational Analysis

A Pearson Product correlational matrix, including all dependent and independent variables, was conducted. All significant correlations from this matrix are displayed in Table 1. No significant correlations were found between stress (hassles and skating) and

² Upon viewing histograms for each independent and dependent variable, we observed that most measures fit the normal distribution. However, the distributions for total hassles (distress) and total skating distress exhibited positive skewness. Analysis conducted with any outliers removed from the regression model and with outliers remaining in the regression model yielded similar findings. Thus, the outliers remained in the model and the skewness was attributed to the stress measures used since very few participants would have zero distress or the maximum possible distress rating.

practice performance for each individual time frame. Competitive performance, however displayed positive correlations with total hassles ($r = .43, p < .05$) and total skating stress ($r = .52, p < .05$).

In terms of the potential moderator variables, a number of points are worth noting. First, total practice performance across the four weeks revealed a positive correlation with task coping ($r = .57, p < .05$) and a negative correlation with avoidance coping ($r = -.36, p < .05$). Also, avoidance coping negatively correlated with competitive performance ($r = -.39, p < .05$).

Finally, social support did not correlate with either type of performance, but it did exhibit a negative correlation with total hassles ($r = -.51, p < .05$). Thus, as the level of perceived social support increased, the number of perceived hassles decreased.

Hierarchical Regression Analyses

In order to explore the specific contributions of the stress variables and psychological coping variables to the prediction of practice and competitive performance, hierarchical regression analyses were conducted. Separate regressions were used to predict total practice performance for the four-week duration and competitive performance respectively. The results for these analyses are displayed in Table 2.

The variables entered into the regression models were those that exhibited a significant correlation with either of the dependent variables. Thus, major life stress, social support and emotion coping were excluded as predictors. Also, the two subscales for avoidance coping were collapsed into one score because we were not interested in the

³ We did find a risk of multicollinearity between total hassles (distress) and total skating distress. However, the intent of this study was to examine how each of these individual stress types contributes to the relationship of interest. Thus, we kept these two stress variables as separate independent variables.

individual impact that each variable had on either type of performance. Thus, for total practice performance, the predictors were, in order of entry, (1) stress variables (i.e., total hassles and total skating stress) and (2) psychological coping variables (i.e. task coping and avoidance coping). Coping variables were entered last in the regression since they were hypothesized to modify the impact of stress (Aikens, Fischer, Namey & Rudick, 1997). As shown in table 2, task coping and avoidance coping were significant predictors of total practice performance (R^2 increase .42, $p < .05$).

The same regression model was used for competitive performance and the findings are also displayed in Table 2. After step 1, the stress variables made no significant contributions to competitive performance ($R^2 = .27$, $p > .05$). Significance was only revealed when the coping variables were added to the equation (R^2 increase = .20, $p < .05$). Specifically, avoidance coping was the sole predictor of this performance measure.

Two-Way Interactions Among Psychological Coping Variables and Stress Variables.

Possible interactions among the psychological coping and stress variables in predicting competitive performance were also tested. These analyses served to investigate the degree to which different combinations of supports and stresses had stress-buffering effects. That is, any significance in additional variance accounted for by an interaction provides evidence for the buffering/moderating hypothesis. In order to test interactions, the hierarchical regressions described above were recomputed with all possible two-way interaction terms entered at the end of the prediction equation. The variables for both regression analyses were entered in the following order: stress variables, psychological coping variables, task coping x total hassles, task coping x total skating stress, avoidance

coping x total hassles and avoidance coping x total skating stress. The analyses for both total practice and competitive performance revealed no significant moderator effects.

Discussion

The purpose of this experiment was two-fold. First, we wanted to examine the relationship between stress variables and figure skating performance in both the practice and competition setting. The second purpose was to study the influences of social support and coping abilities on practice and competitive performance. The results demonstrated partial support for the hypotheses set forth, yet other unexpected findings emerged.

Purpose 1: Relationship Between Stress Variables and Performance

Contrary to our hypotheses, total practice performance did not reveal a negative relationship with either total hassles or total skating stress. This is in contrast to the findings of Felsten and Wilcox (1993). They found higher stress levels to be negatively related to total practice performance across a four-week time frame. Our non-significant findings may be related to the time of year examined. Indeed, summer skating consists of on-ice and off-ice training for many hours a day, five days a week. Many of our potential stressors listed in the LECIm pertains to school and family situations, but due to the summer training season the skaters were out of school and spent very little time with their families. The stressors which are more likely to accumulate during this time frame would be skating specific stress, however, as mentioned, this stress variable did not correlate with practice performance. We return to this issue and offer a broader interpretation of these findings in our conclusion.

Perhaps the most intriguing finding of this study pertained to competitive performance. When we examined the relationships between both total stress scores

(hassles and skating stress) and competitive performance, positive correlations were revealed. This unforeseen finding was contrary to what we expected and was not in accordance with previous findings in the stress literature. Following the regression analysis, however, it was determined that none of the stress variables contributed to the predictions of competitive performance. When trying to make sense of the correlations observed, certain features of the time of year examined were speculated as being related to this finding and need to be considered.

The first feature to consider is that the competition that was assessed occurred during the summer skating season. During this time, figure skaters are mainly preparing for their competitive season which begins in mid-fall. Thus, the summer season tends to be regarded as an opportunity to choreograph competitive programs, adjust the choreography of existing competitive programs and to work on elements which need to be executed consistently by the peak season. Any summer competitions attended are usually regarded as opportunities to 'try out' these programs and elements in front of an audience and to receive feedback from the judges. Results from these competitions have no direct influence on future competitions entered. However, the experience and the performance feedback provides both the skaters and coaches ample time to make any necessary changes to the competitive program and/or the technique utilized prior to the onset of the competitive season.

In this light, we question whether this competition truly reflected a 'real competitive atmosphere'. In fact, we posit that these characteristics of the summer season may be associated with our unexpected positive correlations between stress variables and performance. That is, because of this lack of a true competition setting, the coaches may

not have had high performance expectations for the skaters during the summer season.

This could have affected how the coaches chose to evaluate their skaters. In fact, almost every coach who completed the competitive performance evaluations in the presence of the researcher commented on how their skater did not skate bad considering the fact that they had a new program or attempted more difficult jumps.

Purpose 2: Relationship Between Psychological Coping, Social Support and Performance

Studies examining the stress and athletic injury relationship have documented the importance of the buffering effects of coping and/or social support (i.e. Petrie, 1993; Udry, 1997). However, none of the research examining stress and athletic performance to date have included these potential moderator variables in their methodology. McCutchen et. al. (1989) did speculate that their non-significant findings may have been indicative of the buffering effects of the exercise benefits associated with running, but they did not examine any other potential buffers. Although the present study did find psychological coping variables to be significant predictors of both practice and competitive performance, no support for the buffering hypothesis was found. This is in line with other athletic injury studies that have found potential moderator variables to have a direct impact on the dependent variable, that being athletic injury occurrence, despite having no support for buffering effects (e. g., Hardy, Prentice, Kirsanoff, Richman & Rosenfeld, 1987; Williams, Tonyman & Wadsworth, 1986).

In the present study, task coping and avoidance coping were significant predictors of total practice performance. Task coping displayed a positive relationship with total practice performance while avoidance coping exhibited a negative relationship. Therefore,

the skaters who utilized more effective, task coping methods performed better than skaters who relied on ineffective, avoidance coping skills. In addition, the skaters' competitive performance was significantly predicted by avoidance coping, which exhibited a negative relationship with this performance measure. That is, skaters who utilized a greater number of ineffective, avoidance coping tactics had lower competitive performance scores. These findings support past results that have linked effective coping with positive outcomes and ineffective coping styles with poorer outcomes (e.g., Endler & Parker, 1990; Herman-Stahl, Stemmler & Petersen, 1995).

The second potential moderator variable of interest, that being perceived level of social support, exhibited a negative correlation with total hassles. That is, the skaters reported experiencing a lower number of hassles, or they rated their hassles as having less of an affect on them, when they perceived more social support as being available to them. This result, however, should be interpreted cautiously because perceived social support did not add to the prediction of either type of performance and it also received no support for the buffering hypothesis.

Conclusions

The results of this experiment contributed new information to the body of knowledge pertaining to stress and athletic performance. Psychological coping skills were found to predict both total practice performance and competitive performance. Although this study did not find evidence for a negative stress-performance relationship, we propose that this was due to the time of year studied. That is, the data was collected during the summer skating season. Concomitant with this is that skaters were not in academic school, nor were they involved in their peak competitive season. Support for the time of

year being an important factor was provided by analyses of the first time frame. Recall that we eliminated that time frame because we had learned that the skaters had been in school during its first week. Nonetheless, we conducted a correlational analysis as well as a regression analysis of only that time frame to determine if any significant findings would emerge. The results of the correlational analysis revealed that practice performance was negatively correlated with avoidance coping, and hassles from general life as well as from skating. Hierarchical regression analysis demonstrated that hassles and avoidance coping were both significant predictors of practice performance. These findings lead us to propose that future research should consider examining the stress-athletic performance relationship under these conditions that lead to more perceived stress. Past studies have demonstrated that accumulations of stress at once, or over time, tend to be associated with negative repercussions, as opposed to isolated stressors (Rulter, 1979; Kolvin, Miller, Scott, Gatzanis & Fleeting, 1990). Thus, a time frame which is characterized by an accumulation of stressors in order to “capture some of the complexities of stress impacts that are familiar to us from personal experience but have long been neglected theoretically and empirically” (Thoits, 1995, p. 57) is recommended.

This study had limitations which need to be acknowledged. First of all, the sample size was small, however, this arose as a function of our interest in the specific age and competitive groups utilized. A second limitation pertained to our first bi-weekly measure which was dropped from the analysis as a confound. Our original intent was to surpass the four-week study carried out by Felsten and Wilcox (1993). However, as previously mentioned, including the first two week time frame was deemed by us to be inappropriate. Hence, the duration of the present study was identical to that of Felsten and Wilcox

(1993). Finally, only using coaches for the competitive evaluations may have limited our findings. Therefore, future research should consider an additional source of competitive evaluation in order to strengthen the findings, such as the inclusion of judges scores.

We believe the finding of coping variables predicting both total practice performance and competitive performance is relevant to athletes, coaches, parents and sport psychology consultants. Up until this point, the relationship between these variables and athletic performance have not been studied. These findings demonstrate the importance of utilizing effective coping styles when trying to perform well. Avoiding, or denying the existence of problems is not an effective means of actively dealing with them. Rather, actively resolving issues through task coping strategies was found to produce a positive relationship with practice performance. However, for many, task coping abilities must be learned. As Botterrill (1996) has stated, tremendous time, effort and persistence is needed for the development of psychological skills. Thus as a coach or a sport psychology consultant, we need to become educated about the effective coping strategies available so that we can teach these skills to our athletes in order to help them achieve their goals for optimal performance during both practice and competition. Moreover, these skills may prove not only to be useful in sport, but also in the athletes' day to day lives.

