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**Explanatory Perspectives of Enjoyment During Deliberate Practice Sessions
for Competitive Swimmers of Varying Levels of Expertise**

by
Garry Watanabe

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**

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University of Ottawa
2000**

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ABSTRACT

The Ericsson framework (1996) for the acquisition of expertise describes deliberate practice as the most relevant training for the improvement of performance within a domain of expertise. The framework describes deliberate practice as highly relevant, highly effortful forms of training that are inherently non-enjoyable. Contrary to the framework, which was based upon studies from the domain of music, subsequent studies seeking to apply the framework in the domain of sport (Starkes et al, 1996; Helsen et al., 1998; Young & Salmela, 1998) found that many subjects described highly relevant, highly effortful forms of practice to be enjoyable. Following the findings of previous deliberate practice studies in the sport setting, this study sought to seek out swimmers who were currently training and who described deliberate practice as being enjoyable and to discover the sources of this pleasure. A questionnaire was administered to 237 male and female competitive swimmers from three different performance groups to identify how they rated swimming specific deliberate practice activities regarding the relative relevance, effort, concentration and enjoyment of each. Subsequently, 18 subjects who had rated deliberate practice as enjoyable, were interviewed regarding the nature of their enjoyment of the deliberate practice. The results indicated that enjoyment of deliberate practice came from several different perspectives, the two most frequent ones, challenge and mastery, were related to the actual performance of the activity. The next two, results and social contacts, concerned the outcome and the context of performing the deliberate practice activities. These findings are in contrast to Ericsson's original conception and indicate that many highly relevant and effortful deliberate practice activities are also enjoyable in sport. Future research needs to determine why these enjoyment perspectives

emerged during sport-related practice and to determine if they are tied to the performance or developmental level the of athletes. Another direction for future research might be to devise and test the effectiveness of strategies to teach these enjoyment perspectives to athletes to make practice more pleasurable.

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CHAPTER I

INTRODUCTION

A substantial body of research suggests that elite performers require more than 10 years or 10,000 hrs. of practice to acquire the necessary skills and experience to perform at the elite level. Based on work with musicians, Ericsson, Krampe, and Tesch-Römer (1993) presented a strongly environmentalist theory known as the theoretical framework of deliberate practice in which inherited traits are believed to be minimal and expert abilities within a domain are acquired almost exclusively through demanding practice activities known as deliberate practice (DP). According to this framework, DP consists of highly effortful, inherently non-enjoyable training activities that are highly relevant to the skill demands of a domain.

Although the DP framework was based upon work with musicians, Ericsson et al. (1993) had considered and discussed the application of the framework to the domain of sport. Indeed, shortly afterward, a number of researchers (Helsen, Starkes & Hodges, 1998; Hodges & Starkes, 1996; Young & Salmela, 1998) tested the framework with athletes from several different team and individual sports.

On several matters the sport studies confirmed the finding of the music studies. First of all, the sport studies, like the music studies, confirmed a monotonic relationship between level of expertise and the accumulated amount of practice. Second, the sport studies also confirmed that practice tasks that are highly relevant to the skill demands of the domain, seem to improve sport performance. However, the sport studies also revealed some differences in the nature of DP in the sport domain as compared to the

domain of music. The first of these differences related to the issue of whether or not DP was by its very nature, inherently non-enjoyable.

According to Ericsson's framework, DP, presumably due to its demanding nature, was inherently non-enjoyable. While this aspect of DP was supported by the research with musicians, researchers in the sport-related studies found that athletes rated certain highly relevant and highly effortful activities, in fact, to be enjoyable. This raised two issues. The first issue was, whether these highly relevant activities requiring high amounts of effort ought to be considered to be DP despite the fact that their enjoyable nature placed them outside the criterion set by the DP framework? The second issue was, irrespective of whether or not these practice activities fell within the DP framework, what is it about the nature of these sport-related practice activities which makes them enjoyable to athletes despite their highly specific, highly demanding nature? While several studies on deliberate practice in the domain of sport have noted the existence of DP-like activities that are rated by performers as being highly enjoyable, this author is not aware of any research which seeks to explain these high enjoyment ratings.

Purpose of the Study

The purpose of this study is twofold. First this study will continue the research on whether or not the characteristics of practice in sport suggest the need for a sport-modified DP framework. Second, this study will investigate the nature of the enjoyment that athletes claim they experience when performing sport-related DP.

Significance of the Study

Given that it takes a minimum of 10 years or 10,000 hrs. of DP for a person to acquire the necessary skills to be able to achieve expert level performances in a skill

domain, one of the most significant hurdles faced by a would-be expert is maintaining sufficient motivation to complete the necessary amount of training. Certainly, if athletes enjoy practice they are more likely to perform the necessary amounts to achieve expert-level abilities than if they find practice to be non-enjoyable. The information that this study provides regarding the enjoyment of practice activities may suggest strategies that can be used by athletes and coaches to make training more enjoyable. This would provide an additional tool for athletes and coaches to use as they follow the difficult path to developing in an athlete, the capacity to perform at an expert level.

Limitations of the Study

Participation in this study was limited to registered athletes in the sport of competitive swimming who were training with clubs or teams within the continental United States and Canada. This suggests two possible limitations. First, the nature of swimming is that all training performed by athletes is performed within the context of a highly structured team practice. Due to time and facility constraints, it is likely that little, if any, training occurs outside of the structured practice sessions. In many other sports, it is possible, or even expected, that athletes will perform some of their training outside of regularly scheduled practice sessions. Accordingly, there will tend to be less variation from swimmer to swimmer, in terms of the amount of practice performed. Also, it is possible that, because the practice schedule is consistent and predictable, that swimmers will tend to provide more accurate practice estimates than athletes in many other sports. Thus the results of this study may not be applicable to other sports.

In addition, due to differences in cultural norms, educational systems, sport systems, access to facilities, funding for programs, and differences in the number and

variety of alternative activities, the results of this study may not be applicable to athletes from outside the United States and Canada.

In terms of the skill level of the participants, all had achieved performances faster than 15% of the 1996 Canadian Olympic Trials Time Standard. Accordingly, the results may not be applicable to less accomplished or less serious athletes. Also, given that this study involves performers within the domain of sport, which has a significant physical component and as well as a high degree of social acceptance, the results should be applied with caution to other domains of expertise.

The use of a questionnaire to collect data rating the training activities along four dimensions was limiting in that it only revealed participants' subjective opinions as opposed to objective measurements. In addition, both the questionnaire and the follow-up interview data may have been influenced by the participants' desire to provide socially acceptable responses. Nickel (1976) determined that this tendency is particularly pronounced in younger subjects and the majority of the subjects in the present study were under the age of 18 years of age.

CHAPTER II

REVIEW OF THE LITERATURE

Although it is not yet clear what role inherited or innate characteristics have to play in determining if an individual becomes an expert at performing a particular activity, numerous studies now suggest that at least 10 years or 10,000 hrs. of practice, are a necessary but not sufficient condition, to performing at an expert level. This 10-year rule was first proposed by Simon and Chase (1973) and has subsequently been found to be relevant in domains as diverse as chess (Charness, Krampe, & Mayr, 1996), music (Bloom, 1985; Ericsson et al., 1993), art (Bloom, 1985); science (Bloom, 1985) and more recently, sports (Bloom, 1985; Kalinowski, 1985; Hodges & Starkes, 1996; Helsen et al., 1998; Young & Salmela, 1998)

The study in which Chase and Simon (1973) initially proposed the 10-year rule involved the cognitive assessment of the skill of memory retrieval within the game of chess. The results revealed that chess skills could only be acquired by performing chess related activities and led Chase and Simon to conclude that the characteristic skills of experts could only be acquired through practice within their domain of expertise.

Subsequent research by Bloom (1985) profiling the developmental history of expert performers in a number of domains revealed the significant role of the social context in the development of the expert performer. Bloom spearheaded a group of investigators who studied the developmental patterns of expert artists, scientists and athletes along with the roles that family and mentors or coaches played in their careers. The developmental profiles of these 120 expert performers revealed how the social context played a significant determining role in shaping the development of talented

performer across the early, middle and late stages of their careers. Bloom thus suggested that the situational context and the role of family, mentors and coaches overrode innate abilities possessed by the developing performer.

The Deliberate Practice Framework

Following the work of Bloom and colleagues, Ericsson et al. (1993) more closely examined the role of practice in the development of expert musicians. The investigators collected detailed information regarding the daily practice activities of expert violinists and pianists, all of whom had practiced the violin for more than 10 years. The expert musicians were divided into two groups, those who had achieved the highest level performances and those who were less accomplished. In addition, these two groups of expert performers were compared with a group of amateur musicians of approximately the same age. Using retrospective recall of the performers' careers, the investigators were able to estimate each musician's amount of accumulated practice from the time they commenced playing their instrument until the date of the study. In the first part of the study, the musicians were asked to rate their practice and everyday activities according to three dimensions: relevance to improving performance, inherent enjoyment of the activity, and effort required to perform the activity. The results failed to identify any differences between the three skill groups in terms of their conceptions of the importance of practice. In other words, musicians from all three skill groups gave each of the practice activities similar ratings for relevance, enjoyment and effort. This suggests that differences in ability were not attributable to their perceptions of practice performed by the musicians in the three skill groups.

In the second part of the study, the musicians were asked to retrospectively estimate weekly amount of practice each year from the year they first took up playing their instrument until the age of 18 years. Analysis of the results indicated that differences in the amount of practice could be used to reliably predict the differences in skill level. By the age of 18 years of age, the “best” group of musicians had engaged in significantly more practice alone with the musicians than the “good” group. Furthermore, both the “best and “good” groups had significantly higher totals than the “amateur” group. Since all three groups started playing the violin at similar ages, the differences in total accumulated amounts of practice were attributed to differences in the weekly amounts of practice. Similar relationships between the amount of DP and the attained level of expert performance were found to exist other domains of expertise such as sport (Starkes et al., 1996) and chess (Charness, Krampe & Mayr, 1996).

Based upon their research Ericsson et al. (1993) proposed a framework of DP in which innate talent plays no role in the development of expertise. According to the DP framework, the amount of DP of relevant skills is the primary cause and therefore the most significant predictor of mastery over a task, whether it be in the field of chess, music, art, sport or scientific achievement. This framework essentially discounts any significant determining role of inherited characteristics in the development of the ability to perform a task at an expert level.

To examine both the reliability of recall and accuracy of practice estimates a secondary “diary study” was conducted with the subjects. In this secondary study, musicians recalled their practice and everyday activities for a recent “typical” week and then recorded, in diary style, their practice and everyday activities for a week. The

results of this secondary study revealed that subjects tended to overestimate practice amounts, perhaps indicating that the recall amounts were an indication of how much the subjects aspired to practice.

The framework describes DP as being highly structured, purposeful forms of practice that are highly relevant to improving performance in a domain and which are not inherently enjoyable (Ericsson et al., 1993). In addition, the practice is described as being designed to achieve specific goals and built into the practice are opportunities to obtain feedback and to correct errors in performance. The definition distinguishes DP from non-effortful, practice-like activities and from enjoyable or play-like activities in which the performer may accumulate hrs. of experience without acquiring significant skill development. The definition also distinguishes DP from work-like or volunteer work-like activities which lead to immediate monetary or social rewards.

DP in the domain of sport. Although the DP framework was not developed on the basis of sport research, Ericsson in several publications has used sport research by others to infer that the DP was applicable to the development of expertise in sport domains. (Ericsson, 1996; Ericsson & Charness, 1994; Ericsson et al., 1993; Lehmann & Ericsson, 1996). More recently Hodges and Starkes (1996) and Helsen et al. (1998) tested the DP framework in the domain of individual and team sports. The study by Hodges and Starkes (1996) looked at the individual sport of wrestling. The study compared “international” and “club” level wrestlers who had been wrestling for 10 or more years. In the first part of the study, the wrestlers were asked to rate a list of sport-related and everyday activities according to their relevance, enjoyment and physical effort, as well as adding a fourth dimension: concentration or mental effort. As was the case for Ericsson et al. (1993), the

results showed that both skill groups had similar mean rating scores for their perception of each of the four dimensions. This indicated that both skill groups had similar conceptions of practice activities according to the four dimensions and enabled ratings data for the two skill groups to be collapsed and analyzed as if it were acquired from one large group.

In the second part of the study the wrestlers retrospectively recalled weekly amounts of practice at the start of their careers and at stages three years apart up until the time of the study. As was done by Ericsson et al. (1993), to examine both the reliability and accuracy of the retrospective practice estimates, a secondary “diary study” was conducted with 10 subjects from the elite group and 11 subjects from the club group. In this secondary study, wrestlers recalled their training and everyday activities for a recent “typical” week and then recorded, in diary style, their training and everyday activities for a week.

The overall results of the retrospective recall study showed that “international” wrestlers devoted significantly more time to practice than did the “club level” wrestlers from as early as three years into their career. In addition, the differences in practice time between the two groups increased as wrestlers progressed into their respective careers. In terms of reliability of practice estimates, the secondary diary study revealed that there was a correlation of 0.66 for wrestling-related activities, with subjects tending to significantly over-estimate the amount of hours actually spent training.