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Table 1

Pearson Product Moment Correlation Matrix

	1	2	3	4	5	6	Mean	SD
1. Total Practice Performance	1.00						14.06	3.27
2. Competitive Performance	.51*	1.00					13.65	3.67
3. Total Hassles	.18	.43*	1.00				52.19	44.99
4. Total Skating Stress	.06	.52*	.86*	1.00			41.77	36.18
5. Avoidance Coping	-.36*	-.39*	.10	.02	1.00		46.58	10.01
6. Task Coping	.57*	.19	-.07	-.13	-.16	1.00	49.61	10.69

*p < .05

Table 2

Summary of Hierarchical Regressions on Performance Measures X Stress Variables and Coping Variables

Predictor (a)	Beta	R ²	R ² increase
<i>Total Practice Performance</i>			
step 1: Stress Variables		.06	.06
Total Hassles	0.48		
Total Skating Stress	-0.36		
step 2: Coping Variables		.48*	.42*
Avoidance Coping	-0.32*		
Task Coping	0.52*		
<i>Competitive Performance</i>			
step 1: Stress Variables		.27	.27
Total Hassles	-0.07		
Total Skating Stress	0.58		
step 2: Coping Variables		.47*	.20*
Avoidance Coping	-0.37*		
Task Coping	0.20		

a All statistics for predictors are those that are attributable to the named variable

*p < .05

Running Head: STRESS AND FIGURE SKATING

Examining the Relationship Between Life Stress, Skating Specific Stress and Figure
Skating: Performance During the Competitive Season

Prakash and Diane Ste-Marie

University of Ottawa

Abstract

This study examined the relationship between life stress and skating specific stress on figure skating practice and competitive performance during the skaters' competitive season. Thirty competitive figure skaters were assessed during a six week time frame which encompassed their peak competitive season and academic school. Bi-weekly measures of hassles, skating specific stress and practice performance evaluations were obtained. Single measures were obtained for major life stress, perceived social support, coping abilities and competitive performance. The results revealed that total hassles, total skating stress and avoidance coping were negatively correlated with practice and competitive performance, while task coping was positively correlated with both performance types. Eighty-three percent of total practice performance was predicted by both total hassles and the use of task coping. These significant findings were attributed to the characteristics of the time frame examined. A discussion of these characteristics and of future research suggestions are provided.

It can be stated with much certainty that no one passes through life without experiencing stress. Indeed, the prevalence of stress in many domains of life is highlighted by the large number of studies conducted on stress in a multitude of fields (Miller, 1996). In the domain of athletics, however, there is a dearth of studies which have attempted to examine the impact that stress has on athletic performance. A former study conducted by these authors (Prakash & Ste-Marie, 1998) yielded no sign of a relationship between stress and athletic performance. That investigation was completed during the skaters' summer season and the lack of significance was attributed to that time frame having fewer sources of stress. This factor will be elaborated upon later, but serves to introduce the purpose of this study which was to further examine this relationship, but during the skaters' competitive season, which also coincided with the attendance of academic school.

Stress can be defined as a state of heightened physiological arousal that arises when we perceive a stressor (environmental demand) to overtax our ability to cope with that demand (Lazarus, 1966; Lazarus & Folkman, 1984; Spielberger, 1989). Because past research has determined that stress perceived as being negative, or what is commonly referred to as 'distress', is associated with numerous negative consequences (Thoits, 1983), we have chosen to only focus on this type of stress. Thus, from this point forward, any stress referred to, will be distress. When studying the impact that stress has on athletic performance, Jones and Hardy (1997) stated that "precise identification of the relationship between stress and performance has proved elusive" (p. 8). One factor this can be attributed to is that the terms of stress and anxiety have been used interchangeably (Felsten & Wilcox, 1993; Jones & Hardy, 1997; Williams & Roepke, 1992). The problem with doing this though is that stress and anxiety are not synonymous (May, 1993).

Rather, anxiety is only one of many emotional reactions to stress, such as loneliness, depression, lowered self-esteem, and phobias (Powell, 1997). Thus, the approach of using anxiety measures to study the relationship between stress and athletic performance is narrow in that such measures provide information about only one resultant emotion. This is evident in many of the studies which have studied stress in sports, yet have utilized measures of anxiety rather than measures of stress (e.g., Martens, Burton, Vealey, Bump & Smith, 1990).

Although anxiety measures have provided us with a wealth of information pertinent to the athletic/competitive environment (see Martens, Vealey & Burton, 1990; Jones & Hardy, 1997 for a review of anxiety), such measures do not allow us to determine the impact that the sources of stress may have on athletic performance. We have proposed (Prakash & Ste-Marie, 1998) that a more holistic view needs to be considered in the stress-athletic performance relationship (see also Felsten & Wilcox, 1992; 1993). That is, stress from experiences outside of the competitive context also needs to be considered. For example, potential stress originating from the occurrence of major life events, daily hassles unrelated to the sport, and daily hassles that are sport-specific warrant consideration. Thus far, we have only been able to identify four studies which have examined the stress-performance relationship with varying degrees of this holistic approach and the findings yielded from these studies have been inconsistent (Felsten & Wilcox, 1993; McCutcheon, Lummis & Ellis, 1989; Popkin, Stillner, Pierce, Williams & Gregory, 1976; Seggar, Pedersen, Hawkes & McGown, 1997). As well, each study had their own limitations.

Of the four, the one most relevant to this research was conducted by Felsten and Wilcox (1993) (see Prakash & Ste-Marie, 1998 for more details pertaining to the other studies). Felsten and Wilcox (1993) incorporated measures of major life stress, hassles and sport specific stress in their examination of practice performance in figure skating. Although their findings yielded support for the detrimental impact of increased levels of stress on performance, a number of limitations were associated with the study, such as the sample being too small, and using too broad of a competitive range and age range. Another concern was that their sport specific questionnaire did not tap into the numerous potential stressors that exist within the skating domain. Finally, only practice performance was considered in that study.

A noteworthy limitation of all four studies is that they all neglected to examine the impact of the potential moderator variables of social support and psychological coping abilities. These variables are important to consider because they have been found to buffer the negative impact of stress on athletic injury occurrence (e.g., Heil, 1993; Petrie, 1992; Smith, Smoll & Ptacek, 1990). Specifically, social support refers to our perception of the functions performed for us by significant others (Thoits, 1995). Research has shown that increased levels of social support has been linked with reduced stress and more favorable outcomes (Thoits, 1995). Coping skills, on the other hand, refer to the behaviors we use when we are confronted with a stressful situation. Utilizing effective coping methods which actively deal with reducing or eliminating the problem at hand has been linked to more positive outcomes, such as reduced rate of injury occurrence (Petrie, 1992).

In an effort deal with the limitations discussed thus far, Prakash and Ste-Marie (1998) examined this relationship with competitive figure skaters during their summer

training season. Thirty-one competitive figure skaters were examined over a six-week time frame, however, only four weeks were analyzed for reasons soon to be discussed. The skaters completed questionnaires assessing a broad spectrum of potential stressors, such as major life events, daily hassles and skating specific hassles. In addition, a social support survey and coping abilities inventory was completed. Performance during both practice and competition were evaluated by the skaters' coaches.

The findings revealed that total practice performance across the four weeks did not exhibit negative correlations with any of the stress variables. Total practice performance, however, was shown to be predicted by both task coping and avoidance coping. The skaters who used task coping to a greater extent had better total practice performance evaluations than those who utilized an ineffective method of coping, specifically avoidance coping. This is consistent with previous research that has shown task coping to be associated with more favorable outcomes and avoidance coping to be connected to negative consequences (Endler & Parker, 1990; Herman-Stahl & Peterson, 1996).

With respect to the relationship between total hassles, total skating stress and competitive performance, an unanticipated finding emerged--a positive correlation was revealed. These stress variables, however, were not significant predictors of competitive performance. This positive relationship stands in contrast to what has been found in other research in similar domains, where the expected, negative relationships are more prevalent (e.g., Bramwell, Masuda, Wagner & Holmes, 1975; Cryan & Alles, 1983; Passer & Seese, 1983). Although we are not certain as to why this positive relationship occurred, we suggested that two characteristics of the summer season may have led to such findings.

The first aspect related to the fact that competitions during the summer season are not truly reflective of the pressures found during the skaters' 'real competitive season'. In the summer season, competitions are regarded as a time to 'try out' competitive programs and the scores are not used for ranking purposes. The recommendation was to obtain data in a time frame that was consistent with what happens at a true competition, such as the peak competitive event of the year. In this season, figure skaters strive to land difficult jumps consistently and they also have to perform their competitive program with a standard of artistic ability which only comes with hard work and dedication. A second factor of that study was that the coaches were used as performance evaluators. Again, because they were evaluating the skaters during the summer season, their frame of reference may have been different than if they were to make those evaluations during a true competitive season. Finally, solely using the coaches as evaluators is somewhat limiting. Therefore, in this study, we also introduce actual judges scores as an additional variable to address the issue of the relationship between stress and competitive performance. For these reasons, the competitive measures used in this study are a more accurate representation of a true competition as compared to the measure used in Prakash and Ste-Marie's (1998) summer study.

A second aspect that we attributed to the lack of significant findings during the summer study was that it was a time frame wherein the athletes were not in school. Support for this notion was provided from that study from a serendipitous event. Originally, data was collected for a six-week duration, but one the first bi-weekly time frames was eliminated because it was learned that the skaters were still enrolled in academic school. Moreover, a one-way, repeated measures ANOVA of the three time

frames indicated that the first bi-weekly time frame yielded greater levels of stress than the latter two time frames. The original intent of that study, however, was to examine the stressors that were characteristic of summer skating, hence, potential school stressors did not fit into our design. To do a preliminary test of the 'summer season' hypothesis required an analysis of only that time frame. That analysis revealed a significant, negative correlation between hassles, avoidance coping and practice performance. These variables were also predictors of practice performance for that time frame. These results were the impetus for this experiment and motivated us to further examine the stress-figure skating performance relationship during a time frame that included the participants attending academic school.

Certainly, because our population of study are adolescents, they do contend with stressors that arise as a result of attending school (Foreman, 1993). Beyond obvious stressors, such as exams and major assignments, Phillips (1978) stated that school conditions, events and interpersonal relationships are also sources of school stress. Moreover, in recent years, schools have placed a stronger emphasis on the academic achievement of students which has resulted in more achievement stressors, such as receiving pressure from parents to perform well, or getting in trouble by the teacher in front of the entire class (Phillips, 1973; 1993). However, school stressors related to achievement is but one type of stress. Another type of school stress discussed by Phillips (1978; 1993) are social stressors, such as being physically attacked by other children or having clothes that are not as nice as your classmates. Of major importance is that both of the characteristics attributed to the findings of the earlier study, the lack of a true

competitive event and of school stress, coexist during the skaters' peak competitive season. The importance of these stressors being combined during are discussed next.

The potential stressors from academic school combined with stressors associated with competing when the stakes are higher have not been investigated. Past researchers, however, have determined that stressful experiences that occur in isolation may not be as likely to act as precursors to the negative repercussions of stress. Rather, it is the combination of stressors occurring simultaneously, or the accumulation of stressors over time which tends to be followed by the negative consequences. (Kolvin, Miller, Scott, Gatzanis & Fleeting, 1990; Rutter, 1979). When one considers athletes, it is likely that they encounter the same range of life stress as non-athletes and that the sources of stress related to their sport are an additive feature (see also Felsten & Wilcox, 1993). Thus, the hypothesis that the accumulation of stressors, from various aspects of adolescent athletes' lives, such as school and competitive training, may have a negative impact on athletic performance is tenable.

Method

Participants

Thirty, female, adolescent, pre-novice and novice competitive figure skaters (age range = 11 - 16 years of age; average age = 14.2 years) from the Ottawa and Halifax regions were recruited to participate in this experiment. Because Palmer (1992) described these two competitive groups as being homogenous we grouped them together for the purpose of this study. In addition, private coaches, with varying numbers of these competitive skaters, acted as performance evaluators for this study. In order to be eligible to participate in the study, each skater had to have been skating for the entire six-week

duration of the study and had to be scheduled to compete in the provincial competition scheduled for mid-November. The coaches had a minimum of Level two full certification, as set by the National Coaches Certification Program (NCCP) of Canada. This level of certification is the minimum level required in order to train competitive pre-novice skaters.

Materials

Four questionnaires and two assessment forms were used in this study. Due to ethical considerations raised by the University of Ottawa's ethics committee, some of the standardized questionnaires required modification. A description of each questionnaire, the assessment forms, as well as their necessary modifications or development follows.

Life Events Checklist modified (LECM). The LECM (Johnson & McCutcheon, 1980) is used to assess major life stress in children and adolescents. The standard form of this questionnaire contains 46 items that are frequently experienced by children and adolescents. Only 38 items were listed for this study, due to the concerns raised by the University of Ottawa's ethics committee about questions pertaining to teen pregnancy or abortion. The first 18 items represented events over which participants have little or no control (e.g., the death of a family member). The remaining 20 items reflected major events which were potentially under the participants control (e.g., joining a new club). Beside each event was a rating of 'good' or 'bad', as well as a seven point Likert Scale (1 - 7) in place of the original four-point rating scale. Respondents were asked to indicate whether an event has occurred in the previous year, and, if it has, to appraise the event as being good or bad and indicate the degree of stress they felt the event had on their lives (1=stress, 7=very high stress). Four open spaces were provided at the end of the questionnaire for participants to include any major life events that were not listed, but had

occurred to them over the time frame. A total score was obtained for good stress as well as for bad stress. Scores on the LECm, for either good or bad stress, had a possible range of 0 to 294.

Life Events and Coping Inventory modified (LECIm). The Life Events and Coping Inventory (LECI) (Dise-Lewis, 1988) is a validated 125 item inventory designed to assess hassles and major life stress in adolescents. Similar to Felsten and Wilcox (1993), daily hassles were chosen from the more commonly experienced items in the LECI. The process used to filter out daily hassles is described below. A modified version of this inventory, the LECIm, was completed by the skaters.

The format for modifying the LECI was based on the procedures of Dise-Lewis (1988) and Petrie (1992). First, a small group selected the hassles from the LECI which they believed could be experienced by an adolescent during a two-week time frame. The hassles selected through this phase were separated from the original LECI and constituted the first draft of the modified version. This draft was then distributed to various adolescents between the ages of 11 and 16 years. Because hassles were defined as annoying or negative events that could occur on a frequent basis (Robbins et. al, 1994), usually over a two-week time frame, the adolescents were asked to indicate which items they felt would not occur to any adolescent over a two-week time frame. The hassles that remained following the screening process constituted the final draft of the LECIm and contained 81 items. At the end of the questionnaire were five blank spaces in which the participants could insert hassles that were not listed but had occurred to them over the time frame. The same rating scales and procedure as that of the LECm questionnaire were used with this questionnaire as well. A total score was obtained for good stress as well as

for bad stress. Scores on the LECm, for either good or bad stress, had a possible range of 0 to 602.

Figure Skating Stress Questionnaire (FSSQ). This inventory was developed using the few sport-specific items included in Felsten and Wilcox's (1993) questionnaire, as well as a number of sources of figure skating stress cited in studies by Scanlan et. al (1991) and Gould et. al (1993). A simple procedure was then followed whereby this list of stressors was presented to various high level figure skaters to either filter out those items which they deemed as not being applicable to the sport of single, competitive figure skating, or to add in any items which they felt needed to be included. The restructured list was then presented to various figure skaters, between the ages of 11 and 16, who were asked to identify those stressors which they believed would not occur to any adolescent figure skater over a two-week time frame. The remaining stressors constituted the finalized version of the FSSQ. The FSSQ contained 44 hassles specific to the sport of figure skating. At the end of the questionnaire was an open space for participants to include items that were not listed on the questionnaire but had occurred to them over that time frame. The rating scales and procedure for this questionnaire was identical to those of the LECm and LECIm questionnaires. A total score was obtained for good stress as well as for bad stress. Scores on the FSSQ, for either good or bad stress, had a possible range of 0 to 343.

Social Support Survey (SSS): The SSS assesses social support as a multidimensional construct. Evidence for content validity, concurrent validity, construct validity, and test-retest reliability of the SSS were reported in Richman, Rosenfeld, & Hardy (1993). Rosenfeld and Richman (1977) demonstrated the usefulness of using this

questionnaire for assessing student-athletes' levels of social support. The SSS assesses four sources of information for eight different types of social support. The four sources of information obtained pertained to the (1) relationship for each person who provides the type of support which provides information concerning the number of people who provide support, as well as the composition of the social network, (2) satisfaction with the support received, (3) difficulty involved in obtaining more support, and (4) perceived importance of the support for the respondent's well-being. The eight types of social support examined were: (a) listening support, (b) emotional support, (c) emotional challenge, (d) reality confirmation support, (e) task appreciation support, (f) task challenge support, (g) tangible assistance support, and (h) personal assistance support. Definitions of each of these types of social support were provided throughout the inventory.

Coping Inventory for Stressful Situations (CISS): The CISS is a validated, self-report measure of adolescent coping which consists of 48 items with three scales, task coping, emotional coping and avoidance coping (Endler & Parker, 1990). Sixteen items assess task coping, 16 items assess emotion coping, and 16 items assess avoidance coping. There are two subscales for avoidance coping - distraction (eight items) and social diversion (five items). The CISS has been shown to have adequate internal alpha coefficients ranging from .78 to .92 (Endler & Parker, 1990). When completing the CISS, respondents were asked to rate each item on a five-point frequency scale ranging from (1) "Not at all" to (5) "Very much". Total scores were obtained for each type of coping.

Performance Assessment Form (PAF). This form was created by the researchers. It was based on the Evaluating System used by judges in the Canadian Figure Skating Association. Information pertained to how skaters performed in three areas: technical

performance (i.e. jumps, footwork), spinning performance and artistic performance.

Overall performance in these three areas were rated on a 7-point Likert scale ranging from *Needs Improvement* (1) to *Excellent* (7). This range of evaluating figure skating (needs improvement to excellent) is an established judging scale set by the Canadian Figure Skating Association. Because the coaches were all level 2 certified, they had experience with this system of assessment. Coaches were asked to evaluate practice performance using the 7-point Likert scale. The scores for the PAF ranged from 0 to 21.

Competitive Performance Assessment Form (CPAF): This form was similar to the PAF, except that it was specific to competitive performance. The same scale and procedure used for the PAF was used for this form as well. The scores for the CPAF ranged from 0 to 21.

Procedure

All questionnaires were completed by the skaters either individually, or in small groups. When done in small groups, the skaters were asked to complete the forms by themselves and to not discuss them with any of the other participants. A researcher was always present when the skaters completed the questionnaires and was available to answer any questions posed by the skaters, as well as to ensure the independence of completing the task.

Skaters completed the LECm, SSS and the CISS once during the study, which occurred on the third week of the six week time frame. Skaters completed the LECIm, and FSSQ on a bi-weekly basis. The coaches completed their forms in conjunction with the skaters. That is, on the same days that the figure skaters completed these biweekly questionnaires, the coaches were asked to complete the PAF. Both the skaters and

coaches were asked to refer to the previous two weeks when they completed their respective forms. This procedure was repeated every second week for six weeks, which generated a total of three measures.

Competition evaluations were obtained by having the coaches complete the CPAF forms immediately after their skaters competed. A second measure of competitive performance was obtained by including the judges scores that were displayed at the competition. This measure was obtained in order to rectify the limitations of the competitive performance evaluations set forth by Prakash and Ste-Marie (1998). These scores are revealed through what is known as an 'open marking system', and is made available to the public by being displayed on number cards. After the six week time frame of data collection was completed, the data was analyzed and results were determined.

Results

Responses for all the stress measures were divided into two categories-those that the participants perceived as good and those that they perceived as bad. Total scores were then obtained for eustress and for distress for each stress questionnaire completed during the study. As mentioned previously, our analysis will only deal with measures of distress.

In order to tap into perceived social support, only question two of the SSS was analyzed. This question evaluated the participants' satisfaction with their perceived level of social support. The information from the remaining questions were not analyzed because they pertained more to assessing social support with the intent of administering an intervention (Richman, Rosenfeld & Hardy, 1993; Rosenfeld & Richman, 1997). This was not a focus of the present study and was therefore not relevant to our hypotheses.

Preliminary Data Analysis

Tests for normality and linearity were done.⁴ Tests for multicollinearity were also conducted.⁵ Following our tests for normality, one-way ANOVA's with repeated measures were conducted to determine if there were any significant differences between stress levels obtained during each time frame. Results showed no main effect, all F 's < 1.0 for time frame. Thus, the hassles scores across the entire six weeks to be combined to create the variable of total hassles, as were the skating stress scores, to create a total skating stress score.

Correlational Analysis

A Pearson Product correlational matrix including all dependent and independent variables was conducted. Total practice performance, the coaches evaluations of competitive performance and the judges scores revealed a number of correlations with various independent variables and these are displayed in Table 1. Each of the three dependent variables displayed a significant correlation with both total hassles and total skating stress. Major life stress, emotional coping and social support did not reveal any correlations with any of the dependent variables. Performance measures were negatively influenced by total hassles, total skating distress and avoidance coping, but were positively influenced by task coping. Dependent variables also displayed positive correlations with each other. Specifically, total practice performance was positively correlated with the

⁴ Upon viewing histograms for each independent and dependent variable, we observed that most measures fit the normal distribution. However, the distributions for total hassles (distress) and total skating distress exhibited positive skewness. When we searched for reoccurring outliers, we did not find any. Thus, the skewness was attributed to the stress measures used since very few participants would have zero distress or the maximum possible distress rating.

⁵ We did find a risk of multicollinearity between total hassles (distress) and total skating distress. However, the intent of this study was to examine how each of these individual stress types contributes to the relationship of interest. Thus, we kept these two stress variables as separate independent variables.

coaches' evaluations of competitive performance ($r = .73, p < .05$) as well as the judges' scores ($r = .56, p < .05$). Also, the coaches' evaluations of competitive performance were positively correlated with the judges' scores of the same performance ($r = .55, p < .05$).

Hierarchical Regression Analyses

In order to explore the specific contributions of the stress variables and psychological coping variables to the prediction of practice and competitive performance, hierarchical regression analyses were conducted. Separate regressions were used to predict total practice performance for the six-week duration and competitive performance respectively. The results for these analyses are displayed in Table 2.

The variables entered into the regression models were those that exhibited a significant correlation with either of the dependent variables. Thus, major life stress, social support and emotion coping were excluded as predictors. Also, the two subscales for avoidance coping were collapsed into one score because we were not interested in the individual impact that each variable had on either type of performance. Thus, for total practice performance, the predictors were, in order of entry, (1) stress variables (i.e., total hassles (distress) and total skating distress) and (2) psychological coping variables (i.e. task coping and avoidance coping). Coping variables were entered last in the regression since they were hypothesized to modify the impact of stress (Aikens, Fischer, Namey & Rudick, 1997). As shown in Table 2, total hassles and avoidance coping both contributed to the prediction of total practice performance ($R^2 = .85, p < .05$).