While Ericsson et al. (1993) found differences in the skill groups between cumulative amounts of individual practice, Hodges and Starkes (1996) found there to be no significant differences between the cumulative amounts of individual practice for the

skill groups. Instead, there were differences in the cumulative amounts of group practice. This difference may be due to the fact that wrestling is an activity that requires the presence of an opponent and therefore, the most relevant training activities required the presence of others. Alternatively, this finding may simply reflect that both the expert wrestlers and violinists engaged in higher total amounts of practice than their less skilled counterparts, but for the wrestlers, there were more opportunities to practice with others while for the violinists there were more opportunities to practice alone.

Subsequent to the study with wrestlers, Helsen et al. (1998) replicated the results in a related study when they applied the DP framework to the development of expert athletes involved with team sports. In the first part of the study, international, national and provincial soccer and field hockey players recalled the amounts of time they spent in individual and team practice, sport-related activities and everyday activities from the start of their career and every subsequent three years. As in the Hodges and Starkes (1996) study of individual sports, a monotonic relationship between total amounts of combined individual and group practice and skill level was found. In addition, the authors found that at around nine years into their careers, the expert team-sport athletes showed steep increases in the amount of time spent practicing with a team.

In the second part of the study, the practice activities were rated in terms of their relevance for improving performance, inherent enjoyment and required effort and concentration. Similar to the finding of Hodges and Starkes (1996), no interactions were found between skill level and the ratings given. Therefore, due to the high similarity in the way activities were rated by all soccer players, further analyses were collapsed across performance groups. As was done by Hodges and Starkes (1996), Helsen et al. (1998)

calculated a mean rating for each activity and compared this to the mean rating for all activities along a particular dimension. In general, the results revealed that practice activities rated as highly relevant were also rated as requiring high concentration. The one exception, running, which was also rated highly relevant, was rated low on concentration but high on effort.

More recently, Young and Salmela (1998) applied the DP framework to the study of middle distance runners. In this study, Canadian middle distance runners were recruited and divided them into three groups: an elite group who had achieved 1996 Olympic Trials Provisional Qualifying Standard times, a group who had achieved times within 5% of this standard, and a group who had achieved times within 15% of this criterion time.

In the first part of the study, runners in the three groups rated running-related and everyday activities according to the same four dimensions of relevance, effort, enjoyment, and concentration used by Hodges and Starkes (1996). Similar to the findings of Hodges and Starkes (1996), Young and Salmela found that the ratings were very similar across skill groups. As a result, the decision was made to collapse the skill groups into one large sample for analysis.

In the second part of the study, the current and past levels of practice for the three skill groups were compared. A significant strength of the study was that the subjects' estimates of current and past practice were assisted by reviewing training logs rather than relying solely upon retrospective recall. Unlike some of the previous studies, Young and Salmela found no significant differences in amounts of practice between the three groups. This finding may reflect the fact that the comparison groups were all fairly close

in terms of level of performance and, therefore, any differences in practice amounts were too subtle to register a significant difference without using larger sample size or that the microstructure of the practice activities was different.

Alternatively, this finding may reflect the possibility that expert performers in previous studies overestimated their retrospective amounts of practice. In previous studies (Ericsson et al., 1993; Hodges & Starkes, 1996; Helson et al., 1998) the researchers found that a comparison of retrospectively recalled practice amounts with practice amounts as recorded in a diary revealed that the subjects tended to significantly overestimate the actual amount of practice. This reliability problem was addressed by Young and Salmela who had all of their subjects recall their respective practice amounts with the assistance of training logs for all of the years covered in the study.

Effort and concentration as components of DP. All of the DP studies in the domain of sport suggest that the original framework proposed by Ericsson et al. may require some modification within the sport setting. The first such modification, which was proposed by Hodges and Starkes (1996), involved evaluating the “effort” component of DP and splitting that component into two separate concepts, “concentration” to signify mental effort, and “effort” to signify physical effort. While it did not appear that musicians required this distinction when evaluating practice activities, all the previously mentioned sport-related studies found that athletes were readily able to distinguish between those activities that they perceived as requiring high amounts of effort as opposed to high amounts of concentration (Helsen et al., 1998; Starkes et al., 1996; Young & Salmela, 1998). Given the significantly physical nature of sport as compared to musical performance, this distinction is not surprising. However, this does create an

issue as to determining whether these two concepts should only fit into the DP framework, or into a sport-modified DP framework which is only applicable to practice and performance within the domain of sport.

On the one hand, given that concentration seems to relate more closely to what the musicians perceived as effort, it could be argued that only the concentration dimension and not that of physical effort should be central to the definition of DP. On the other hand, given the physical demands of sport, it seems clear that if athletes did not perform practice activities which required great physical effort, they would not undergo the long term developmental physical adaptations necessary for the achievement of expert performance as athletes. There certainly is an argument to be made that both dimensions should be a part of the DP framework within the sport setting.

The issue then becomes whether an activity should be categorized as being DP if it requires either high mental concentration or high physical effort, or if it should only be categorized as DP if it requires a high amount of both. On the one hand, demanding that activities be rated highly in terms of both physical and mental “effort” in order to be considered to be DP may raise the threshold too high and exclude some pertinent practice activities. On the other hand, allowing the inclusion of activities which are rated highly in terms of only one dimension, may dilute the definition and allow virtually every sport-related practice activity to meet this definition.

For the purposes of this study it was decided to choose a more inclusive framework and define training activities as DP if they were rated highly in terms of relevance and either effort or concentration. This decision was made for several reasons. First, previous studies involving DP and sport found that athletes were readily able to

distinguish between the two concepts of physical versus mental “effort” which indicates that the demands of sport and practice in sport may, from time to time, require either effort or concentration alone.

Second, in the earlier DP studies with chess players and musicians, since there was only the dimension of “effort” which corresponds with “concentration”, activities in the chess and music studies were essentially being identified as DP if they were rated high in terms of relevance and “concentration” without regard to any physical demands of the practice activity. This being the case, it is likely that many of the DP activities from the music studies (Ericsson et al., 1993; Krampe, 1994) would not have qualified as being DP under a more restrictive criterion which required both mental concentration and physical effort. This result simply would not make sense. The answer to this, of course, is to point out that music has no obvious physically demanding component to its performances and, therefore, physical effort has no place in practice. However, although sport is physical in nature, it is entirely possible that there are relevant skills which lead to success in the domain of sport, that are not physically demanding.

It may well be that the concentration aspect is central to the DP framework and that the presence or absence of the physical requirements of practice are largely irrelevant. However, since the realm of sport clearly has an additional and significant physical component that is not present in music or chess, it makes sense to expand the framework of DP to recognize the additional dimension of physical effort as being sort of a “brother” or “sister” dimension to mental concentration. In the absence of further research to clarify the distinction as to how “effort” and “concentration” work together as

part of the DP framework, this study cannot at this time justify making DP framework more restrictive by adding further criteria to the framework.

Enjoyment as a component of DP. The second proposed modification of the DP framework in the sport setting relates to the inclusion of “inherently non-enjoyable” as a criterion for a training activity to be considered to be DP. Ericsson et al. (1993) argued that DP is not inherently enjoyable, but that individuals engaged in it as an instrumental means to improve their performance to attain the highest levels. In support of this claim, Ericsson et al. (1993) reviewed studies showing that individuals who abandoned their goal to compete in a domain, shortly thereafter, reduced their level of DP to that of other amateurs.

However, in each of the previously discussed DP studies in the sport setting (Helsen et al., 1998; Starkes et al., 1996; Young & Salmela, 1998), the researchers found that some of those activities that were rated most relevant and effortful were also judged to be most enjoyable. This creates an issue as to how to address those activities which athletes rate as being highly relevant, requiring high amounts of concentration or effort and at the same time as being highly enjoyable. If we strictly apply the DP framework proposed by Ericsson et al. (1993) then, any activities rated as being enjoyable cannot be considered to be DP. Yet the non-enjoyability dimension of the DP framework is in a sense fundamentally different from the other three dimensions. After all, the fundamental essence of DP is that it improves performance. It makes sense that practice activities would have to be highly relevant to the skill demands of a domain and that these practice activities would have to be executed with high amounts of concentration or effort to bring about performance improvements. In contrast, it is not evident, at face

value, that activities would have to be non-enjoyable to the performer to bring about performance improvements. It does, however, seem to follow that performing highly specific tasks requiring high amounts of effort or concentration would tend to be non-enjoyable, but there is no compelling reason to suggest that this would necessarily be the case in all circumstances.

Support for this position comes from the fact that sport is, at its essence, a recreational activity. Sports are “played” not performed and most people start and continue playing a sport because they enjoy doing so. There may in fact be components of sport and sport practice for which the enjoyment to the athlete cannot easily be diminished even by significant amounts of regimented repetition. Additional support for this position can be found in the results of the DP studies that have been performed within sport setting (Helsen et al., 1998; Hodges & Starkes, 1996; Young & Salmela, 1998). Each of these sport-related studies found that there were some practice activities that were rated as being highly relevant and highly effortful, while at the same time being highly enjoyable.

Sport-modified DP framework. The previously discussed findings led Young and Salmela (1998) to recognize the contentiousness of including the dimension of enjoyment dimension of DP in the domain. Indeed, Young and Salmela questioned whether the enjoyment dimension could be transferred across domains, i.e., from music to sport, and proposed a multi-dimensional or sport-modified definition of DP that either eliminated considerations of enjoyment or else recognized the inherent enjoyment of some of the most relevant and effortful practice. Based on findings of these previous studies, this sport-related study will utilize a sport-modified DP framework which classifies activities

as DP if they are found to be highly relevant and highly effortful or requiring high amounts on concentration, but without consideration as to whether or not those activities are enjoyable.

The Nature of Enjoyable DP

Even though this study will not consider the dimension of enjoyment when assessing whether or not practice activities can be classified as DP, it will investigate the fact that within the domain of sport, athletes have been found to perceive some highly relevant and highly effortful activities to be enjoyable despite their demanding nature. Given the enormous amounts of practice required in order to achieve expert performance, probably the biggest constraint to athletes achieving expert performance is for an athlete to find the necessary motivation to perform sufficient DP in order to achieve expert abilities. Thus, determining whether or not athletes truly enjoy training activities and if so, the nature of that enjoyment, has tremendous relevance to determining how and why excellence is achieved in sport.

Enjoyment and sport commitment. This important relationship between the motivation to perform high amounts of DP and the effects of performing high amounts of DP was discussed by Helsen et al. (1998) who related sport enjoyment under Ericsson's framework of deliberate practice with sport enjoyment under Scanlan, Simons, Carpenter, Schmidt, and Keeler's (1993) sport commitment model. According to the sport commitment model (Carpenter, Scanlan, Simons, & Lobel, 1993; Scanlan et al., 1993a, 1993b) the decision to stay with a sport, and perform the requisite DP, is a consequence of an athlete's commitment. Commitment, in turn, derives from several factors including: sport enjoyment, involvement alternatives, personal investments, social

constraints and involvement opportunities. Of these factors, sport enjoyment, personal investment and, to a lesser degree, involvement opportunities explain more than 68% of commitment variance.

The fact that participation in sport involves significant amounts of time spent in training as opposed to competition suggests that the sport commitment model views practice for sport as being inherently enjoyable. This would directly contrast with the deliberate practice framework which looks at practice for sport as being inherently non-enjoyable. This apparent contradiction caused Helsen et al. (1998), to propose that either Ericsson's DP framework under-estimates athletes' enjoyment of practice, or the enjoyment of sport as seen by Scanlan and colleagues, comes almost exclusively from performance and not practice. In either case, it is evident that whether or not athletes enjoy practice has tremendous relevance as to whether or not an athlete will achieve expert performance capabilities in their sport.

Explanatory perspectives of enjoyment of DP. In considering the question: "Why do athletes rate certain DP activities as being enjoyable?" it is helpful to consider the question in two parts. First, do the athletes actually enjoy the DP itself or is it some other aspect related to performing the DP that they enjoy? Second, if athletes actually enjoy DP, what is the nature of that enjoyment and can it be facilitated in other activities? In addressing these questions, a number of perspectives will be addressed which might explain either why non-enjoyable activities might be rated as being enjoyable, or why highly demanding activities might be perceived as being enjoyable.

The following discussion of the explanatory perspectives is essentially divided into two parts. The first part of the discussion will look at the possibility that the athletes

might not actually find the DP activities to be enjoyable and yet rate them as such. To put it another way, the first part will look for “false enjoyment”, where the true source of enjoyment stems from a source separate from the actual performance of the DP activity. The second part of the discussion, will look at the possibility that the athletes truly enjoy performing some DP activities that are a part of their training. Put in another way, the second part will look for the “true enjoyment” where the source of enjoyment is an integral part of the training activity.

“False” enjoyment of DP. The perspectives discussed under this heading relate to athletes perceiving enjoyment for a source external to the performance of the practice activity itself. The first such explanatory perspective relates to athletes rating training as being enjoyable when, in fact, what they actually enjoy are the results of training - usually in the form of improved performance.

In a study into sources of enjoyment in elite figure skating, Scanlan, Stein and Ravizza (1989) found that two of the four major sources of enjoyment by athletes in that sport related to the results of practice as opposed to enjoyment of the practice activity itself. The first results-oriented source of enjoyment involved social and life opportunities that resulted when an athlete experienced and success in the sport. For example, many athletes indicated that as a result of their athletic success, they enjoyed travel opportunities, they obtained access to special programs, and they received athletic scholarships to attend post-secondary institutions.