The same hierarchical regression model was used for the coaches' and judges' evaluations of competitive performance. Findings from these analyses revealed that none

of the stress variables, nor either of the coping variables, played a role in the prediction (see Table 2) of competitive performance.

Two-Way Interactions Among Psychological Coping Variables and Stress Variables.

Possible interactions among the psychological coping and stress variables in predicting competitive performance were also tested. These analyses served to investigate the degree to which different combinations of supports and stresses had stress-buffering effects. That is, any significance in additional variance accounted for by an interaction provides evidence for the buffering/moderating hypothesis. In order to test interactions, the hierarchical regressions described above were recomputed with all possible two-way interaction terms entered at the end of the prediction equation. The variables for all three regression analyses were entered in the following order: stress variables, psychological coping variables, task coping x total hassles, task coping x total skating stress, avoidance coping x total hassles, and avoidance coping x total skating stress. The analyses for total practice performance and both measures of competitive performance revealed no significant moderator effects.

Discussion

This study had three purposes: 1) to examine the relationship between stress variables and performance during practices and competition, 2) to determine the impact of potential moderator variables, and 3) to test the hypothesis that the lack of significance between stress and figure skating performance in Prakash and Ste-Marie's (1998) study was due to the time frame of interest (i.e. the summer season). The results revealed strong support for the majority of the hypotheses set forth.

Purpose 1: Relationship Between Stress Variables and Performance

The first purpose of this study was to determine if increased stress levels were negatively correlated with both practice and competitive performance. It was found that total hassles and total skating stress exhibited a negative correlation with all performance measures. These findings are consistent with past studies which have shown negative correlations between stress and athletic performance (e.g., Seggar et. al., 1997; Felsten & Wilcox, 1993). Such findings provide much needed evidence for the stress-athletic performance relationship which has revealed inconsistent results in previous studies (for a review see Felsten & Wilcox, 1992;1993).

When the predictive value of the stress variables were examined, we found that total hassles was a significant predictor for total practice performance. Specifically, negative stress perceived from the skaters' social life, outside of figure skating, explained 45% of the variance of total practice performance. Thus far, research pertaining to life stress and athletic performance has mainly relied on correlations to establish the existence of a stress-performance relationship, while the focus on the predictive nature of these sources of stress has been minimal. However, similar to our findings, past research has relied heavily on predictions to make sound conclusions with respect to the predicative nature of heightened stress with sport injury occurrence (e.g., Smith, et. al., 1990) , as well as with the onset of physical illness (e.g., Aikens, Fisher, Namey & Rudick, 1997).

Despite the lack of predictive power for competitive performance, we feel that it is important to note the positive correlation between competitive performance measures and practice performance. This finding leads us to speculate that factors which cause detriments in practice performance may also impair competitive performance.

Unfortunately, this methodology only allowed for one competitive measure to be collected.

Purpose 2: Relationship Between Psychological Coping, Social Support and Performance

The second purpose of this study was to determine the role that potential moderator variables played in the stress-athletic performance relationship. The correlational analyses showed that total practice performance and both competitive performance measures were not correlated with social support. These results replicate the results of Prakash and Ste-Marie (1998) as well as other studies that have shown that social support is not consistently a factor of importance in similar relationships (e.g., Udry). Also, our findings revealed correlations between task coping, avoidance coping and both types of performance. Specifically, task coping was found to be positively correlated with both practice and competitive performance, while avoidance coping exhibited a negative relationship with these performance measures. These findings were also obtained by Prakash and Ste-Marie (1998) and are consistent with previous research linking effective task coping styles with positive outcomes and ineffective avoidance coping styles with less favorable outcomes (Endler & Parker, 1990; Herman-Stahl & Peterson, 1997).

The present findings also showed that task coping contributed to the prediction of total practice performance, but none of the coping types significantly predicted competitive performance. Again, we postulate that additional significant predictions may have emerged had we obtained repeated measures of competitive performance.

Purpose 3: Significant Differences Between Experiment 1 and Experiment 2

The final purpose of our research was to determine if the lack of significance obtained in Prakash and Ste-Marie's (1998) study was due to the time of year examined. As previously mentioned, we attributed our findings obtained in our first experiment to the characteristics of the time frame in which data was collected - that of the summer season. Hence, we postulated that in the fall, we would obtain evidence to support the detrimental impact of stress on athletic performance because the figure skaters were attending academic school and involved in their peak competitive season.

Indeed, past research has demonstrated that the accumulation of stressors over time, or all at once, is linked to the negative consequences of stress and that isolated stressors will not reveal such outcomes (Kolvin, et. al., 1990; Rutter, 1979). Furthermore, in Thoits's (1995) review of stress, it was suggested that true situations in life involve the 'carry over' effects of stress in which heightened stress experienced in one facet of life (e.g. school) 'spill over' to create increased stress in another (e.g. skating). Thus, stress is most complex when the number of potential stressors increase in number and accumulate and/or carry over to elicit negative consequences. We posit that the stressors experienced during the summer were not as complex as those experienced during the fall which would explain our different findings obtained in these two time frames. To test this hypothesis, a cross experimental analysis of independent r 's was conducted.

Results from this analysis demonstrated that the relationship between stress and both performance measures in this study were significantly different from those studied

during the summer investigation.⁶ These significant differences support the hypothesis that the time of year is an important factor in the stress-athletic performance relationship. More specifically, the fall skating season is one that contains a greater accumulation of stressors than the summer season and the result is that performance is negatively affected. These stressors arise from daily hassles encountered in family life, school and figure skating and may be responsible for the negative impact of stress that is evident in this study. As mentioned, similar detriments were not evident in the summer study which may be due to the athletes' overall stress levels being substantially reduced during the summer training season.

Conclusions

The findings from this study provide support for existing stress-athletic performance theory, and also contributes new information pertaining to this relationship. We found that heightened levels of hassles experienced in general life and in skating were related to detriments in practice and competitive performance. Furthermore, total practice performance was predicted by increased levels of daily hassles. Of major importance is that this evidence for the detrimental impact of heightened stress was obtained during a time of year in which the stressors experienced by the athletes were complex in nature.

Our findings highlight the importance of acknowledging the fact that nonsport and/or noncompetitive aspects of an athlete's life causes them stress, which subsequently can impair performance. A direct implication of this is that athletes need information pertaining to stress management. One of the key concepts for managing stress is evident

⁶ We only compared the competitive performance measures that were provided by the coaches in both experiments. Hence, competitive performance as provided by the judges scores could not be included in the cross-experimental analysis since it was specific to the methods of this experiment.

in the definition of stress provided earlier. That is, stress is a process by which we perceive the demands of stressors to exceed our coping skills. Hence, by enhancing our method of coping, we may decrease the unfavorable impacts of stress (e.g., Endler & Parker, 1990). However, as this study and numerous other studies has shown, the choice of coping tactics will influence the outcome.

We found that skaters who made more use of effective task coping skills had greater performance levels in practices and competition than those who favored avoidance tactics. Furthermore, task coping was the second predictor of total practice performance. This suggests that interventions designed for increasing coping abilities should emphasize those tactics which effectively deal with the problem, or stressor. An example of such a tactic would include time management training. Furthermore, previous documented interventions designed to reduce injury occurrence found a marked decrease in injury rates following an intervention consisting of relaxation techniques (Davis, 1991). These relaxation techniques are also important for stress management since they serve to reduce the heightened physiological arousal associated with perceived stress. Once relaxed, the athlete will be better able to utilize the more effective task coping skills and will be less likely to experience detriments associated with this prolonged arousal.

Another major finding of this study was that practice performance was highly correlated with both competitive performance measures. This supports our notion that solely focusing on competitive aspects is narrow and should be balanced by a more holistic view. This view should focus on aspects which will impact performance both in practice and competition. Many sport psychology consultants encourage athletes to use their practice sessions to mentally and physically rehearse simulated situations which may

transpire in the competitive domain (i.e. Botterill, 1997; Orlick, 1986). The logic behind such emphasis is that factors which benefit their practice session will more than likely benefit their performance during competitive events. For example, an athlete who uses positive self talk consistently throughout his/her practice sessions may feel more confident during their competitive performance than an athlete who fails to incorporate this technique into his/her regular training regime. Along this line, factors which consistently impair practice performance, such as general life hassles, may also impair competitive performance. Hence, the interventions mentioned earlier may serve to decrease stress levels, enhance practice performance as well as subsequent competitive performances.

Of major importance is the notion that we should no longer chastise athletes for acknowledging annoying hassles that arise from general life or from within their athletic domain. By telling athletes to 'leave their problems outside' is merely encouraging the use of avoidance coping. Certainly, this does not mean that precious, practice time should be spent discussing stressors and how to cope with them. Orlick's (1986) well known 'parking' technique is effective for removing distracting thoughts from our minds so that we can focus on the task at hand, such as a quality practice. However, at some point, these stressors need to be acknowledged and effective coping skills need to be used to eliminate possible negative consequences. Hence, it is important for sport psychology consultants, coaches and parents to become aware of when stressful events need to be 'parked' and when they must be attended to.

This study has limitations which need to be acknowledged. Firstly, the small sample size was the primary limitation. Future research should aim to investigate stress-athletic performance issues using a larger sample. Having larger numbers may yield

support for the buffering hypothesis that was not obtained here. The second limitation noted is that there was only one competitive event that was used to collect data pertaining to competitive performance. A more long term examination would have included a greater number of competitions, which would have been more beneficial. The final limitation concerns the assessment of potential moderator variables. Udry (1997) determined that social support and coping skills were dynamic in nature. That is, significant differences were found between repeated assessments of these potential moderator variables. It was concluded that single measures of these variables may not provide as much information as repeated assessments would (Udry, 1997). In this study, however, these measures were obtained only once across the six weeks because of concerns for feasibility. Hence, future researchers are encouraged to include these repeated assessments into their design.

Finally, in this last section, we want to highlight areas for future researchers in stress and athletic performance. One direction would be to begin implementing psychological interventions designed to reduce stress. Researchers such as Davis (1991) have already documented the effect of such interventions, but the results were reported in terms of injury occurrence. Applied research should also focus on increased levels of athletic performance. Specifically, future research should obtain baseline measures of stress, coping, social support, and performance. Subsequent to this, a psychological intervention, emphasizing effective coping tactics, should be implemented. Lastly, additional measures of stress, moderator variables and performance should be assessed to determine the effectiveness of the psychological training.

A final suggestion for future researchers would be to take the next step and focus on qualitative methods. Rubin and Rubin (1995) emphasize the notion that quantitative research methods are used to define an overall concept, but a more in-depth understanding of this concept can be obtained through the use of qualitative techniques. Scanlan et. al. (1991) and Gould et. al. (1993) have already used this approach to provide an in-depth understanding of the sources of stress in the figure skating environment, but it was suggested that future research needs to explore these stressors further to determine why they impact performance. Also, the results of the present study mandate the need for an in-depth exploration into the coping skills used by adolescents. Additionally, qualitative research methods would be the ideal technique to obtain a better understanding of why the time frame we used resulted in heightened stress leading to a negative influence on both practice and competitive performance in our adolescent athletes.

In summary, the focus of sport psychology needs to include a broader scope of issues. Acknowledging the existence of factors outside of sport, as well as within the practice setting, that could impair performance is crucial. This should then be followed by appropriate interventions and interviews. Such strategies may help our young athletes to perform better in practice, competition, and in life.