The second results-oriented source of enjoyment focused on the social rewards resulting from participation and success in sport. Many athletes indicated that they received enjoyable social recognition, both from their peers and from society at large due

to their athletic success. For example, some acquired a measure of “star quality” in the eyes of their peers as a result of having their athletic success reported by local media.

In the case of both results-oriented sources of enjoyment, the enjoyment was experienced after the training or practice had occurred. However, what may have happened is that the athletes recalled the training as being enjoyable through a process of retrospective interpretation. This would occur in the following manner. The athlete performs well and experiences enjoyable results. The strong performance was perceived as being due to training or practice. The athlete then generalizes the feeling of enjoyment to the training or practice believed to be responsible for the strong performance and resulting rewards.

If we take the sport that is the focus of the present study, competitive swimming, the goal of the sport is to swim a specific distance in a given stroke in the shortest time possible. If the swimmers can swim the distance faster than most other swimmers, they will win most competitions, they will have opportunities to travel, receive recognition from their peers and in the media for their accomplishments and may receive offers of athletic scholarships. Accordingly, any practice activity that the swimmers believe is making them faster will tend to be interpreted as being enjoyable. In particular, this would explain why athletes might rate those practice activities that they deem to be most relevant as also being the most enjoyable.

Under this paradigm, perceived enjoyment may be outcome contingent in that athletes will only tend to rate training as being enjoyable if they evaluate their performance during or after practice as a reflection of a successful training session. Although the athletes may enjoy increased social recognition, social opportunities or life

opportunities, in the end, all the possible outcomes relate back to the perceived performance improvements resulting from practice. Because this perspective rates the results of training rather than the training itself, this perspective will be labeled the “Results Perspective”.

Second, it is possible that athletes rate perceived physiological effects of training, rather than the training itself as being enjoyable. For example, in the sport of running, several studies have suggested that endorphin addiction might provide a physiological explanation for the high enjoyment ratings of hard training activities. This was initially suggested by Dishman (1982) and later by Sachs (1991) to explain enjoyment of practice sessions by runners. The investigators speculated that runners become addicted to or dependent upon their exercise experiences. Researchers found that following bouts of sustained vigorous exercise, various chemical changes in the body such as the elevation of endorphin levels seem to result in positive shifts in mood (Dishman, 1982; Markoff, Ryan, & Young, 1982). Dishman theorized that as runners continue to train, they develop a tolerance for these chemicals and a corresponding increased threshold for the subjective “runner’s high”, and there is a resultant increased severity of withdrawal symptoms following the conclusion of the training. Swimming practice, similar to running, consistently makes great physical demands which will likely trigger endorphin release. Thus, it is possible that high enjoyment ratings of practice may in fact reflect enjoyment of the physiological effects involving endorphins and other naturally occurring chemicals in the body as opposed to the practice activity itself.

In a related effect, it is possible that psychological processes resulting from the experiences of hard training, may cause athletes to rate non-enjoyable training activities

as being enjoyable. Opponent-process theory (Hatfield, 1991; Solomon, 1977) theorizes that psychological processes interact dynamically such that an opposing or unpleasant state follows engagement in any pleasurable activity. According to this theory, athletes experience unpleasant withdrawal stressors following the termination of a physically demanding practice as they come down from their “endorphin high”. This experience suggests to the athlete that the preceding event, a demanding training activity, must have been an enjoyable experience.

The real difference between physical/chemical effects and the psychological effect is a matter of timing. The first effect concerns the chemically induced positive mood shift that immediately follows intense training. The second effect results in the negative withdrawal following the positive shift that occurs some time after intense training when the “chemically induced” changes begin to fade. Since both of the previously discussed perspectives relate to an “addiction” to the chemical result of hard training, these perspectives will be considered together and labeled the “Dependency Perspective”.

Another psychological effect provides the third perspective which might explain why athletes would rate highly relevant and effortful activities as being enjoyable. Cognitive dissonance theory (Festinger, 1957) suggests that the reported ratings may represent “expressed” rather than genuine perceptions of enjoyment. The athletes have voluntarily chosen to engage in long-term periods of highly effortful systematic training. It is possible that insufficient justification for the difficult and often painful training has compelled these athlete to inflate their ratings of enjoyment for the activities in to reduce uncomfortable feelings within this “Dissonance Perspective”. Because this perspective

will motivate the athletes to find acceptable justification for continued participation in the sport, it is likely that such athletes will inflate overall enjoyment ratings rather than specific ones. Thus, this perspective will not, by itself, explain any unusually high ratings of particularly difficult DP activities.

A fourth explanatory perspective which may explain “false” high enjoyment ratings of DP activities was suggested by Ericsson (1996). Ericsson noted that the DP activities in sports tend to involve social interaction. In Ericsson’s opinion, it was the social aspect of DP in sport that the athletes found to be enjoyable, as opposed to the practice itself. While this may be true, it is difficult to separate the social enjoyment of sport activities from other factors. Human beings are social creatures and sports activities are, for the most part, inherently interactive. Accordingly, many highly relevant DP activities may necessarily involve the presence of others and removing the social aspect would also be to reduce the relevance of the activity. Thus, it may be fair to say that athletes who are rating the social effects of DP activities as being enjoyable are rating an integral component of the DP itself as being enjoyable.

It is also important to note that in the study by Helsen et al. (1998) of elite soccer and field hockey players, many athletes rated certain technical practice activities performed totally alone to be highly enjoyable. Clearly such ratings cannot be explained by the social aspect of the sport setting. Nevertheless, while this “Social Perspective” cannot provide the complete picture, it may provide an explanation for some of the positive rating of DP activities.

A fifth possible explanation for the high enjoyment rating of DP activities was mentioned by Ericsson (1996) and proposed both by Scanlan et al.(1989) and by

Csikszentmihalyi (1990). This perspective relates to the phenomenon of “flow” or the complete immersion within and effortless mastery of an activity. Csikszentmihalyi (1990) indicated that the experience of flow during an activity is inherently enjoyable and that many individuals seek out flow experiences. It is possible that athletes who experience flow during training might recall training, in general, as being enjoyable as a result. This perspective can be termed the “Flow Perspective”.

On an initial assessment, flow experiences might seem to be more appropriately associated with “True Enjoyment” perspectives. However, the characteristics of flow are inconsistent with the demands of deliberate practice in terms of monitoring specific goals and providing opportunities for feedback and error correction. In addition, flow, which is effortless in nature, is fundamentally different from DP which, by definition, requires high physical effort or mental concentration. Thus, an athlete who rates practice as enjoyable due to experiencing flow during training sessions is perceiving enjoyment from a source other than the DP itself. Accordingly, the “Flow Perspective” will be examined in this study to determine if flow experiences might provide a “False Enjoyment” explanation for high enjoyment ratings of DP.

In order to counter the possibility that an athlete might rate training as enjoyable because of the perceived results of that training, Ericsson et al. (1993), as well as Starkes et al. (1996), instructed their subjects to try to disregard the consequences of the corresponding activity. An example provided by Ericsson (1996) was that rating the inherent enjoyment of cleaning one’s house should reflect the enjoyment of the actual activity (cleaning) and disregard the enjoyment of the outcome (a clean and attractive house). If these instructions are followed, this should have the effect of minimizing

athletes rating activities as being enjoyable due to “false enjoyment” reasons. Although it is not certain to what degree these instructions promote more accurate ratings, similar instructions will be provided to the participants in the present study in an effort to encourage athletes to rate the DP itself as opposed to any related results or effects.

As an additional step to encourage athletes to rate the DP itself, some of the interview sessions might be conducted while the athletes are actually performing the training activities rated to be highly relevant, effortful and enjoyable. Collecting data when the experience is fresh would permit the athletes to express what they are feeling at the time and before physiological and psychological effects come into play.

“True” enjoyment of DP. These perspectives relate to athletes inherently enjoying some aspect of practice activities as they are being performed. The two perspectives in this category are the remaining two of the four major sources of enjoyment found by Scanlan et al. (1989) in their study of elite figure skaters.

Scanlan et al. (1989) found that many of the athletes interviewed enjoyed the feeling of mastery that they experienced when practicing and competing in their sport. Because the athletes that were interviewed were all elite figure skaters, they were already at the top end of their sport and were aware of that fact. These athletes enjoyed knowing that they were very good at the sport and found that performing the key activities of their sport, whether during practice or during competition, was enjoyable to them. This enjoyment resulting from a feeling of mastery when performing practice activities will be labeled the “Mastery Perspective”.

The second of the “true” enjoyment perspectives and last of the four major sources of enjoyment found by Scanlan et al. (1989) relates to enjoying the physical

sensations related to performing the practice activities of their sport. A number of the skaters who were interviewed expressed that the movement sensation, the feeling of athleticism and the opportunity for self-expression all provided a source of enjoyment. Similar to the Mastery Perspective, this perspective views enjoyment as coming from the movement sensations in performing the practice activities at the moment that they are being carried out. This perspective, i.e., the enjoyment of the sensations associated with DP, will be labeled the “Sensory Perspective”.

Therefore, in an attempt at furthering the research into the enjoyment of practice in the domain of sport, this study will generate additional, complementary data regarding whether or not a sport-modified DP framework is appropriate. Also, this study will consider the nature of “enjoyable” DP activities and determine what it is about them, or the way that they are perceived by athletes, that makes them enjoyable despite their demanding nature. A number of possible perspectives exist which might explain why athletes might rate non-enjoyable DP as being enjoyable or, alternatively, why athletes might genuinely perceive highly-relevant, highly-effortful DP as being enjoyable. To date, while several studies in the sport setting have noted that some DP activities might actually be rated by performers as being highly enjoyable, this researcher is not aware of any which have done follow-up work to investigate and explain these ratings.

The purpose of this study is to attempt fill this gap regarding why some forms of sport-related DP seems to be enjoyable. If the nature of athletes’ enjoyment of sport-related DP can be determined, then it might be possible to use this information to shape training in such a way that a greater number and a wider variety of practice activities are perceived as being enjoyable. This would create a valuable tool, for athletes training for

expert performance and for the coaches of those athletes, to use when trying to provide motivation for the athlete to commit to performing the amount of practice necessary to achieve expert level abilities.

CHAPTER IV

METHODOLOGY

Participants

Two hundred and thirty seven Canadian and American competitive swimmers participated in the study. The participants were selected from 11 different swimming teams including six Canadian club teams, three American club teams, one Canadian university team and one American university team. The largest number of participants from any single team was 34 swimmers (14.3%) and the fewest number of swimmers from any single team was 11 swimmers (4.6%). The sample included 137 female (57.8%) and 100 male swimmers (42.2%).

Each participant voluntarily participated in the research following the administration of a letter of information and informed consent. Each participant was currently training for and competing in events in the sport of competitive swimming within the auspice of one of the following sport organizations: Swimming/Natation Canada (SNC), USA Swimming, the National Collegiate Athletic Association (NCAA), or the Canadian Inter-university Athletic Union (CIAU).

The participants were assigned to one of three performance groups based upon their personal performance over the previous 12 months of competition using the 1996 Canadian Olympic Trial Time Standard (the Standard) as the basis for separating the groups. The decision to divide the sample into three performance groups was made in order maintain some basis for comparison with previous sport-related DP studies (Helsen et al., 1998; Hodges & Starkes, 1996, Young, 1998), all of which used three performance groups formulated with similar criteria.

The Olympic Trial (OT) Group consisted of 64 swimmers (27% of the sample) who had achieved times equal to or faster than the Standard. The Less 5% Group consisted of 76 swimmers (32% of the sample) who had not achieved the Standard but who had achieved performances within 5% of the Standard. The Less 15% Group consisted of 97 swimmers (41% of the sample) who had not achieved times within 5% of the Standard but who had achieved times within 15% of the Standard. See Appendix A for the complete questionnaire package including the time standards.

Procedure

Contacting participants. The head coaches of the Canadian competitive and American competitive swimming clubs, as well as the Canadian and American university swim teams were contacted. During this contact, the nature of the study was explained and the participation and cooperation of athletes from their senior training group was requested. The senior training group was defined to the coaches as being those training groups where all or almost all of the swimmers had times that were at a minimum within 15% of the 1996 Canadian Olympic Trials Time Standard. Once agreement to participate in the study had been obtained, each head coach was mailed a copy of the Deliberate Practice in Swimming Questionnaire Booklet.

The Booklet consisted of three main components. The first component consisted of a letter to the head coaches, thanking them for their agreement to participate in the study, a brief written a written summary of the study and an action plan and time table for the head coaches to follow. The second component consisted of a letter to participants or their legal guardians explaining the study and a consent form to participate. The third component consisted of an athlete profile, a table of times for

placing athletes within performance groups, a list of swimmer training activities, and a chart for the participants to use to rate the training activities on a Likert scale anchored at 0 and 10. A copy of the Deliberate Practice in Swimming Questionnaire Booklet appears in Appendix A.

The head coaches contacted the researcher once they received the questionnaire packages in the mail and scheduled a date and time for the researcher to attend and administer the questionnaire. Based upon the results of a pilot study, the decision was made to have the researcher personally administer all the questionnaires to ensure that the training activities and the rating scales were all explained to the participants in a comparable manner. The head coaches were instructed to distribute copies of the explanatory letter and consent form two weeks before the questionnaire administration date to each member of the senior training group. The head coaches were further instructed to inform the prospective participants that the letter and consent forms were to be read by each adult participant or by the parent or guardian of each participant under the age of 18 years, and that only those swimmers who returned signed consent forms by the administration date would be permitted to participate in the study.

Administering the questionnaire. On the administration date, the researcher met with the head coach and all athletes who had returned signed consent forms. In each case, the questionnaire was administered on the pool deck or in a team meeting room immediately before or immediately after the afternoon practice for that day. The researcher instructed the participants to perform three steps. First, the participants were asked to determine the performance group in which they should be placed (OT, Less 5%, Less 15%). In all cases, participants were able to determine this quickly and easily. In

several instances the coach came to the administration session already having placed the athletes in the performance groups based upon each athletes "best times" achieved over the previous 12 months of competition. Second, the participants were asked to complete an athlete profile to collect basic background information as well as a contact phone number in case the athlete was selected for a follow-up interview. Finally, each participant was instructed to rate 19 different swimmer training activities in terms of relevance, effort, enjoyment and concentration on a scale anchored at 0 and 10.

As in the previous studies of DP in sport settings, the four dimensions were the activity's relevance to improving performance in the athlete's primary event, the effort required to perform the activity, how much the participant enjoyed the activity, and the concentration required to perform the activity. Effort was described as physical work required to perform the activity while concentration was described as the mental focus necessary to complete the activity. A rating of zero was to indicate the minimum possible amount of relevance, effort, enjoyment or concentration. A rating of 10 was to indicate the maximum possible amount of relevance, effort, enjoyment or concentration.

As an additional step to have participants focus on rating the enjoyment of the activity itself, following the format of Ericsson et al. (1993) and Starkes et al. (1996), participants were instructed, when rating the various training activities, to disregard the consequences of these activities. This instruction was clarified with an analogy to rating the enjoyment of the act of cleaning a house as opposed to the enjoyment of having a clean house after the cleaning had been performed.

Follow-up interviews. Once the participants rated the various activities, a preliminary analysis was conducted to identify DP activities. As discussed in the review

of literature, it was decided that, for the purposes of this study, activities would meet DP criteria if they were rated high in terms of relevance and either effort or concentration and that the enjoyment rating would not be considered. Once a list of DP activities had been compiled for each performance group, a second list was then compiled of participants in each performance group who rated one or more of the listed DP activities as highly enjoyable.

Participants were selected from this list for one-on-one interview sessions to probe into the source and the nature of the enjoyment of the DP activities. In order to assist the participants' recollection of their enjoyment of training activities, some of the interview sessions were conducted during practice, while the athletes were performing the DP activities that they had rated as being highly enjoyable. It was believed that by soliciting the participants' thoughts while the activity was being performed or very shortly afterward, the participants would be better able to express what they were feeling at the time and before their perspectives could be altered by any physiological and psychological effects

Instruments

List of swimmer training activities. In order to identify DP activities it was necessary to first develop a list of swimmer training activities. To produce the list, six swimming coaches were contacted and requested to list all of the training activities that they currently or in the past have had swimmers perform in the course of a season. All six coaches had a minimum of five years of experience as full-time competitive swimming coaches and four of the six coaches had at least 10 years of experience. The list of coaches included: one coaching at the University level in the United States, one

coaching at the University level in Canada, two coaching at the Club level in the United States and two coaching at the club level in Canada.

The lists were collected, consolidated and then re-distributed to the coaches for feedback. Based upon this feedback a master list of 22 training activities was prepared. Through pilot work with one club team and one university team, it was determined that two activities should be combined into one category and that two other activities ought to be eliminated as they were not really considered to be “training” activities by a significant majority of the swimmers participating in the pilot study. The result was a comprehensive list of 19 swimming training activities which, in the opinion of six coaches and over 30 swimmers, contained a sufficient number of categories which comprehensively described all training activities that might be performed by competitive swimmers. The list of training activities and the chart for rating each of the activities along the dimensions of relevance, effort, enjoyment and concentration are included as part of the Deliberate Practice in Swimming Questionnaire Booklet (Appendix A).

Follow-up interview guide. An interview guide was developed for the follow-up interviews with those participants who rated DP activities as being enjoyable to probe if the athletes truly enjoyed the DP itself as opposed some results or consequence related to the performance of DP. In addition, the interview guide was designed to probe the athlete’s perceived enjoyment of DP from each of the explanatory perspectives discussed in the review of literature. The format for the interview guide including the use of descriptive probes, clarification probes, contrast probes and authenticity probes was modeled after the form of interview guide used by Partington (1995) in his study

involving the development of talented musicians. The Follow-up Interview Guide appears in Appendix B.

Data Analysis

Biographical data. The first step in the analysis was a side by side comparison of the biographical data of the swimmers from the three performance groups to see if any patterns emerged which differentiated the profile of one group from the next.

Ratings data. The second step was to analyze the ratings for the 19 swimmer training activities by the three performance groups (OT, Less 5%, Less 15%) and by the four dimensions (relevance, effort, enjoyment, concentration) using a multivariate analysis of variance (MANOVA) to determine any significant differences in the ratings of the training activities among the three performance groups. In addition to identifying any general differences among the groups, the results of the MANOVA were used to determine if the three performance groups had similar conceptions of practice according to the four dimensions and, accordingly, if it was possible to collapse the ratings of all three groups into one large group for analysis.

In previous studies into the nature of DP involving more than one performance group (Helsen et. al., 1998; Starkes et. al., 1996; Young & Salmela, 1998) the investigators found no significant differences between the performance groups for activity ratings. All participants, regardless their performance group, tended to rate all particular activities in a similar manner. Because there were no differences amongst performance groups, those studies were able to collapse the practice activities across performance groups and treat all the participants into a single group for the purpose of the identification of DP activities.

Identification of DP. The third step in the analysis was to compare the ratings of each activity along the four dimensions in order to identify DP from the list of swimming training activities. Consistent with previous research (Helsen et al., 1998; Starkes et al., 1996; Young & Salmela, 1998), a grand mean of activity ratings was calculated for each dimension of relevance, effort, concentration and enjoyment for each of the three performance groups (Elite, Less 5%, Less 15%). Next t-tests were performed to compare the individual activity rating means to the respective grand mean for each dimension. Measures of significance were based on an adjusted alpha level calculated by dividing the significance level by the number of training activities, and therefore the number of t-tests performed. In other words, to be considered significant the value had to differ from the grand mean by $p < 0.05/19 = 0.026$ in order to be indicated as significantly different at $p < 0.05$.

Enjoyment interviews. Once the DP activities had been identified for each performance group, a list of participants was identified for each performance group who had rated the DP activities as being significantly enjoyable. This list was then randomized and participants were selected for follow-up interviews to probe the nature of each participants' enjoyment of the DP. Rather than set any particular number of interviews, the decision was made to continue conducting interviews until the content of the answers started to become repetitious or saturated, indicating that the enjoyment perspectives had been thoroughly probed. Following this format, follow-up interviews were performed with 18 participants.

CHAPTER IV

RESULTS

Biographical Data

For the overall sample, the mean age of the participants was 16.27 yrs. with the oldest swimmer in the sample being 28 yrs. of age and the youngest swimmer in the sample being 13 yrs. of age. The mean amount of experience in the sport was 6.87 yrs.. The mean number of practices per week was just under eight sessions. The mean duration of each practice was almost exactly two hrs. from start to finish. The mean amount of cumulative yearly practice was 653.56 hrs. The cumulative practice estimates ranged from a maximum of 1056 hrs. of practice per year to a minimum of 216 hrs. of practice per year.

The OT Group, the top performance group, consisted of 31 females (48.4%) and 33 males (51.6%). The mean age of swimmers in this group was 18.2 yrs. and the mean amount of experience was 9.1 yrs. of participation in the sport of competitive swimming. The amount of experience is just under the 10 year benchmark amount of time that the DP framework specifies is necessary in order to achieve expertise. The average swimmer in the OT Group was training 9.2 times per week for 2.0 hrs. per practice. The mean cumulative amount of practice for swimmers in this group was 798.8 hrs. per year.

Although in terms of experience, the swimmers in the OT Group had not quite performed the 10 years or 10,000 hrs. of practice necessary to meet the formal criterion specified by the DP framework, this researcher decided that the achievement of swimming faster than the OT Standard provided a compelling reason to accept the swimmers in the OT Group as being expert performers.

First of all, as previously discussed, training within the sport of competitive swimming occurs almost exclusively within the context of regular, highly structured, highly predictable practice sessions. Since there is almost no “optional training” whatsoever, swimmers are likely to be more accurate when estimating practice totals than participants in other sports or domains of expertise. Since previous studies acknowledged a clear tendency for expert performers to overestimate practice amounts (Ericson et al., 1993; Helsen et al., 1998) it is likely that the 10,000 hour rule is also, to some degree, overestimated.

Second, swimming performance take place within a very controlled environment. The length of the course, the height and shape of starting blocks, air temperature, water temperature, resistance (in the form of wind or water currents) are all extremely uniform from one competition to another. Accordingly, it is possible to judge the performances of each swimmer against the performances of any other swimmer. According to information provided by Swimming-Natation-Canada and USA Swimming, the national sport governing bodies of the subjects participating in the study, swimmers who had achieved the OT Standard had achieved performances which placed them within the top 2% of all registered competitive swimmers in the United States and within the top 1.5% of all registered competitive swimmers in Canada. Collectively, these considerations seemed sufficient to warrant categorizing the OT Group as “expert performers”.

The Less 5% Group, the middle performance group, consisted of 44 females (57.9%) and 32 males (42.1%). The mean age of swimmers in this group was 16.3 yrs. and the mean amount of experience was 6.7 yrs. of participation in the sport of competitive swimming. The mean number of training sessions for swimmers in this

group was 7.6 practices per week. The mean practice duration for swimmers in this group was 2.0 hrs. per practice. The mean cumulative amount of practice for swimmers in this group was 658.4 hrs. per year.

The Less 15% Group, the lowest performance group, consisted of 62 (63.9%) and 35 males (36.1%) The mean age of swimmers in this group was 15.0 yrs. and the mean experience level was 5.6 yrs. of participation in the sport of competitive swimming. The mean number of training sessions for swimmers in this group was 6.7 practices per week. The mean duration of practice for swimmers in this group was 1.9 hrs. per practice. The mean cumulative amount of practice for swimmers in this group was 553.9 hrs. per year.

In comparing the three groups, some interesting patterns emerged. Although there were differences of over 100 hrs. of cumulative yearly practice between the Less 15% Group and the Less 5% Group and between the Less 5% Group and the OT Group, all three groups attended practices of fairly similar duration. The Less 15% Group averaged just under two hrs. per practice (1.93 hrs.) and both the Less 5% Group and the OT Group averaging just over two hrs. per practice (2.03 hrs.). The difference in the cumulative amount of yearly practice between the three groups relates almost exclusively to the frequency of the practices and the duration of the training season.

As might be expected we see that the age, experience and amount of practice increase as we compare the higher performance groups against the lower performance groups. However, what is interesting is that even though the difference in performance groups is greater between the Less 15 % Group and the Less 5% Group as compared to between the Less 5% Group and the OT Group (a 10% increase in performance versus as

Table 1

Comparison of the biographical profiles of the three performance groups including numerical and percentage increases from the lowest to the highest performance group.

	Less 15% Group	Less 5% Group	Numerical Increase	Percent Increase
Mean Age (Years)	14.98	16.31	+ 1.33	+ 8.9%
Mean Experience (Years)	5.58	6.68	+ 1.1	+ 19.7%
Practice Duration (Hours)	1.93	2.03	+ 0.1	+ 5.2%
Practice Frequency (Hours)	6.95	7.63	+ 0.68	+ 9.8%
Weekly Practice (Hours)	13.51	15.57	+ 2.06	+ 15.2%
Yearly Practice (Hours)	553.94	658.39	+ 104.45	+ 18.9%

	Less 5% Group	OT Group	Numerical Increase	Percent Increase
Mean Age (Years)	16.31	18.19	+ 1.88	+ 11.5%
Mean Experience (Years)	6.68	9.06	+ 2.38	+ 35.6%
Practice Duration (Hours)	2.03	2.03	+ 0.0	+ 0.0%
Practice Frequency (Hours)	7.63	9.21	+ 1.58	+ 20.7%
Weekly Practice (Hours)	15.57	18.72	+ 3.13	+ 20.1%
Yearly Practice (Hours)	658.39	798.81	+ 140.42	+ 21.3%

5% increase in performance), the difference in age, experience and amount of practice is greater between the Less 5% Group and the OT Group as compared to between the Less 15% Group and the Less 5% Group. In other words, the 5% performance increase between the Less 5% Group and the OT Group appears to be associated with greater

increases in practice than is associated with the 10% performance increase between the Less 15% Group and the Less 5% Group. This apparent association is not all that unexpected and in fact conforms with the standard performance gain curve.

Ratings Data

MANOVA. The results of the MANOVA revealed significant differences between performance groups for activity ratings $F(8, 236) = 12.84, p < 0.01$, between activities $F(72, 236) = 43.785, p < 0.01$, and between groups and activities $F(144, 236) = 2.827, p < 0.01$. This indicated that the three groups had different conceptions of practice in terms of the four dimensions and therefore the ratings could not be combined for analysis.

This difference in terms of the mean activity ratings between performance groups is a completely contrary to what was found by previous sport-related DP studies (Helsen et al., 1998; Hodges & Starkes, 1996; Young, 1998). While it is not clear why this difference was found in the present study and not in the previous studies several possible explanations for this discrepancy will be discussed in the Discussion Chapter.