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Table 1

Pearson Product Correlations between Total Practice Performance, Coaches' Evaluations of Competitive Performance, and Judges' Scores for Competitive Performance and Various Independent Variables.

	1	2	3	4	5	6	7	Mean	SD
1. Total Practice Performance	1.00							15.09	3.52
2. Coaches Competitive Evaluation	.73*	1.00						14.33	2.64
3. Judges' Scores	.56*	.55*	1.00					3.13	0.54
4. Total Hassles	-.66*	-.62*	-.50*	1.00				110.91	68.63
5. Total Skating Stress	-.52*	-.58*	-.48*	.85*	1.00			78.25	38.40
6. Avoidance Coping	-.81*	-.62*	-.50*	.59*	.50*	1.00		43.37	19.81
7. Task Coping	.89*	.59*	.52*	-.64*	-.57*	-.86*	1.00	51.93	18.65

*p < .05

Table 2
 Summary of Hierarchical Regressions on Performance Measures X Stress Variables
 and Coping Variables

Predictor (a)	Beta	R ²	R ² increase
<i>Total Practice Performance</i>			
step 1: Stress Variables		.45*	.45*
Total Hassles(distress)	-0.79*		
Total Skating Distress	0.14		
step 2: Coping Variables		.83*	.38*
Avoidance Coping	-0.15		
Task Coping	0.71*		
<i>Coaches' Evaluation of Competitive Performance</i>			
step 1: Stress Variables		.39	.39
Total Hassles (distress)	-0.46		
Total Skating Stress distress	-0.19		
step 2: Coping Variables		.48	.09
Avoidance Coping	-0.38		
Task Coping	0.009		
<i>Judges Scores for Competitive Performance</i>			
step 1: Stress Variables		.26	.26
Total Hassles (distress)	-0.34		
Total Skating Stress distress	-0.19		
step 2: Coping Variables		.34	.08
Avoidance Coping	-0.16		
Task Coping	0.20		

a All statistics for predictors are those that are attributable to the named variable

*p < .05

Table 3

Tests of Independents r 's to Determine if Correlations from Experiment 1 Were

Significantly Different from those of Experiment 2

Experiment 1 vs. Experiment 2	Zobt
1. Total Practice Performance with Total Hassles Distress	3.57*
2. Total Practice Performance with Total Skating Distress	2.35*
3. Competitive Performance with Total Hassles Distress	4.39*
4. Competitive Performance with Total Skating Distress	4.58*

Note. Competitive Performance refers to the performance evaluated by the coaches only.

CHAPTER IV

GENERAL DISCUSSION

General Discussion of Article 1

In terms of the relationship between stress and performance, the first article revealed unanticipated findings. Specifically, negative stress perceived in the forms of daily hassles and/or figure skating stress did not demonstrate any significant correlations with total practice performance. These stress variables, however, exhibited a significant, positive correlation with competitive performance. These unforeseen correlations were attributed to the characteristics of the summer training season.

With respect to coping styles, task coping was positively related to both types of performance, while avoidance coping exhibited a negative link to both performance types. Task coping and avoidance coping significantly predicted total practice performance and avoidance coping significantly predicted competitive performance. These predictions surpassed previous findings in the stress-performance literature and have direct implications for sport psychology which will be discussed later.

The lack of negative correlations between stress and performance left many unanswered questions pertaining to the impact of stress. The main reason put forth for the lack of a significant relationship was the time of year studied. Ultimately, our question was answered in the second article because the time frame of interest was the fall skating season.

General Discussion of Article 2

In the second article, total hassles and total skating stress were both negatively correlated with total practice performance as well as with competitive performance. Task

coping was positively linked to both performance types, whereas avoidance coping exhibited a negative relationship with the dependent variables. In terms of predicting performance, both total hassles and task coping significantly added to the prediction of total practice performance across the six weeks. Further analysis revealed that the correlations reported in this study were significantly different from those reported in the first article. This difference was interpreted as evidence to support our claim that the characteristics of the fall skating season included a greater number of stressors from both school and sport which can affect athletic performance. These characteristics were lacking in the summer training season.

Global Summary and Practical Implications

The findings from these two articles provide an increase in the knowledge of how stress can impact athletic performance. The results show that perceived stress during the summer time frame does not impair performance during either practices or competition. As previously stated, the skaters' perception of less stress may have been due to the skaters being out of the stress-filled school environment while engaging in a training season that is not highly competitive in nature. Thus, the number of potential stressors they were exposed to were substantially reduced during the first experiment. In fact, many of the skaters who participated in the summer study repeatedly stated to the researcher that many of the stressors listed in the questionnaires were not applicable to them at that time since they were not attending school. Also, comments were made to suggest that even though summer skating involves many hours a day of training, it is the most fun for them. Their comments led us to speculate that they perceived a smaller number of stressors both from general life and from skating during their summer training. Past

research has stated that individual stressors will not be related to negative outcomes (Rulter, 1979; Kolvin et. al., 1990), thus in accordance with this aspect of stress theory, it was postulated that the fewer number of stressors perceived in the summer months were responsible for the lack of significance.

The competitive season, however, seems to be characterized by heightened levels of perceived stress which accumulates from many facets of life. Numerous skaters who participated in the second experiment shared some of their many perceived stressors with the experimenter, such as having to move away from home and a familiar academic school during the peak competitive season in order to train with a preferred coach, having a great deal of pressure being placed on them by their parents to perform well, having a tough time doing well in school because they have had to miss many classes in order to train, and feeling left out of their crowd of friends from school because their training time did not leave room for a social life. Thus, they revealed a number of stressors that were originating from various facets of their lives. It is the accumulation of stressors which have been found to be associated with the negative repercussions of stress (Rulter, 1979; Kolvin et. al., 1990) and now, this accumulative nature of stressors in the athletes' peak season is deemed responsible for the strong support obtained for our hypotheses. Thus, the time of year seems to be a key factor in the stress-athletic performance topic.

Another issue of major importance is that the use of the effective task coping style was a significant factor revealed during the more 'relaxed' time frame and should be emphasized, especially since this factor was also prevalent during the competitive season. One can conclude that effective coping styles may impact on athletic performance regardless of the time of year. However, future research could confirm this by examining

a time frame other than those included in this thesis, such as the spring training season, or the training which occurs immediately following the peak competitive event.

In summary, this thesis has succeeded in surpassing previous stress-athletic performance research. On account of the knowledge presented in this thesis, additional evidence has been found in the stress literature to demonstrate the negative impact that stress can have on athletic performance. In addition, this impact is dependent on the time of year during the athletes' training season, or their cycle of periodization. Typically, these cycles range from time frames of intense training to those in which there is an abstinence of training. These cycles are designed to prepare the athlete for their peak competitive season, which is typically the most intense (Wilmore & Costill, 1994). Thus, should future researchers choose to investigate this issue further, the time of year in which their study transpires is of significance.

This study also contributed to the stress literature by including the moderator variables of coping and social support. Up until this thesis, these variables have been omitted from previous research on this topic. The contributions of these variables to the stress-athletic performance relationship, however, were evident in these two experiments. Effective psychological coping skills can be deemed a necessary ingredient in the pursuit of optimal athletic performance. Increased social support, however, did not impact on this relationship. In experiment one social support was negatively linked with heightened levels of hassles, but these results were interpreted with caution.

Conclusions

The articles presented here have provided sport psychology consultants, parents and coaches with a more holistic view of stress and its impact on performance. This

information can be used to benefit the young athletes of today. In order to help adolescent athletes handle the accumulation of stressors imposed on them, psychological interventions should focus on enhancing the athletes' task coping abilities. The importance of such interventions can be traced back to the original definition of stress offered in both articles. That is, the stress process involves the perception that the stressor exceeds one's ability to cope (Lazarus, 1966; Lazarus & Folkman, 1984; Martens, Vealey & Burton, 1990; McGrath, 1970; Spielberger, 1989). Thus, heightened coping abilities should lessen the number of stressors that would result in the harmful stress response. Ultimately, such psychological skills should be followed by improved performance during practice and competition.

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Appendix A

Contribution of Collaborators

Contribution of Collaborators

I had the original idea of examining stress and athletic performance. I then researched this area further and presented my ideas to Dr. Ste-Marie. Together, we created a methodology for the thesis proposal, with the input of the other graduate students in Dr. Ste-Marie's lab, such as Sheri Valiquette, Gail Taylor and Jennifer Cumming. I then created the original draft of my proposal document, which was edited by Dr. Ste-Marie. I continued to write numerous drafts and Dr. Ste-Marie edited them all, until we felt that the document was ready for proposal.

Following the proposal, numerous changes were made in the methodology. These changes were made as a result of Dr. Michelle Fortier's and Dr. Pierre Trudel's comments concerning feasibility. Specifically, one of the three original experiments was eliminated from the methodology. Additions of moderator variables to the study were based on Dr. Fortier's encouragement. Also, Dr. Fortier helped with the selection of the measurement tools for these variables.

I contacted the skating clubs myself in order to obtain permission to recruit participants. In terms of collecting data, I collected most of it myself, but two undergraduate students, Heather Fletcher and Wendy Lang, collected data at the Minto Skating Club. Also, Renee Richard volunteered her time to help me collect data at the Gloucester Skating Club. Sheila Dwyer was responsible for the data that was collected in Nova Scotia.

All data entry was done by myself. Dr. Michelle Fortier met with both Dr. Ste-Marie and/or myself on a few occasions to advise us on the statistical analyses required to

answer our research question. Dr. Fortier also provided help during numerous telephone calls and emails. Dr. Robert Coplan from Carleton University advised me on how to conduct these analyses on the SPSS program for Windows '95. Dr. Ste-Marie, myself and the students in her lab group all contributed to the interpretation of the results.

Once the data was analysed, I wrote the original drafts of the two articles. Then, Dr. Ste-Marie and I repeated the method of editing and re-writing that we used to prepare the proposal document. This process of writing entire thesis document began prior to Christmas and was completed in mid-March.

Appendix B
Revised Methodology

Revised Methodology

This Appendix contains the revised thesis proposal methodology. The revisions made to this were based on comments provided to me from Dr. Michelle Fortier and Dr. Pierre Trudel. Originally, three different experiments were proposed, but comments concerning feasibility provided by my committee member were followed by the elimination of the first proposed experiment. Dr. Michelle Fortier also suggested modifications for the questionnaires as well as the inclusion of additional questionnaires. Specifically, the original methodology lacked the assessment of two potential moderator variables. All suggested modifications were made to the methodology and the current version, incorporating all changes, were used in both experiments.

Method

Participants

Thirty, female, adolescent, pre-novice and novice competitive figure skaters from the Ottawa and Halifax regions will be recruited to participate in this experiment. Because Palmer (1992) described these two competitive groups as being homogenous we may group them together for the purpose of this study. In addition, private coaches, with varying numbers of these competitive skaters, will act as performance evaluators for this study. In order to be eligible to participate in the study, each skater has skate for the entire six-week duration of the study and be scheduled to compete in the upcoming competition. The coaches must be a minimum of Level two full certification, as set by the National Coaches Certification Program (NCCP) of Canada. This level of certification is the minimum level required in order to train competitive pre-novice skaters.

Materials

Four questionnaires and two assessment forms will be used in this study. Due to ethical considerations raised by the University of Ottawa's ethics committee, some of the standardized questionnaires required modification. A description of each questionnaire, the assessment forms, as well as their necessary modifications or development follows.

Life Events Checklist modified (LECM). The LECM (Johnson & McCutcheon, 1980) will be used to assess major life stress in children and adolescents. The standard form of this questionnaire contains 46 items that are frequently experienced by children and adolescents. Only 38 items were listed for this study, due to the concerns raised by the University of Ottawa's ethics committee about questions pertaining to teen pregnancy or abortion. The first 18 items represented events over which participants have little or no

control (e.g., the death of a family member). The remaining 20 items reflected major events which were potentially under the participants control (e.g., joining a new club). Beside each event was a rating of 'good' or 'bad', as well as a seven point Likert Scale (1 - 7) in place of the original four-point rating scale. Four open spaces were provided at the end of the questionnaire for participants to include any major life events that were not listed but had occurred to them over the time frame.

Life Events and Coping Inventory modified (LECIm). The Life Events and Coping Inventory (LECI) (Dise-Lewis, 1988) is a 125 item inventory designed to assess hassles and major life stress in adolescents. In order to obtain a measure of hassles only, the major events were filtered out through the process described below. A modified version of this inventory, which we termed the Hassles Questionnaire, was completed by the skaters.

The format for modifying the LECI was based on the procedures of Dise-Lewis (1988) and Petrie (1992). First, a small group selected the hassles from the LECI which they believed could be experienced by an adolescent during a two-week time frame. The hassles selected through this phase were separated from the original LECI and constituted the first draft of the modified version. This draft was then distributed to various adolescents between the ages of 11 and 16 years. Because hassles were defined as annoying or negative events that could occur on a frequent basis (Robbins et. al, 1994), usually over a two-week time frame, the adolescents were asked to indicate which items they felt would not occur to any adolescent over a two-week time frame. The hassles that remained following the screening process constituted the final draft of the LECIm and contained 81 items. At the end of the questionnaire were five blank spaces in which the

participants could insert hassles that were not listed but had occurred to them over the time frame. The same rating scales as that of the LECm questionnaire were used with this questionnaire as well.

Figure Skating Stress Questionnaire (FSSQ). This inventory was developed using the few sport-specific items included in Felsten and Wilcox's (1993) questionnaire, as well as a number of sources of figure skating stress cited in studies by Scanlan et. al (1991) and Gould et. al (1993). A simple procedure was then followed whereby this list of stressors was presented to various high level figure skaters to either filter out those items which they deemed as not being applicable to the sport of single, competitive figure skating, or to add in any items which they felt needed to be included. The restructured list was then presented to various figure skaters, between the ages of 11 and 16, who were asked to identify those stressors which they believed would not occur to any adolescent figure skater over a two-week time frame. The remaining stressors constituted the finalized version of the FSSQ. The FSSQ contained 44 hassles specific to the sport of figure skating. At the end of the questionnaire was an open space for participants to include items that were not listed on the questionnaire but had occurred to them over that time frame. The same rating scales as those of the LECm and LECIm questionnaires were used with the FSSQ as well.

Social Support Survey (SSS): The SSS assesses social support as a multidimensional construct. Evidence for content validity, concurrent validity, construct validity, and test-retest reliability of the SSS were reported in Richman, Rosenfeld, & Hardy (1993). Rosenfeld and Richman (1977) demonstrated the usefulness of using this questionnaire for assessing student-athletes' levels of social support. The SSS assesses

four sources of information for eight different types of social support. The four sources of information obtained pertained to the (1) relationship for each person who provides the type of support which provides information concerning the number of people who provide support, as well as the composition of the social network, (2) satisfaction with the support received, (3) difficulty involved in obtaining more support, and (4) perceived importance of the support for the respondent's well-being. The eight types of social support examined were: (a) listening support, (b) emotional support, (c) emotional challenge, (d) reality confirmation support, (e) task appreciation support, (f) task challenge support, (g) tangible assistance support, and (h) personal assistance support. Definitions of each of these types of social support were provided throughout the inventory.

Coping Inventory for Stressful Situations (CISS): The CISS is a valid and reliable self-report measure of adolescent coping which consists of 48 items (Endler & Parker, 1990). Each item is rated on a five-point frequency scale ranging from (1) "Not at all" to (5) "Very much". Sixteen items assess task coping, 16 items assess emotion coping, and 16 items assess avoidance coping. There are two subscales for avoidance coping - distraction (eight items) and social diversion (five items).

Performance Assessment Form (PAF). This form was created by the researchers. It was based on the Evaluating System used by judges in the Canadian Figure Skating Association. Information pertained to how skaters performed in three areas: technical performance (i.e. jumps, footwork), spinning performance and artistic performance. Overall performance in these three areas were rated on a 7-point Likert scale ranging from *Needs Improvement* (1) to *Excellent* (7). This range of evaluating figure skating (needs improvement to excellent) is an established judging scale set by the Canadian Figure

Skating Association. Because the coaches were all level 2 certified, they had experience with this system of assessment.

Competitive Performance Assessment Form (CPAF) : This form was similar to the PAF , except that it was specific to competitive performance. The same scale used for the PAF was used for this form as well.

Procedure

All questionnaires are to be completed by the skaters either individually, or in small groups. When done in small groups, the skaters will be asked to complete the forms by themselves and to not discuss them with any of the other participants. A researcher will always be present when the skaters complete the questionnaires and will be available to answer any questions posed by the skaters, as well as to ensure the independence of completing the task.

Skaters will complete the LECm, SSS and the CISS once during the study, on the third week of the six week time frame. Skaters will complete the LECIm, and FSSQ on a bi-weekly basis. The coaches will complete their forms in conjunction with the skaters. That is, on the same days that the figure skaters completed these biweekly questionnaires, the coaches will be asked to complete the PAF. Both the skaters and coaches will be directed to refer to the previous two weeks when they complete their respective forms. This procedure will be repeated every second week for six weeks, to generate a total of three measures.

Competition evaluations will be obtained by having the coaches complete the CPAF forms immediately after their skaters competed. A second measure of competitive performance will be obtained in the second study by including the judges scores that will

be displayed at the competition. These scores are revealed through what is known as an 'open marking system', and is made available to the public by being displayed on number cards.

Appendix C

Life Events Checklist modified

Life Events Checklist modified

*We are interested in the types of major life events that you have experienced during the **last year**. Major life events are those events in life that we experience about once a year, such as your mother having a baby. They do not occur very often, but they can have varying degrees of impact on your life. When completing this inventory, please read the items below and determine whether or not you have experienced any of the major life stress items during the **last year**. For the ones you have experienced, indicate whether you think each event was either **good or bad** by circling the appropriate word. Then, indicate **how much stress each item created for you** by circling the most appropriate number on the scale below. Ignore items you have not experienced over the **last year**. Evaluate only those items that you have experienced over the **last year**. This is neither a test nor an evaluation. Therefore, there are no right or wrong answers. We are simply interested in your honest and truthful responses. Remember, that all of your responses will remain confidential.*

Please refer to the following scale when rating the amount of stress that each item created for you.

No Stress		Moderate Stress		Very High Stress
1	2	3	4	5
			6	7

Example: Your mother has just had a baby

Good Bad

(Stress level) 1 2 3 4 5 6 7

Your Name _____

Your Coach's Name _____

The Name of Your Skating Club _____

Your Age _____

The Date _____

1. Moving to a new home

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

2. New brother or sister

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

3. Changing to a new school

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

4. Serious illness or injury of family member

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

5. Parents divorced

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

6. Increased number of arguments between parents

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

7. Mother or father lost job

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

8. Death of a family member

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

9. Parents separated

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

10. Death of a close friend

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

11. Increased absence of parent from home

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

12. Brother or sister leaving home

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

13. Serious illness or injury of close friend

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

14. Parent getting into trouble with law

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

15. Parent getting a new job

Good	Bad							
(Stress level)	1	2	3	4	5	6	7	

16. New stepmother or stepfather
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
17. Parents going to jail
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
18. Change in parents' financial status
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
19. Trouble with brother or sister
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
20. Special recognition for good grades
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
21. Joining a new club
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
22. Losing a close friend
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
23. Decrease in number of arguments with parents
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
24. Losing a job
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
25. Making the honor role
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
26. Getting your own car
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
27. Failing a grade
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
28. Increase in number of arguments with parents
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
29. Getting a job of your own
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
30. Getting into trouble with police
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

- 31. Major personal illness or injury

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 32. Major trouble with teacher

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 33. Failing to make an athletic team

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 34. Being suspended from school

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 35. Making failing grades on report card

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 36. Making an athletic team

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 37. Trouble with classmates

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 38. Special recognition for athletic performance

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

Can you think of any other major life events that you experienced over the last year that is not listed? Please indicate what the events were in the space below and then rate each one as you have rated the other items

- 39. _____

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 40. _____

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 41. _____

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 42. _____

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

- 43. _____

	Good	Bad					
(Stress level)	1	2	3	4	5	6	7

Appendix D

Life Events and Coping Inventory modified

Life Events and Coping Inventory modified

*We are interested in the types of hassles that you have experienced during the last 2 weeks. Hassles are frequently occurring events which could be negative, or annoying in some way. For example, when your hair does not do what you want it to do many times during the week, this is a hassle. When completing this inventory, please read the items below and determine whether or not you have experienced any of the hassles during the past 2 weeks. For the ones you have experienced, indicate whether you think that event was either **good or bad** by circling the appropriate word. Then, indicate **how much stress each item created for you** by circling the most appropriate number on the scale below. Ignore items you have not experienced during the past 2 weeks. Evaluate only those items that you have experienced over the past 2 weeks. This is neither a test nor an evaluation. **Therefore, there are no right or wrong answers.** We are simply interested in your honest and truthful responses. Remember, that all of your responses will remain confidential.*

Please refer to the following scale when rating the amount of stress that each item created for you.