In addition, the differences among the performance groups seemed to reflect similar patterns when comparing Relevance rating with Enjoyment ratings and when comparing Effort ratings with Concentration ratings. These patterns will each be discussed in turn.

Relevance and enjoyment. For the dimensions of Relevance and Enjoyment the Less 15% Group rated activities significantly higher than did the Less 5% Group. In addition, the OT Group rated activities significantly higher than both the Less 15% Group and the Less 5% Group. This information is displayed in the graphs in figures one and

two. Figure one is a graph of the mean relevance ratings for the 19 training activities by each performance group. A reference line is drawn across the graph marking the mean relevance rating of the training activities for the three performance group combined. Figure two is a graph of the mean enjoyment ratings for the 19 training activities by performance group. A reference line is drawn across the graph marking the mean enjoyment rating of the training activities for the three performance groups combined.

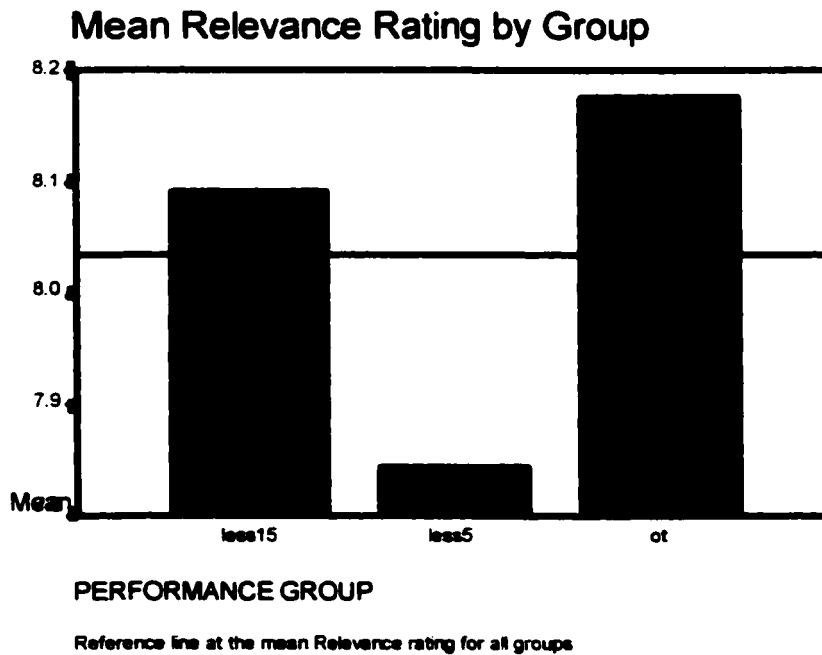


Figure 1. Graph of the mean relevance rating for the 19 swimmer training activities by each of the three performance

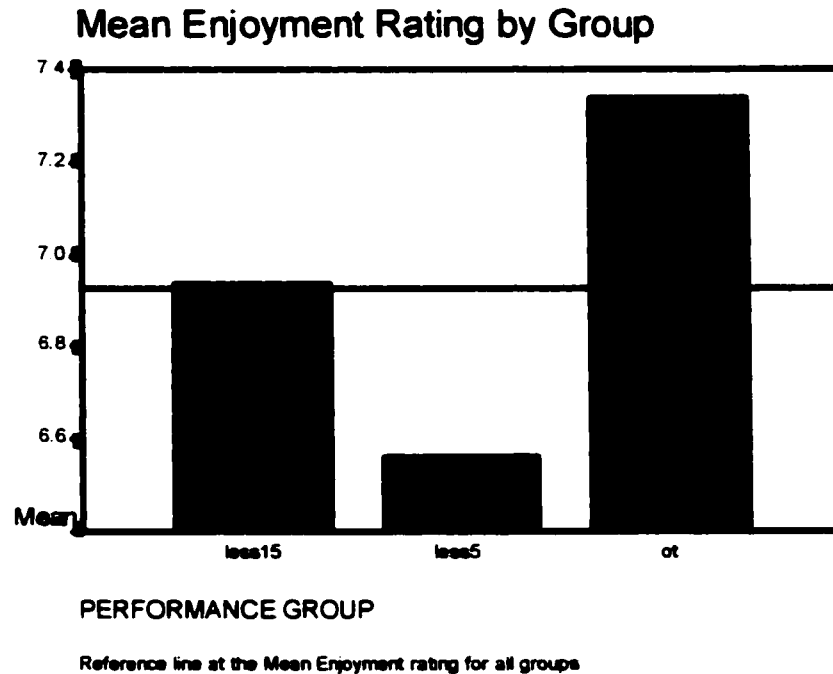


Figure 2. Graph of the mean enjoyment rating of the 19 swimmer training activities by each of the three performance groups.

The graphs clearly reveal how with both relevance and enjoyment ratings, as performance level increases, there is a significant decrease in the perceived relevance and enjoyment of training activities, followed by a significant increase in the perceived relevance and enjoyment of training activities.

Effort and concentration. For the dimensions of Effort and Concentration the OT Group rated activities significantly higher than both the Less 15% Group and the Less 5% Group. By contrast, the activity ratings for the Less 15% Group and the Less 5% Group did not differ significantly. Figures three and four are graphs of the mean effort and concentration ratings of the 19 training activities by the three performance groups. A reference line is drawn across the graphs marking the mean effort and concentration ratings of training activities for all three performance groups combined.

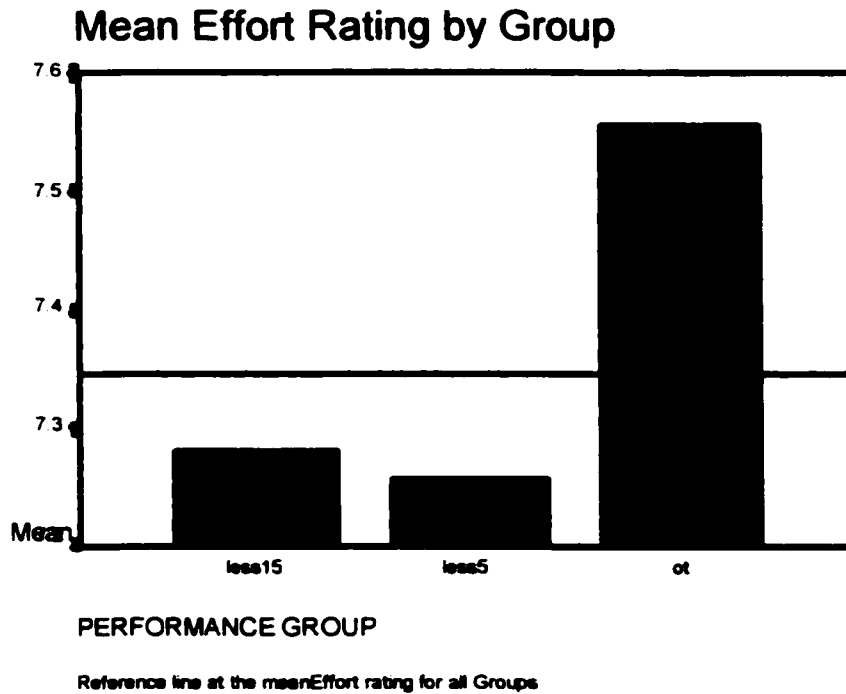


Figure 3. Graph of the mean Effort rating of the 19 swimmer training activities by each of the three performance groups

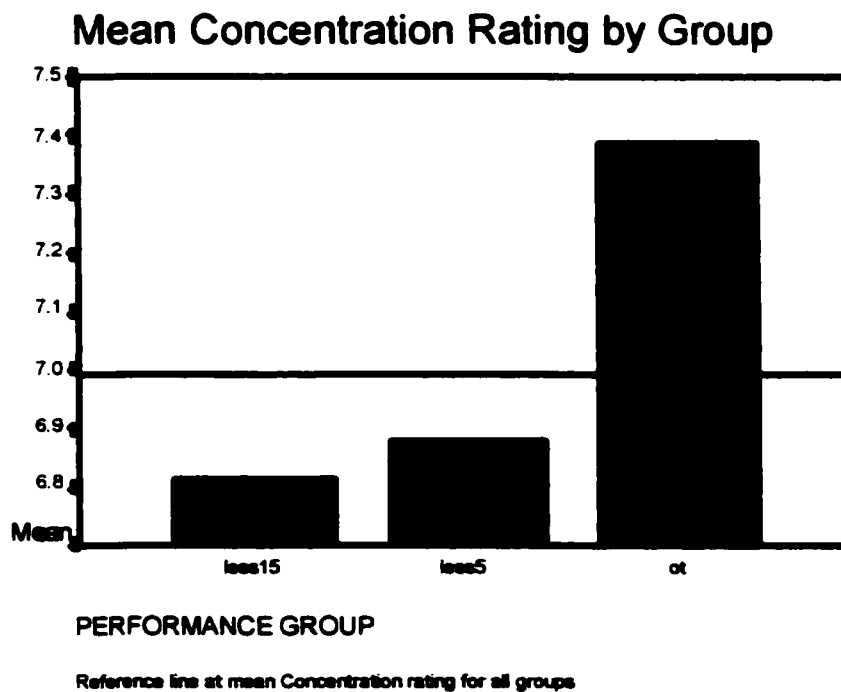


Figure 4. Graph of the mean concentration rating of the 19 swimmer training activities by each of the three performance groups.

The graphs reveal a pattern of rating training activities by each performance group that is remarkably similar for both the dimensions of effort and concentration. This seems to indicate that at lower performance levels, there is no difference in the way which training activities were perceived by swimmers. In each case, swimmers perceive practice activities as requiring moderate amounts of effort and concentration. By contrast the ratings indicate that those swimmers that achieve performances which place them within the top performance group, perceive training activities as requiring significantly higher amounts of effort and concentration.

Looking back, the biographical data revealed there to be a disproportionately large increase in the amount of practice versus the improvement in performance when the differences between the OT Group and Less 5% Group were compared against the differences between the Less 5% Group and the Less 15% Group. In a similar pattern, the ratings data reveals a disproportionate increase in the effort and concentration during training versus increase in performance when we compare the differences between the OT Group and the Less 5% Group against the differences between the Less 5% Group and the Less 15% Group.

Although the swimmers in the Less 5% Group were clearly faster than the swimmers in the Less 15% Group, an apparent 10% increase in performance, they were not practicing with a significantly higher degree of effort and concentration according to the ratings. In contrast, according to the ratings data, the swimmers in the OT Group though clearly faster than the swimmers in the Less 5% Group, an apparent 5% increase in performance, were practicing with significantly greater amounts of effort and

concentration according to the ratings. This data, on the face of it, suggests that some sort of practice-related law of diminishing returns is at play in which athletes have to keep increasing the quantity and the quality of their practice in to achieve higher and higher levels of performance.

Unfortunately, it is impossible draw any sort of conclusions on this issue from the ratings data in the present study since no data was collected or analyzed with respect to each participants actual performance times. In other words, while we know that the participants in the OT Group had achieved times in excess of the OT Standard, we do not know if any individual participant exceeded that standard by 1% or 5% for 50%. Similarly, while we know that the participants in the other two groups had achieved times within a range of performance standards, we do not know exactly where within that range the specific times fell. Nevertheless, the suggestion of the existence of a pattern, indicates that further research might be warranted to determine of whether there is any rule with respect to the increase in the amount of practice (cumulative hrs. of practice) and in the quality of practice (effort and concentration ratings) necessary to achieve certain performance improvements.

Identification of sport-related DP. The intent in having the athletes rate the training activities along the four dimensions was to identify sport-related DP activities for use in further analysis. In the original study into the nature of DP Ericsson et al. (1993) specified that in order to be considered DP activities had to be highly relevant, highly effortful and significantly non-enjoyable. As discussed in the review of literature, for the purposes of this study it was decided to classify training activities as DP if they received significantly high ratings for the dimensions of relevance and either effort or

concentration (DP Criteria). It was also decided that enjoyment ratings would not be considered when determining whether or not a training activity fit within the DP framework. For a complete list and descriptions of the 19 swimmer training activities refer to Appendix A. In the discussion that follows, activities will be referred to as being “highly relevant”, “highly effortful”, “highly enjoyable” or requiring “high amounts of concentration” when the mean rating for that activity is significantly higher than the mean rating for all 19 training activities.

OT Group DP. For the OT Group, Racing was rated the most relevant and enjoyable activity and the one requiring the most concentration. Lactic was rated as being the most effortful. Five activities were rated by OT Group participants as being highly: Racing, Drills, Skills, Lactic and Alactic training. Six activities were rated as being highly effortful: Racing, VO2 Max, Lactic, Cross-Training, Free Body and Alactic training. Four activities were rated as being highly enjoyable: Racing, Alactic, Equipment and Skills training. Finally, five activities were rated as requiring high amounts of concentration: Racing, Skills, Mental, Drills and Strategy training.

Applying the sport-modified DP framework to the ratings for the OT Group produced five activities which were classified as DP: Racing, Drill, Skills, Lactic and Alactic training. Of those five activities, three of them, Racing, Alactic and Skills training were rated as being significantly enjoyable while none were rated significantly low in terms of enjoyment.

Table 2

OT Group mean activity ratings by the four dimensions of the DP framework
All activities are rated on a scale anchored at 0 and 10.