<u>No Stress</u>		<u>Moderate Stress</u>		<u>Very High Stress</u>
1	2	3	4	5
			6	7

Example: Your mother has just had a baby

Good Bad

(Stress level) 1 2 3 4 5 6 7

Your Name _____

Your Coach's Name

The Name of Your Skating Club

Your Age _____

The Date _____

1. Some of your personal property was lost or stolen
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
2. Something violent happened in your school or in your neighborhood
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
3. You had to study for a big test
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
4. You had to take a big test
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
5. You had a school report to do
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
6. You got your report card or grades
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
7. You were late for class
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
8. You had chores to do
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
9. You don't like your teacher
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
10. Your teacher bugged or nagged you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
11. You had to take a gym class
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
12. You had a sports or play tryout
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
13. Other kids forced you to do something you didn't want to do
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
14. All of your homework, or other work, got piled up at once
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
15. Some of the kids laughed at you, picked on you, or called you names
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

16. Kids threaten you or beat you up
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
17. Kids talked about you behind your back or spread rumors about you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
18. You had a fight, conflict, or argument with a friend
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
19. Your friend criticizes you or put you down
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
20. Your friend deserted you or didn't want to be with you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
21. You weren't invited to a party your friends went to
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
22. You felt jealous of a friend for something
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
23. Your friend had a problem or something the matter with him/her
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
24. You got stood up by a date
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
25. You compared grades with other kids
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
26. You competed with other kids in schoolwork
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
27. You competed with other kids in sport
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
28. Your parent(s) didn't listen to you when you tried to tell him/her something
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
29. Your parents hold high expectations of you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
30. Your parents had a fight or argument with each other
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

31. Your parent came home mad
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
32. Your parent embarrassed you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
33. Your parent didn't give you something which was promised to you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
34. You had a fight with one of your parents
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
35. Your parents didn't support your interests
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
36. You got caught stealing something
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
37. Your school teacher embarrassed you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
38. Your parent put you down or criticized you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
39. Your parent accused you of something you didn't do
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
40. Your parent didn't seem to understand when you tried to tell him/her something
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
41. Your family had financial problems
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
42. You competed with your brother or sister
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
43. Your family members had arguments with one another
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
44. Your brother or sister bothered or bugged you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
45. You felt like no one liked you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

46. You felt rushed or pressured
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
47. You felt upset or angry
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
48. You felt alone
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
49. You thought you were ugly, or you worried about your looks
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
50. You felt frustrated
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
51. You were worried about hurting your parents
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
52. You were worried over a decision
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
53. You were worried about being good
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
54. You felt rejected by someone important to you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
55. You felt like you're not worth anything
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
56. You felt angry with yourself
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
57. You couldn't get to sleep
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
58. You had bad dreams
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
59. You smoked cigarettes
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
60. You've taken drugs
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

61. You got in trouble at school
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
62. Your teacher yelled at you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
63. Your teachers had a conference about you
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
64. You were sent to the principal's office
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
65. You were grounded
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
66. You were punished for something you did
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
67. You felt like your brother or sister were better than you at something
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
68. You got in trouble with adults
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
69. You were suspended from school
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
70. You felt like you had no money
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
71. You had some things to do that you didn't want to do (i.e. chores, baby-sitting)
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
72. You wanted to do something but you weren't allowed to do it
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
73. You felt like there was nothing enjoyable(fun) to do
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
74. You tried to do something and failed at it
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
75. You felt bored
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

76. You told someone a lie
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
77. You did something wrong or bad
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
78. You got lost somewhere
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
79. One of your parents went away for a trip
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
80. You broke up with a boyfriend/girlfriend
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
81. Your physical development has been slower than other kids
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

Can you think of any other hassles that you experienced over the 2 weeks that is not listed? Please indicate what the events were in the space below and then rate each one as you have rated the other items

82. _____
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

83. _____
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

84. _____
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

85. _____
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

86. _____
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

Appendix E

Figure Skating Stress Questionnaire

1. You feel pressure because you are trying to prove yourself when you skate
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
2. You have high expectations to attain (achieve a lot or do a lot) a lot in a short time
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
3. You have been trying to be as good as you could
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
4. You have been trying to give consistent competitive performances
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
5. You have been feeling like everything in your skating lessons are done in a hurry
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
6. You have been feeling unprepared
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
7. You have been getting a new program ready
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
8. You have been pressuring yourself with your own competitiveness on a regular basis
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
9. You feel that you have been getting a lot of pressure from your parents concerning your skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
10. You have been spending a lot of your time trying to please others
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
11. You were afraid of what others would think of your skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
12. You were trying to balance both school and skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
13. Your skating is making it harder to keep up with your schoolwork
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
14. You have recently changed your training situation (i.e. new coach, new arena)
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
15. You have an injury that has been interfering with your training
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
16. Your competitors/skaters in your arena have an unfriendly attitude
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
17. Your coach has been sick
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
18. You have had conflict/poor relationship with your coach
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
19. Your body has been fatigued/sore
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

20. You have lost training time due to an injury
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
21. You have an injury
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
22. You have had trouble focusing on your skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
23. You have been unhappy with your coach's personality/style of coaching
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
24. You were wanting, but was not getting constant praise from your coach
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
25. You received a lot of criticism from your coach concerning your skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
26. The ice was too hard
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
27. The ice was too soft
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
28. You felt like your skating looked awkward or ugly
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
29. You have changed (re-choreographed) your skating program (either short or long)
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
30. You got a new skating program (either short or long)
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
31. The ice at skating has been crowded
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
32. You have had problems with your blades
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
33. You have had problems with your skates
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
34. A friend had mastered a skating move that you have not
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
35. you felt like you were falling behind in skating
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
36. Your coach has missed many sessions
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
37. Your coach has not been giving you all of your lessons or enough lessons
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7
38. You do not want as many lessons from your coach
Good **Bad**
 (Stress level) 1 2 3 4 5 6 7

39. Your coach compared your skating to someone else's

Good Bad

(Stress level) 1 2 3 4 5 6 7

40. You have had to change your technique

Good Bad

(Stress level) 1 2 3 4 5 6 7

41. You have recently 'lost' a jump, or some jumps, that you used to be able to land

Good Bad

(Stress level) 1 2 3 4 5 6 7

42. The ice has had many holes/ruts in it

Good Bad

(Stress level) 1 2 3 4 5 6 7

43. You have had blisters

Good Bad

(Stress level) 1 2 3 4 5 6 7

44. You have been very hard on yourself

Good Bad

(Stress level) 1 2 3 4 5 6 7

Can you think of any other skating-specific events that you experienced over the last 2 weeks that is not listed? Please indicate what the events were in the space below and then rate each one as you have rated the other items.

45. _____

Good Bad

(Stress level) 1 2 3 4 5 6 7

46. _____

Good Bad

(Stress level) 1 2 3 4 5 6 7

47. _____

Good Bad

(Stress level) 1 2 3 4 5 6 7

48. _____

Good Bad

(Stress level) 1 2 3 4 5 6 7

49. _____

Good Bad

(Stress level) 1 2 3 4 5 6 7

Appendix F
Social Support Survey

Social Support Survey

Your Name _____

Your Coach's Name

The Name of Your Skating Club

Your Age _____

The Date _____

The following questions focus on individuals in your environment who provide you with help and/or social support. Read the definition of the type of support being considered and respond to the questions that follow it. Please answer all the questions as best you can - there are no right or wrong answers. All your responses are strictly confidential.

Listening Support - *People who listen to you without giving advice or being judgmental.*

- Write the initials of all the individuals who provide you with listening support. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

- In general, how satisfied are you with the overall quality of listening support you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

- How difficult would it be for you to obtain more Listening Support?

Very Difficult 1 2 3 4 5 Very Easy

- How important for your overall well-being is it to have one or more persons provide you with listening support?

Very Unimportant 1 2 3 4 5 Very Important

Task Appreciation - People who acknowledge (recognize) your efforts and express appreciation for the work you do

1. Write the initials of all the individuals who provide you with Task Appreciation. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

2. In general, how satisfied are you with the overall quality of Task Appreciation you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Task Appreciation?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Task Appreciation?

Very Unimportant 1 2 3 4 5 Very Important

Task Challenge - People who challenge your way of thinking about your work or activity in order to stretch you, motivate you, and lead you to greater creativity, excitement, and involvement in your work or activity.

1. Write the initials of all the individuals who provide you with Task Challenge. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

2. In general, how satisfied are you with the overall quality of Task Challenge you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Task Challenge?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Task Challenge?

Very Unimportant 1 2 3 4 5 Very Important

Emotional Support - People who comfort you and let you know that they are on your side and care for you.

1. Write the initials of all the individuals who provide you with Emotional Support. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)
-
-
-

2. In general, how satisfied are you with the overall quality of Emotional Support you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Emotional Support?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Emotional Support?

Very Unimportant 1 2 3 4 5 Very Important

Emotional Challenge - People who challenge you to evaluate your attitudes, values, and feelings.

1. Write the initials of all the individuals who provide you with Emotional Challenge. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)
-
-
-

2. In general, how satisfied are you with the overall quality of Emotional Challenge you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Emotional Challenge?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Emotional Challenge?

Very Unimportant 1 2 3 4 5 Very Important

Reality Confirmation - *People who are similar to you - see things the way you do - who help you to confirm your perceptions and perspectives of the world and help you to keep things in focus.*

1. Write the initials of all the individuals who provide you with Reality Confirmation. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

2. In general, how satisfied are you with the overall quality of Reality confirmation you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Reality Confirmation?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Reality Confirmation?

Very Unimportant 1 2 3 4 5 Very Important

Tangible Assistance - *People who provide you either with financial assistance (give you money), products, and/or gifts.*

1. Write the initials of all the individuals who provide you with Tangible Assistance. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

2. In general, how satisfied are you with the overall quality of Tangible Assistance you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Tangible Assistance?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Tangible Assistance?

Very Unimportant 1 2 3 4 5 Very Important

Personal Assistance - People who provide you with services or help, such as running an errand for you or driving you somewhere.

1. Write the initials of all the individuals who provide you with Personal Assistance. If no one provides you with this support, please indicate "no one". After each person, indicate the relationship you have with her or him (for example, they could be a friend, co-worker, parent, brother, sister, coach, or school teacher)

2. In general, how satisfied are you with the overall quality of Personal Assistance you receive?

Very Dissatisfied 1 2 3 4 5 Very Satisfied

3. How difficult would it be for you to obtain more Personal Assistance?

Very Difficult 1 2 3 4 5 Very Easy

4. How important for your overall well - being is it to have one or more persons provide you with Personal Assistance?

Very Unimportant 1 2 3 4 5 Very Important

Appendix G

Coping Inventory for Stressful Situations

Name: _____ Age: _____ Sex: _____
 Occupation: Student Y N Other: _____ Grade: _____

Instructions: The following are ways people react to various difficult, stressful, or upsetting situations. Please circle a number from 1 to 5 for each item. Indicate how much you engage in these types of activities when you encounter a difficult, stressful, or upsetting situation.