ACTIVITY	Relevance	Effort	Enjoyment	Concentration
Basic End	7.84	6.50 ^L	4.90 ^L	5.98 ^L
Threshold	8.08	8.27 ^H	6.02	6.81
VO2 Max	8.38	9.17 ^H	6.64	7.66
Lactic	8.89 ^H	9.33 ^H	8.08	7.91
Alactic	8.77 ^H	8.80 ^H	9.19 ^H	7.83
Kicking	7.23 ^L	7.06	6.11	4.47 ^L
Pulling	7.56 ^L	7.09	7.39	6.08 ^L
Drills	9.23 ^H	7.09	7.19	8.73 ^H
Skills	8.91 ^H	7.16	8.55 ^H	9.19 ^H
Equipment	7.43 ^L	6.92	8.67 ^H	6.95
Strategy	8.23	6.99	6.53	8.61 ^H
Race	9.55 ^H	9.31 ^H	9.34 ^H	9.48 ^H
Coach	8.11	5.78 ^L	7.59	7.80
Video Review	7.44	5.28 ^L	7.97	7.98
Flexibility	7.73	7.50	5.77 ^L	6.80
Free Body	8.36	8.36 ^H	6.73	6.83
Weights	7.92	7.95	7.77	6.83
Cross Training	6.83 ^L	8.45 ^H	7.77	5.42 ^L
Mental	8.80	6.44	7.30	8.94 ^H
OVERALL	8.18	7.55	7.34	7.39

Table 3

OT Group activities with significantly high ratings by the four dimension of the DP framework, ranked in order from the highest to lowest rated activities - All activities are rated on a scale anchored at 0 and 10.

RANK	Relevance	Effort	Enjoyment	Concentration
1	Race	Race	Race	Race
2	Drills	VO2 Max	Alactic	Skills
3	Skills	Lactic	Equipment	Mental
4	Lactic	Cross Training	Skills	Drills
5	Alactic	Free Body		Strategy
6		Alactic		

Table 4

OT Group activities with significantly low ratings by the four dimension of the DP framework, ranked in order from the lowest to highest rated activities. - All activities are rated on a scale anchored at 0 and 10.

RANK	Relevance	Effort	Enjoyment	Concentration
1	Cross Training	Video Review	Basic End	Kicking
2	Kicking	Coach	Flexibility	Cross Training
3	Pulling	Basic End		Basic End
4				Pulling

Less 5% Group DP. For the Less 5% Group, Racing was rated as being the most relevant and enjoyable activity and the one requiring the most effort and concentration. Three activities were rated as being highly relevant: Racing, Skills and Lactic training. Five activities were rated as highly effortful: Racing, Lactic, VO2 Max, Alactic and Weight training. Three of the activities were rated as being highly enjoyable: Racing, Skills and Equipment training. Finally, five activities were rated as requiring significantly high amounts of concentration: Racing, Mental, Strategy, Drills and Lactic training.

Applying the sport-modified DP framework to the Less 5% Group ratings produced two activities which were classified as DP: Racing and Lactic training. Of those two activities, Racing was rated as being highly enjoyable and no activities were rated as being significantly non-enjoyable.

Table 5

Less 5% Group mean activity ratings by the four dimensions of the DP framework. - All activities are rated on a scale anchored at 0 and 10.

ACTIVITY	Relevance	Effort	Enjoyment	Concentration
Basic End	7.36	6.38 ^L	4.81 ^L	5.01 ^L
Threshold	8.00	8.50 ^H	4.89 ^L	6.75
VO2 Max	8.07	8.71 ^H	5.63 ^L	6.94
Lactic	8.38 ^H	8.77 ^H	6.28	7.63 ^H
Alactic	7.68	8.42 ^H	7.37	6.78
Kicking	6.99 ^L	6.43	6.14	4.58 ^L
Pulling	7.28	6.30 ^L	5.39 ^L	5.22 ^L
Drills	8.13	5.95 ^L	6.99	8.01 ^H
Skills	8.46 ^H	7.12	8.30 ^H	7.63
Equipment	6.71 ^L	7.40	7.50 ^H	6.39
Strategy	7.87	5.21 ^L	6.41	8.38 ^H
Race	9.92 ^H	9.51 ^H	8.75 ^H	9.37 ^H
Coach	8.20	6.50	6.61	6.81
Video Review	7.51	4.62 ^L	7.04	6.30
Flexibility	7.62	7.22	5.82	5.89 ^L
Free Body	8.04	7.82	6.30	6.89
Weights	7.93	8.30 ^H	6.68	7.03
Cross Training	6.86 ^L	7.36	6.64	6.45
Mental	8.26	7.61	7.24	8.66 ^H
OVERALL	7.84	7.26	6.56	6.88

Table 6

Less 5% Group activities with significantly high ratings by the four dimension of the DP framework, ranked in order from the highest to the lowest rated activities. - All activities are rated on a scale anchored at 0 and 10.

RANK	Relevance	Effort	Enjoyment	Concentration
1	Race	Race	Race	Race
2	Skills	Lactic	Skills	Mental
3	Lactic	VO2 Max	Equipment	Strategy
4		Alactic		Drills
5		Weights		Lactic

Table 7

Less 5% Group activities with significantly low ratings by the four dimension of the DP framework, ranked in order from the lowest to highest rated activities. - All activities are rated on a scale anchored at 0 and 10.

<i>RANK</i>	<i>Relevance</i>	<i>Effort</i>	<i>Enjoyment</i>	<i>Concentration</i>
1	Equipment	Video Review	Basic End	Kicking
2	Cross Training	Strategy	Threshold	Basic End
3	Kicking	Drills	Pulling	Pulling
4		Pulling	VO2 Max	Flexibility
5		Basic End		

Less 15% Group DP. For the Less 15% Group, Racing was rated as being the most relevant activity and the one requiring the most effort and concentration. Equipment training was the activity rated as being the most enjoyable. Four activities were rated as being highly relevant: Racing, Drills, Skills and VO2 Max training. Six activities were rated as being highly effortful: Racing, Alactic, VO2 Max training, Lactic, Threshold and Weight training. Two activities were rated as highly enjoyable: Equipment training and Racing. Finally, seven activities were rated as requiring significantly high amounts of concentration: racing, Mental, Drills, Alactic, Skills, Lactic and VO2 Max training.

Applying the sport-modified DP framework to the Less 15% Group ratings produced four activities which were classified as DP: Racing, Drills, Skills and VO2 Max work. Of these four activities, Racing was rated as significantly enjoyable and none were rated as being significantly non-enjoyable.

Table 8

Less 15% Group mean activity ratings by the four dimensions of the DP framework. - All activities are rated on a scale anchored at 0 and 10.

ACTIVITY	Relevance	Effort	Enjoyment	Concentration
Basic End	7.78	6.43 ^L	5.99 ^L	5.20 ^L
Threshold	8.05	8.14 ^H	5.84 ^L	6.69
VO2 Max	8.71 ^H	8.90 ^H	6.06	7.80 ^H
Lactic	8.10	8.84 ^H	6.79	7.90 ^H
Alactic	8.12	9.06 ^H	7.86	8.08 ^H
Kicking	7.34 ^L	7.02	6.79	3.64 ^L
Pulling	7.57	6.90	7.38	4.98 ^L
Drills	8.91 ^H	6.73	6.81	8.14 ^H
Skills	8.91 ^H	6.89	7.68	7.97 ^H
Equipment	7.54	7.06	8.15 ^H	6.49
Strategy	7.91	7.27	6.87	7.71
Race	9.27 ^H	9.49 ^H	7.99 ^H	9.04 ^H
Coach	8.45	5.15 ^L	6.70	6.98
Video Review	8.04	4.66 ^L	7.54	6.68
Flexibility	7.57	6.04 ^L	6.02	5.24 ^L
Free Body	8.39	7.80	6.42	6.37
Weights	8.42	8.03 ^H	7.25	6.66
Cross Training	6.73 ^L	7.66	7.18	5.52 ^L
Mental	7.91	6.27 ^L	6.49	8.34 ^H
OVERALL	8.09	7.28	6.94	6.81

Table 9

Less 15% Group activities with significantly high ratings by the four dimension of the DP framework, ranked in order from the highest to the lowest rated activities. - All activities are anchored on a scale anchored at 0 and 10.

RANK	Relevance	Effort	Enjoyment	Concentration
1	Race	Race	Equipment	Race
2	Drills	Alactic	Race	Mental
3	Skills	VO2 Max		Drills
4	VO2 Max	Lactic		Alactic
5		Threshold		Skills
6		Weights		Lactic
7				VO2 Max

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Table 10

Less 15% Group activities with significantly low ratings along the four dimension of the DP framework, ranked in order from the lowest to the highest rated activities. - All activities are rated on a scale anchored at 0 and 10.

RANK	Relevance	Effort	Enjoyment	Concentration
1	Cross Training	Video Review	Threshold	Kicking
2	Kicking	Coach	Basic End	Pulling
3		Mental		Basic End
4		Basic End		Flexibility
5				Cross Training

Similar to the study by Young and Salmela (1998), the training activities were analyzed on their own and without the inclusion of ratings for sport-related and everyday pursuits. This approach presumably resulted in a more discriminating analysis of the training activities than previous research (Ericsson et al, 1993; Helsen et al., 1998; Hodges & Starkes, 1996) in which all three categories of activities were amalgamated, thereby deflating the grand dimensions means which would tend to result in finding more significant differences for the respective activity means. It is likely that if, in the present study, participants rated swimming-related and everyday activities, and that if these ratings had been included in the calculation of the grand dimensions mean, that more of the training activities would have been found to be highly relevant, effortful and requiring high concentration. It is also possible that fewer activities would have been found to be enjoyable and that more would have been found to be significantly non-enjoyable.

Enjoyment Interviews

Eighteen participants were selected for follow-up interviews. Each had rated activities high in terms of relevance and effort or concentration and had also rated those same activities as high in terms of enjoyment. The composition of the interview group included nine swimmers from the OT Group, 6 swimmers from the Less 5% Group and 3 swimmers from the Less 15% Group. Although the number of swimmers selected from each group do not follow a normal distribution, this reflects the fact that more swimmers from the OT Group than from either of the other groups rated activities highly in terms of relevance, enjoyment and effort or concentration. Table 11 lists the 18 participants who were interviewed regarding enjoyment perspectives of DP.

Table 11

List of the subjects who were interviewed regarding the nature of their enjoyment of training activities meeting the sport-modified DP Criteria.

CODE	GENDER	AGE	GROUP
CS1	Male	18	OT
CS2	Female	15	OT
CS3	Female	14	Less 15 %
CS4	Male	19	OT
CS5	Female	17	OT
CS6	Female	16	Less 5 %
CS7	Male	16	Less 5 %
CS8	Male	16	Less 5 %
CS9	Female	16	OT
CS10	Female	20	OT
CS11	Female	13	Less 5%
CS12	Male	17	OT
CS13	Female	16	Less 15 %
CS14	Male	22	OT
CS15	Female	16	Less 5 %
CS16	Male	17	Less 5%
CS17	Female	19	OT
CS18	Male	15	Less 15 %

The interviews were on average 30 minutes and when transcribed verbatim, each produced approximately two single-spaced pages of text. The data was analyzed following qualitative data analysis procedures outlined by Cote, Salmela, Baria and Russell (1993). The content of each interview was divided into meaning units and then categorized for analysis in terms of the seven explanatory perspectives discussed in the review of literature. Interestingly, as the analysis of the interviews proceeded an eighth perspective emerged which was added to the list. This eighth perspective related to swimmers enjoying the challenge of completing difficult training activities, not because of the resulting improvement nor because of the feeling of mastery it gave them, but because they enjoyed the competitive nature of striving to achieve a challenging goal.

In each case, participants indicated two, three or even four perspectives which explained their enjoyment of the DP activities. The perspectives, ranked in order from the response most frequently given to the response least frequently given are as follows: enjoyment of challenges of the activity (15), enjoyment of mastery over the activity (13), enjoyment of results of the activity (12), enjoyment of the social aspect of the activities (10), enjoyment of the sensations associated with the activities (7), enjoyment related to post-training hormonal/chemical release (5), enjoyment to justify the time and effort spent performing the activities (4) and enjoyment of the effortless immersion in an activity (0). Table 12 lists the enjoyment perspectives discussed by the participants in order from the perspective most frequently discussed to the perspective least frequently discussed.

Table 12

Perspectives discussed by participants during interviews regarding the nature of their enjoyment during training activities meeting the sport-modified DP Criteria.

	PERSPECTIVE	DESCRIPTION	RESPONSE	PERCENT
1	Challenge	Athletes enjoy DP which they view as challenges to be accomplished	15 of 18	83.3%
2	Mastery	Athletes enjoy feelings of competence when performing difficult and effortful DP	13 of 18	72.2%
3	Results	Athletes enjoy improvements in performance or health that result from performing DP	12 of 18	66.7%
4	Social	Athletes enjoy the social interaction with teammates and coaches during DP sessions.	10 of 18	55.6%
5	Sensory	Athletes enjoy the physical sensations which they experience while performing DP	7 of 18	38.9%
6	Dependency	Athletes enjoy the effects of natural chemicals released during the performance of effortful DP	5 of 18	27.8%
7	Dissonance	Athletes view DP as enjoyable in order to justify to themselves the time and effort spent training.	4 of 18	22.2%
8	Flow	Athletes enjoy "flow experiences" which occur during the performance of DP.	0 of 18	0.0%

"True" Enjoyment of DP

As discussed earlier, several of the perspectives reflected "true enjoyment" of the training activities by the athletes. The athletes who claimed to enjoy DP from these perspectives enjoyed the DP at the moment that it is occurring rather than the anticipated results, or physical or psychological effects occurring after the DP has been performed.

The three perspectives that fell within this category included the Challenge Perspective, the Mastery Perspective and the Sensory Perspective.

The challenge perspective. The challenge perspective was the most frequently discussed perspective to explain swimmers' enjoyment of DP activities. Fifteen (15) out of eighteen (18) athletes interviewed who rated DP activities as enjoyable claimed that formally or informally setting and achieving challenges for themselves provided a source of enjoyment during hard training. The 15 participants who discussed challenges as a source of enjoyment during training were distributed amongst all three performance groups with 9 of 9 from the OT Group, 5 of 6 from the Less 5% Group and 1 of 3 from the Less 15% Group. Interestingly, this most frequently stated source of enjoyment in this study was not mentioned in any significant way in the literature on enjoyment in sport and, as a result, was not amongst the perspectives initially proposed to explain enjoyment of DP.

Although nearly all of the participants in the study discussed "challenges" or "accomplishments" care had to be taken not to confuse the Challenge perspective with the Results perspective. One could argue that accomplishing challenges is somewhat results-oriented in that steadily increasing challenges in training, if met, tended to demonstrate to the athletes that they were progressing toward their goals. Similarly, care had to be taken not to mistake enjoyment of "challenges" with enjoyment of "mastery". It could be argued that accomplishing difficult challenges in training was mastery related in that the accomplishment of the challenges proved to the athletes that they were very skilled at their sport. However, when questioned on the matter, the participants were readily able to distinguish between the three concepts.

In fact, some athletes mentioned that aspects of all three perspectives played a role in providing a source of enjoyment for them when performing DP activities. Those who were evaluated as enjoying DP from the Challenge perspective were quite clear that they received enjoyment from attempting to achieve an objective, even if it was not accomplished - that the enjoyment was in the striving.

I enjoy the challenge of the difficult sets. I mean if I'm having a bad day and don't have the energy to go fast, or if I'm sick or didn't get enough sleep so that I am not capable of performing as I normally might, I work really hard to go slow and I don't like that. But normally, I enjoy the challenge of performing a tough set. [CS6]

I've always thought that one of the greatest opportunities afforded by swimming was the opportunity to challenge yourself every practice. If I am feeling slow I set lower challenges. If I am feeling fast I set tougher challenges. Hopefully the challenges are always getting tougher and I am improving, but that is not critical for my enjoyment, at least not in the short run. Sometimes I just think about trying to beat someone to the wall...I'm lucky that when I was younger I had a coach that encouraged us to set challenges for ourselves in practice and not to rely upon the coach to do everything. So one day I tried it and liked it and found that it made the sets go by faster...and then I guess one day I realized that I was looking forward to it. [CS10]

No, I don't think its that I feel like I am fast. I mean I think I'm probably the slowest in this group. But I like being here. Sometimes just making the pace times is the best I can do... Sometimes I can stay with them, like in kicking sets, I'm a pretty good kicker... but sometimes I'm just trying not to get lapped too badly. But I finish every practice feeling like I've really accomplished something. If I was in the group below I would get bored. [CS18]

The challenge perspective, though given by almost all participants interviewed, was most clearly favoured by the more experience swimmers. All nine of the swimmers from the OT Group mentioned that challenging themselves during training provided a significant source of enjoyment and all spoke at length about the enjoyments of challenges.

Yeah, friends ask all the time if I still enjoy the training, knowing how hard it is, how long the practices are, the early mornings and all. I think that day to day what I really enjoy is the chance to challenge myself... It's part of the nature of swimming with

everything on pace times and the conditions always being the same. I know what I should be able to hold for a certain set of 100's. I am always able to try to go faster or the same speed on less rest or to push myself to the max on the last 10 repeats or whatever. I always try to set a challenge for myself during workout. I think most of the other swimmers do as well... [CS14]

... on the VO2 Max, I find it enjoyable. I mean it takes hard work and a lot of concentration, but when you've finished you feel like you've really accomplished something. It's very satisfying once you have completed one. Your arms are very sore but you feel very good... about 50% of that is during and 50% is after... [CS4]

I enjoy setting a series of challenges for myself during practices and sets. For example, if I was doing a set of 20 time 100 on a pace time I might allow myself the first 5 to get into the set and then try to push myself for the next 3. Once I have done the next 3 I might try to push myself for another 2. And before I know it, just by trying to achieve these little challenges I have done the entire set going quite hard. I feel good afterward of course, but do enjoy it during the set as well. [CS2]

I like to challenge myself in practice. Sometimes they are trying to make a certain time. Some days I just race the other swimmers. Sometimes I catch one of them trying to race me and I challenge myself not to let them win... It's kind of like racing except you know the competition a little better and you know exactly what they have been doing to prepare themselves. So you pretty much know when you should be able to beat someone or at least when they are a little vulnerable... [CS1]

Swimming hard sets involves both effort and effortlessness. For the first part of the set you are swimming and it is relatively effortless to go the speed you are supposed to. For the last part of the set you have to work extremely hard to maintain that speed. I enjoy both aspects of the set, the effortlessness and the effort. I mean that is part of the challenge, to maintain the speed and effort event though you are getting tired. [CS12]

Several swimmers stated quite clearly that it was the challenge of hard training that they enjoyed and that although they liked the thought of improvement, that they did not just enjoy the training because they believed that, as a result, they would become faster swimmers.

When I've finished a set, or even as I'm doing it, I feel like I'm really accomplishing something, that I'm putting a hard days work. It's very satisfying... I don't think it is all about the fact that I'm keeping myself in shape or getting faster. I like knowing that I am doing something hard, that I put in a good days work. If it were easy I think I wouldn't have stuck it out. [CS7]

I like the effort required. There is nothing about this sport that is easy. I remember having to choose between baseball and swimming. And I was a pretty good baseball player, but the game just seemed too easy. I liked the challenge of swimming... sure as the challenges get tougher I know I am improving, but I think it has more to do with the fact that a tougher challenge is a new challenge while something you have already done is not really so much of a challenge. It's the newness that I enjoy, not the fact that I am getting faster or stronger or whatever, although I do like the improvement as well, but it's not the only thing or even the main thing, you know. [CS16]

Knowing that the training will improve performance doesn't really make it enjoyable for me. I like competing in practice. I like pushing myself. I like to see gains, but I also like to challenge myself [CS8].

... I like the challenge of finishing the hard sets. I feel better knowing that it will probably help, but you are not always certain that something will help. But either way I always feel satisfied when I am making it through a tough set. [CS5]

Thus it appears that most swimmers who enjoyed the DP enjoyed the personal competition of setting and achieving challenges. What was revealed in the interviews is that athletes liked to test their abilities, either by racing other athletes, or by racing against their own previous best training performances.

The mastery perspective. The second most commonly discussed perspective which participants indicated provided a source of enjoyment of DP activities was the Mastery Perspective. Thirteen out of 18 participants claimed that the feeling of being very good at something provided a significant source of enjoyment during training for their sport. The 13 participants who stated that this perspective provided enjoyment during DP activities were distributed amongst all three performance groups with six of nine from the OT Group, four of six from the Less 5% Group and all three from the Less 15 % Group.

When evaluating this perspective it was important to discriminate the mastery perspective from the results perspective. It could be argued that athletes who claimed to

enjoy DP because doing the hard training made them feel accomplished were actually enjoying the fact that the hard training would make them even more accomplished. The key determination was whether or not the athletes enjoyed the DP because it made them feel accomplished at the moment when they were performing the DP. If the athletes enjoyed the feeling of being good as they performed training, then the response was evaluated as being from the Mastery Perspective. Conversely, if the athletes enjoyed working hard knowing that the training would make them even more “masterful” at their sport after the training had been completed, then the response was evaluated as being from the Results Perspective.

As it turned out, a significant number of the participants who were interviewed indicated that it was knowing that they were good and performing the DP for their sport at that moment and not the thought of getting better that gave them enjoyment.

Let me put it this way. I can be having a bad practice or a bad race or whatever... bad for me so that I am not going as fast as I am capable. But I am still aware that I am pretty fast, pretty skilled. I still feel good about swimming when I am doing the training, even though I may not be performing at my best at that particular moment or that particular day, I am still doing something that I am good at... [CS6]

Sure I sometimes miss the fact that I can't really go to the parties on week nights because I have 5:30 practice the next morning, but I'm an athlete. It's a decision I made. I enjoy making some of the sacrifices knowing that its because I am doing something different. All the serious athletes on campus - we make sacrifices, we take care of ourselves but it's not like it's really a sacrifice - well maybe occasionally. Most athletes, myself including like taking care of themselves. It's part of being student-athlete. When I'm in the water training, it's the same thing. I'm doing my thing. I'm doing my sport - the fact that the training is hard, that there are sacrifices is all part of being good at it. [CS17]

When I'm in the water training hard like right now, I don't really think a whole lot about things unless my attention is drawn to something by the coach or a teammate... I really like the swimming, all the training... I know this is will help me get faster, but I'm not really thinking about that [right now]... I'm enjoying that I can do this right now as well as I can... [CS3]

Sometimes in a hard set I will use the improvement that will likely result as motivation to push hard and finish, but less often than usual. I prefer more doing it just because I can... [CS11]

I love to swim my events. I have done them so many times in practice and competition that I know how to swim them really well.. I mean of course I could do it better and I am always working at that in practice. But I am swimming my events... in practice or in competition...because I know exactly what I am doing and I know I am doing it well. Even when I am tired, like at the end of practice or when I am hurting at the end of a tough set, it is still a good feeling, especially because even though I may have worked harder than some people and am more tired than them, I can still do a better job. [CS9]

I've done so much in this sport that it is all very familiar, in a good way though. In a certain type of set I know how I am going to feel, and how I should feel at every point in the set. If I am told to go at 90% or 85% I know exactly how hard to go. And when I look up at my times as a check and see that I'm right on what I should be holding it makes me feel good. Its not the result or the fact that I am swimming fast so much as the fact that I am able to do exactly what I am supposed to be doing... no I don't think I feel trapped, I mean I have tried other sports and done well but I like the discipline and, well, the focus of swimming... it's very defined as far as what is good... [CS18]

I like doing the hard work, the tough sets. I enjoy pushing myself as a swimmer. It's enjoyable because it's tough, but also because I know that I have the ability to do the sets even though they are tough. I would get no satisfaction out of doing something easy. I could walk away at any time that I wanted...I have done it before. [CS12]

I know I'm a pretty good swimmer. And I really enjoy doing the things that are a part of that. Whether I'm working hard in practice or racing at competitions or traveling to meets or stretching or eating right or whatever it's my thing. It's all part of the package and I think you have to look at the entire package and decide if you like it or not. I decided I like the whole package. And when I'm training hard I feel good about the fact that I am training hard at my sport. [CS14]

What emerged from the second most commonly discussed explanatory perspective for enjoying DP was athletes who knew that they were good swimmers, enjoyed the DP because it made them feel good to be doing things in their field of expertise. The fact that the DP was hard simply reinforced to these athletes that they were good at something difficult - not easy.

Because the enjoyment was related to feeling good about their abilities, there was evidence of a strong identification with the sport. Many of the swimmers mentioned that swimming was “their thing” that it was “it was their sport”. Similarly there were strong elements of personal control with athletes discussing the fact that they chose their sport. None of these responses appeared to be “dissonance related” and even under persistent probing all the athletes seemed to genuinely enjoy what they were doing.

The sensory perspective. The Sensory Perspective was the fifth overall most commonly stated source of enjoyment and the third of the three “true” enjoyment perspectives. Seven of 18 participants claimed this provided some enjoyment for them while performing DP activities. The participants came from all three groups with four of nine from the OT Group, two of six from the Less 5% Group and one of three from the Less 15% Group.

When initially conceived this perspective was meant to capture the concept of athletes enjoying the feeling of moving through the water, something one would consider to be a highly sensory-related experience. This was certainly true for the lower performance groups. All the responses from the Less 15% and Less 5% Group reflected enjoyment of the sensation of movement through the water.

One of the difficulties in evaluating responses for this perspective was differentiating between those athletes who enjoyed the sensations associated with “going fast” and those athletes who enjoyed the sensations which reinforced to them that they were fast or that their training was paying off. However, after additional probing it was clear that some athletes enjoyed the actual sensations associated with training in the water.

Swimming is very feel oriented. And I think that the ones who are very good at it are very in tune with the feel for the water. I love the fact that even though you are working hard you don't get all hot and sweaty. You are right there in the water and it keeps you clean and it keeps you cool. Also the sense of movement is more present. Like a strong wind lets you know that you are going fast in a car. The water rushes by you and lets you know you are moving. [CS3]

I really like a lot of the sensations of swimming. I like the feel of sliding through the water off a turn or riding high on the water when going fast or grabbing onto the water when my stroke is right. I mean you have to know what feels right in this sport. [CS7]

Yeah I really like the feel of swimming. I mean when I was a kid that was what got me into swimming. I liked the feeling of weightlessness, I liked that it was quieter and different underwater. There were fewer distractions. It's sort of a whole different world. I find it harder to train on land with all the distractions, but when I am in the water I can really push myself without any distractions. [CS15]

Interestingly, none of the responses from the OT Group reflected this enjoyment of movement sensation. Rather, the sensation that the top performance group enjoyed was the feeling of "being fit", the feeling of "being strong", the feeling of "pushing one's body to the limits" in a healthy way. Although the athletes were aware that the effort and pain were good for them it did not seem to be the resulting improved health or strength that was the focus. The participants seemed to really like the sensation of effort - pushing their bodies as hard as they could.