Not at All					Very Much					
1	2	3	4	5	1	2	3	4	5	1. Schedule my time better.
1	2	3	4	5	1	2	3	4	5	2. Focus on the problem and see how I can solve it.
1	2	3	4	5	1	2	3	4	5	3. Think about the good times I've had.
1	2	3	4	5	1	2	3	4	5	4. Try to be with other people.
1	2	3	4	5	1	2	3	4	5	5. Blame myself for putting things off.
1	2	3	4	5	1	2	3	4	5	6. Do what I think is best.
1	2	3	4	5	1	2	3	4	5	7. Become preoccupied with aches and pains.
1	2	3	4	5	1	2	3	4	5	8. Blame myself for having gotten into this situation.
1	2	3	4	5	1	2	3	4	5	9. Window shop.
1	2	3	4	5	1	2	3	4	5	10. Outline my priorities.
1	2	3	4	5	1	2	3	4	5	11. Try to go to sleep.
1	2	3	4	5	1	2	3	4	5	12. Treat myself to a favorite food or snack.
1	2	3	4	5	1	2	3	4	5	13. Feel anxious about not being able to cope.
1	2	3	4	5	1	2	3	4	5	14. Become very tense.
1	2	3	4	5	1	2	3	4	5	15. Think about how I solved similar problems.
1	2	3	4	5	1	2	3	4	5	16. Tell myself that it is really not happening to me.
1	2	3	4	5	1	2	3	4	5	17. Blame myself for being too emotional about the situation.
1	2	3	4	5	1	2	3	4	5	18. Go out for a snack or meal.
1	2	3	4	5	1	2	3	4	5	19. Become very upset.
1	2	3	4	5	1	2	3	4	5	20. Buy myself something.
1	2	3	4	5	1	2	3	4	5	21. Determine a course of action and follow it.
1	2	3	4	5	1	2	3	4	5	22. Blame myself for not knowing what to do.
1	2	3	4	5	1	2	3	4	5	23. Go to a party.
1	2	3	4	5	1	2	3	4	5	24. Work to understand the situation.
1	2	3	4	5	1	2	3	4	5	25. "Freeze" and not know what to do.
1	2	3	4	5	1	2	3	4	5	26. Take corrective action immediately.
1	2	3	4	5	1	2	3	4	5	27. Think about the event and learn from my mistakes.
1	2	3	4	5	1	2	3	4	5	28. Wish that I could change what had happened or how I felt.
1	2	3	4	5	1	2	3	4	5	29. Visit a friend.
1	2	3	4	5	1	2	3	4	5	30. Worry about what I am going to do.
1	2	3	4	5	1	2	3	4	5	31. Spend time with a special person.
1	2	3	4	5	1	2	3	4	5	32. Go for a walk.
1	2	3	4	5	1	2	3	4	5	33. Tell myself that it will never happen again.
1	2	3	4	5	1	2	3	4	5	34. Focus on my general inadequacies.
1	2	3	4	5	1	2	3	4	5	35. Talk to someone whose advice I value.
1	2	3	4	5	1	2	3	4	5	36. Analyze my problem before reacting.
1	2	3	4	5	1	2	3	4	5	37. Phone a friend.
1	2	3	4	5	1	2	3	4	5	38. Get angry.
1	2	3	4	5	1	2	3	4	5	39. Adjust my priorities.
1	2	3	4	5	1	2	3	4	5	40. See a movie.
1	2	3	4	5	1	2	3	4	5	41. Get control of the situation.
1	2	3	4	5	1	2	3	4	5	42. Make an extra effort to get things done.
1	2	3	4	5	1	2	3	4	5	43. Come up with several different solutions to the problem.
1	2	3	4	5	1	2	3	4	5	44. Take some time off and get away from the situation.
1	2	3	4	5	1	2	3	4	5	45. Take it out on other people.
1	2	3	4	5	1	2	3	4	5	46. Use the situation to prove that I can do it.
1	2	3	4	5	1	2	3	4	5	47. Try to be organized so I can be on top of the situation.
1	2	3	4	5	1	2	3	4	5	48. Watch TV.

Appendix H

Performance Assessment Form

**Performance Assessment Form
(Coachs' Evaluations of Practice Performance)**

Your Name _____ Date _____

Your Skater's Name _____

(* if you have more than 1 skater participating, please do a separate evaluation for each skater throughout the experiment)

The Name of the Club that you Coach at _____

We are interested in your evaluation of your skater's OVERALL performance during the last 2 weeks. We are interested in 3 different aspects of OVERALL PERFORMANCE : overall technical performance, overall artistic performance and overall spinning performance. Please use the scales below to indicate the degree to which you evaluate each of the 3 performance aspects. Refer to the evaluation system which the Canadian Figure Skating Association utilizes for judging figure skating performance when you evaluate your own skater's performance. This is neither a test nor an evaluation. Therefore, there are no right or wrong answers. We are simply interested in your honest and truthful evaluations. Remember, that all of your evaluations will remain confidential!!

1. Please evaluate your skater's OVERALL TECHNICAL PERFORMANCE during the past 2 weeks

Needs Improvement							Excellent
1	2	3	4	5	6	7	

2. Please evaluate your skater's OVERALL SPINNING PERFORMANCE during the past 2 weeks

Needs Improvement							Excellent
1	2	3	4	5	6	7	

3. Please evaluate your skater's OVERALL ARTISTIC PERFORMANCE during the past 2 weeks

Needs Improvement							Excellent
1	2	3	4	5	6	7	

If your skater has been working on a new technique, or on new elements, please inform us of this on the back of this sheet. We are interested on what you are working on and for how long. As you know, learning new techniques or new elements will affect overall performance levels.

Appendix I

Competitive Performance Assessment Form

**Competitive Performance Assessment Form
(Coach's Evaluations of Competitive Performance)**

Your Name _____ Date _____

Your Skater's Name _____

(* if you have more than 1 skater participating, please do a separate evaluation for each skater throughout the experiment)

The Name of the Club that you Coach at

*We are interested in your evaluation of your skater's competitive performance today. We are interested in 3 different aspects of PERFORMANCE : **technical performance, artistic performance and spinning performance.** Please use the scales below to indicate the degree to which you evaluate each of the 3 performance aspects. Refer to the evaluation system which the Canadian Figure Skating Association utilizes for judging figure skating performance when you evaluate your own skater's performance. **This is neither a test nor an evaluation. Therefore, there are no right or wrong answers.** We are simply interested in your honest and truthful evaluations. Remember, that all of your evaluations will remain confidential!!*

1. Please evaluate your skater's COMPETITIVE TECHNICAL PERFORMANCE during today's competition

<u>Needs Improvement</u>							<u>Excellent</u>
1	2	3	4	5	6	7	

2. Please evaluate your skater's COMPETITIVE SPINNING PERFORMANCE during the today's competition.

<u>Needs Improvement</u>							<u>Excellent</u>
1	2	3	4	5	6	7	

3. Please evaluate your skater's COMPETITIVE ARTISTIC PERFORMANCE during the today's competition.

<u>Needs Improvement</u>							<u>Excellent</u>
1	2	3	4	5	6	7	

*If your skater has been working on a new technique, or on new elements, please inform us of this on the **back of this sheet.** We are interested on what you are working on and for how long. As you know, learning new techniques or new elements will affect competitive performance levels.*

Appendix J

Ethics Approval



Université d'Ottawa • University of Ottawa

Faculté des sciences de la santé
Cabinet de la doyenne

Faculty of Health Sciences
Office of the Dean

March 20, 1997

Student Kavita Prakash
Professor Diane Ste-Marie
School of Human Kinetics
Faculty of Health Sciences
University of Ottawa
Montpetit Hall
INTRA

Subject: Your project entitled "Examining the relationship between various measures of stress and performance in pre-novice competitive figure skaters"

Dear Student and Dear Professor:

It is my pleasure to inform you that the Faculty of Health Sciences, Human Research Ethics Committee, after study of the documentation provided, concluded that your project met the appropriate standards of ethical acceptability and falls within **CATEGORY 1A** but requires minor modifications:

General Information Form

Add "I am conducting a masters thesis research".

Information sheet for figures skaters and the Consent Form

Should have a title identifying parents and not skaters.

Revise all the letters.

I hereby attach a copy of the certificate of clearance granted by the University Human Research Ethics Committee.

This certificate is valid for a period of one year from the time of issuance. I would also like to remind you that, in accordance with the policies of the UHREC, it is your responsibility to notify the Committee of any major changes in this project.

On behalf of the Committee, I wish you success in your project.

Sincerely,

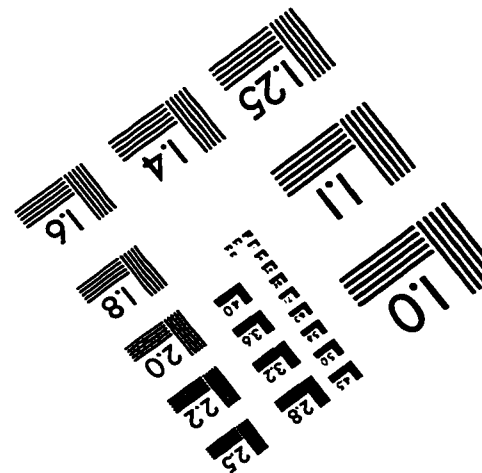
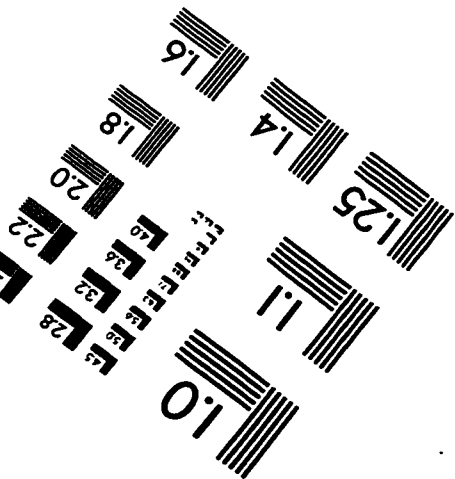
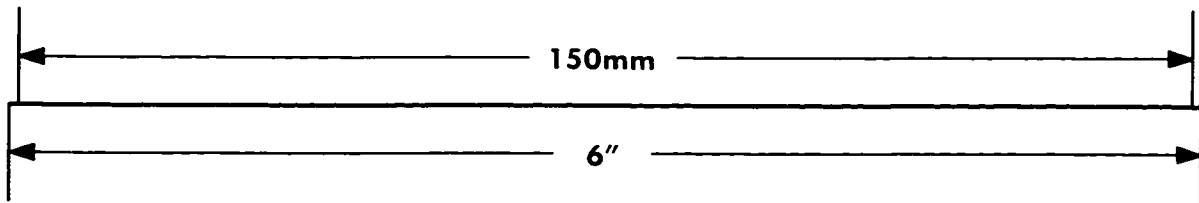
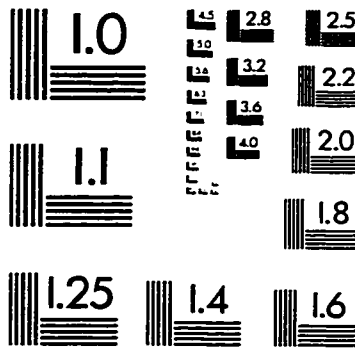
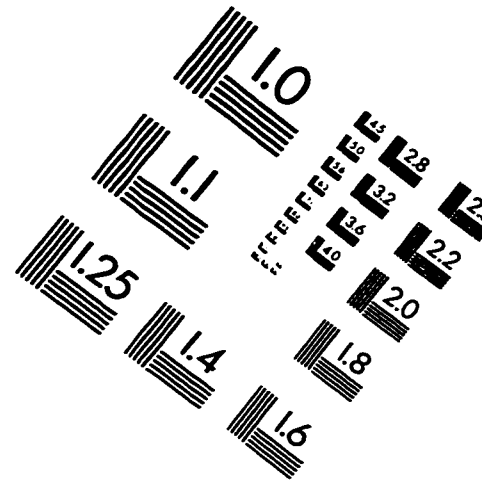
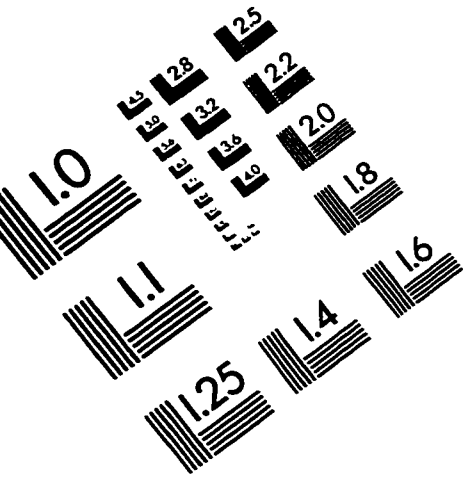
J. Roger Proulx, Ph.D.
Chair, Human Research Ethics Committee

451, ch. Smyth
Ottawa (Ontario) K1H 8M5 Canada

451 Smyth Rd.
Ottawa, Ontario K1H 8M5 Canada

(613) 562-5432 • Téléc./Fax (613) 562-5437

IMAGE EVALUATION TEST TARGET (QA-3)



APPLIED IMAGE, Inc
 1653 East Main Street
 Rochester, NY 14609 USA
 Phone: 716/482-0300
 Fax: 716/288-5989

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