No, I wouldn't really say that I like the feel of the water on my body - not during hard training. I mean, sure when I am doing easy swimming I often enjoy the sensation of gliding through the water... you know, at slower speeds. What I really like is the feeling that I am pushing my body to the max, using all my muscles, all my capacities. [CS2]

...oh yeah! The endorphins haven't kicked in yet. But I'm liking this right now... pushing myself hard... [during a VO2 Max set]... no I don't even notice the water, other than it's cool... [CS4]

What I really enjoy about hard training, is the feeling that I am really using all my abilities. I feel strong, I feel fit. I feel like I am using my body the way it is supposed to be used. I mean, sometimes it really hurts, but I know that it is not a bad pain - it's a good pain brought on by exercise, which is a healthy thing. I like the feeling of the air going into my lungs knowing it is going throughout my body and being used. I mean it would be different if I had a pounding headache or a cramp or a shoulder injury or something. [CS14]

I like the feeling of effort. I even like the pain. Usually on a good day, I like going fast for a long time. Usually in warm-up I go pretty hard. I like the speed and effort and your lungs are hurting, your legs are burning, but you know that it is not going to harm yourself, if anything it will make you stronger, so this is not a bad pain a sign that you are damaging yourself... I don't think it's related to endorphins. I mean you feel good after doing a hard set and I suppose that is related to endorphins, but during I don't do it to feel a certain way, I just enjoy pushing myself. [CS17]

Thus the Sensory Perspective provided two distinct types of enjoyment for swimmers engaged in DP. The less accomplished swimmers who discussed the sensory perspective as a source of enjoyment enjoyed the feeling of movement through the water. In contrast, the more accomplished swimmers enjoyed the feeling of effort during hard training - the feeling of pushing their bodies close to their maximum capacities. While this could be related to endorphin release, these experienced athletes were aware of the effect of endorphins and seemed to enjoy the effort itself.

“False” Enjoyment of DP

The second category of explanatory perspectives involved training activities which were rated by the athletes as being enjoyable when in fact they enjoyed something more than the act of performing the activity itself. The five perspectives which fall within this category include the Results Perspective, the Social Perspective, the Dependency Perspective, the Dissonance Perspective and the Flow Perspective.

Although the Flow Perspective reflected enjoyment of the activity when it was occurring, flow experiences are rare and atypical of DP activities. So an athlete who enjoyed an activity because of flow experiences within that activity was not rating the enjoyability of the activity itself in the “true sense”. In any event, analysis of this category was somewhat irrelevant since none of the athletes claimed to enjoy activities due to flow experiences during training.

The results perspective. This perspective involved athletes rating DP activities as being enjoyable when in fact they enjoyed the benefits that would occur as a result of having performed the DP. This was the third most commonly discussed perspective with 12 of the 18 athletes interviewed indicating that the results of training had some impact on their enjoyment of DP activities. The responses from this category were evenly distributed amongst the three performance groups with four of nine from the OT Group, four of six from the Less 5% Group and three of three from the Less 15% Group. Listed below are some typical responses.

I like working on speed and technique because I'm a sprinter so speed is fun. I like working on technique because I think in a 50 free you have to be fairly efficient. I don't like the long distance stuff because it gets boring. [CS5]

I think I like a little bit of both - the after I am done and while I am doing the activity. Of course the result is fun and rewarding. I like to improve my technique and my strength to get faster. The hard work at the time it might not be as enjoyable but as you look back on it you did have some fun. [CS13]

Part of it has to do with that it will make me faster. For instance tonight I swam and I was doing taper 50's. And I had no idea what my time was. I just swam about 95% hard and I heard my times and it was satisfying to hear that it was a good time and that the training I had been doing had been paying off. [CS9]

I mainly enjoy doing the things that will make me faster. I think that if its not going to help me be fast then I'm not going to be as ambitious to do it, you know I only have so much time to do things... [CS18]

I now enjoy a lot more things. I train with [Well-known College Swim Coach] who knows a lot. He's taught me a lot about the training we need - like building and endurance base for the particular event you swim. I started to enjoy longer endurance sets. Just knowing that it was preparing me to go faster in my event made me feel better while doing them. He explained the reasoning behind it. You know we had some class type sessions. The weren't that much fun, you know they were three or four hour straight of just talking. But after it all sank in, or some of it, I enjoyed the endurance sets more and more. [CS1]

I really like training hard, especially in the back half of longer tougher sets. I can almost feel myself getting stronger. I can feel the fat melting away, the muscles being built up layer after layer, my lungs expanding. I know it's not actually happening as I train, but I know its going to happen afterward. [CS8]

For me if a practice goes well and I can tell I am improving then it puts me in a good mood and I want to be there and working hard. When practice doesn't go well then it is not enjoyable. I consider it to be a waste of time and should have stayed in bed and enjoyed my rest. Although I wouldn't have as I would have felt guilty and like I was falling behind... [CS13]

When originally conceived, this perspective was only meant to look at results of DP in terms of performance improvement - swimmers rating DP as enjoyable because they believed that the DP would make them faster swimmers. In fact the interviews revealed that several of the swimmers enjoyed another result of the DP activities - improved physical fitness and a better looking physique.

I like the fact that you can eat more. I mean most of the girls that I know at school do so little activity that if they ate even half as much as I do, they would put on so much weight. [CS15]

I know that I am fit and when you walk down the street and see someone who is not fit, you feel a lot better knowing that you spent a good part of your day working hard and doing your best not to be like that [CS16]

... but also you know that you are in pretty good shape to do the things you do. You look better, you feel like everything works better. You will live longer. A lot of things. I'm not going to die of a heart attack or some clogged arteries or something like that. [CS10]

I really enjoy working hard because it makes me feel like I am in shape, not just on the outside, but on the inside. I once read that most of your body fat is not outside, next to the skin, but inside around your internal organs and that the inside fat is the fat that is unhealthy. Because of the exercise I do, I know that I am healthy, not just on the outside but throughout my entire body. [CS17]

I like the waking up early and training hard before I go to school and you know, feeling like you've done something. I guess it goes back to accomplishment. You feel like you've really done something worthwhile, getting stronger and faster and the training keeps you in shape...I've all ready accomplished a lot before most other kids' days have even started. [CS2]

It is clear that the results of training were very important to the athletes in the sample. There were two particular results that the athletes enjoyed about the training. Some athletes enjoyed the fact that the training would make them faster swimmers. Others enjoyed the fact that the training would make them healthier and in better shape. In either case, it was clear that for these athletes, when they rated DP as highly enjoyable, they actually enjoyed the perceived benefits of training and not the DP itself.

The social perspective. The fourth most frequently cited perspective for enjoying DP activities was the Social Perspective. Athletes who discussed this perspective stated that they enjoyed the opportunity to interact or even just to be doing something with another person. In some cases, it seemed as if the social interaction itself provided a significant source of enjoyment, rather than the training activity itself.

I like training with teammates. I like to hear about what's happening to other people. It really makes the sets go by a little easier. I have done one hour sets where I had a conversation with the person next to me that lasted approximately two minutes total. We just talked for 10 seconds each time we stopped at the wall and thought about the answer and the next question during the 10 minutes of swimming in between. It's kind of like talking to someone online... [CS15]

... the people here tend to be a little more close. I think that has had a lot to do with me enjoying the training more. This affected most of my ratings... I'm just happier day to day with the people around my now than a year ago... [CS5]

However, in most cases the fact that the athletes were training with others helped to make DP activities more enjoyable rather than providing the sole source of enjoyment.

It is more enjoyable if there are friends, there. I'd rather do it with people... [CS16]

I don't have a lot of close friends on the team but I look around me and I am surrounded by other people who are all doing the same thing I am, working really hard, pursuing the similar goals. It doesn't have to be talking. Sometimes you encourage each other. Sometimes you make each other work harder - mean if the person in the next lane is not backing down you can't really either... [CS4]

...I enjoy training with other people, it helps me work harder... there is a connection with the other swimmers that exists that you know they don't have with their family, their non-swimming friends, anyone outside the sport. I guess it creates a sense of belonging. [CS12]

I think the people you are training with has a big impact on your attitude. Positive attitude. If I'm around a lot of people who don't want to do anything or don't want to be at practice then I'm not going to want to be their either... [CS11]

It's always nice to have somebody to talk to in between sets. Somebody that you know you can talk to at away meets. Somebody that you can relate to. It's not isolated. The team is like a little family. For some people, maybe it makes a difference if there are others to talk to. I think its just personal though. It's much easier for me to swim hard with other people around. But I don't know if that necessarily hold true for anybody else. It's not so much competition as company. You are doing something with somebody else. It's like going for a run with someone. You are not talking with somebody, at least not a whole lot. You are just doing the activity with somebody. [CS1]

While it was clear that for many swimmers, the social aspect of training added to the enjoyment of DP, the more interesting question was what would happen if the social element were not present? From the interviews it appears that the absence of training partners or teammates would have made the DP non-enjoyable for some of the athletes, but not for all of them. Probing this issue was particularly difficult since many of the participants had difficulty comprehending what it would be like to train for the sport of swimming without teammates.

Would I still do the activity without my teammates? Just me? I think so... Would I still enjoy it? Maybe not as much, but I would enjoy it. I mean there are some days where I am feeling a little anti-social and really would rather get in and swim without having to speak to or listen to anyone... but training all by yourself, that would be really hard. I mean, no one to race... no one to talk to between sets... always being the focus of the coaches attention... would there be a coach? [CS11]

Do you mean without teammates? Sort of like swimming laps all by myself in my own backyard? I think I would still enjoy it. Maybe not as much, but I would still enjoy it - as long as I was still going to compete against others. That's kind of hard to think about, but it might be kind of good, not having to share a lane, not having to share lockers, not having to travel. I think I would still prefer training with teammates and coaches though. [CS7]

When the social element wasn't there it was harder going to practice, the time before hand, the waiting around on deck, but the actual training wasn't that different. I still liked the same things. It was harder getting there cause I didn't want to go, but once I was there it was all right... so I think that I sort of have trained without the social aspect of having teammates. I mean with my previous team I certainly didn't go for the social aspect, but I still enjoyed the practices. [CS5]

Would I do this all by myself? I don't think so... but that's probably true of anything. I mean I enjoy movies but I wouldn't like going by myself. I mean I think I would still enjoy the movie, but I would just feel funny. I don't know I could get myself to do it. I guess there are some people who do. Maybe there are some people who would rather train alone... [CS33]

The interviews indicated that very few athletes enjoyed training solely because of social reasons. It seems that training with teammates helped to enhance the enjoyment of activities that were already enjoyable for other reasons. However, the social aspect of training was significant and many of the participants indicated that training alone would not have been enjoyable.

The dependency perspective. The sixth most discussed perspective was the Dependency Perspective, where the participants indicated that they rated DP as highly enjoyable when in fact their enjoyment was related to the effect of naturally occurring chemicals, such as endorphins, which are released by the body during hard training. These chemicals create a natural high which can be craved by athletes over time. Six of the 18 athletes interviewed discussed the release of endorphins, or a “good feeling brought on by training” as a source of enjoyment for training. This response tended to be from the more experienced swimmers with three of nine from the OT Group and three of

six from the Less 5% Group discussing hormonal or chemical release as a source of enjoyment.

This response did not often occur to the participants on their own and they had to be specifically probed on this perspective. It was often difficult to differentiate this perspective with the Sensory Perspective, where athletes indicated that they enjoyed the feeling of “pushing themselves hard” during training. However, once the participants’ attention had been drawn to the specific topic of endorphin release, all seemed to be familiar with the effect and were able to discuss whether post-training chemical release influenced their enjoyment ratings of DP activities.

Sure, I know, especially when I am doing longer harder sets that there will come a point when all of a sudden things will get easier and you get your second wind. My body will feel looser, I will breath easier and will be able to go harder with less effort. I look forward to that moment and like to really push myself after that point. [CS14]

After a hard workout I feel this sort of glow and I am in a good mood for the rest of the day. Part of it is mental, I feel good about what I have done, and part of it is physical. I really look forward to that and hate it when I don't get in an train for several days or more. If I take a week off I am really anxious to get back in and train. [CS9]

I think it's the main thing I enjoy about training over racing. I mean like right now I am working hard. My muscles feel pumped... the endorphins have definitely kicked in. I feel like I can really go hard now... This is something I miss when I'm not training.... [CS4]

I guess that swimmers do get a swimmers “high” sort of like runners get a “runner's high” I know that I do. Not all the time, but it is present when you do the longer, harder sets. It's one of the things that I look forward to in training. If I haven't done a hard set in a while I get a little antsy. [CS7]

Sure I enjoy the endorphin release during hard sets. It is one of the ways that I know that I am fully warmed up. I mean everything is a lot easier after that. It only seems to occur after certain types of sets though, aerobic sets or threshold or VO2 Max or kick sets - not after sprinting or technique. When that feeling kicks in I really feel I can push myself hard and want the set to last long enough. Sometimes the set ends and you just want to keep going and going. [CS10]

Very few of the athletes indicated any sort of “exercise addiction”. Instead, of enjoying the high after the training, what the swimmers seemed to enjoy was the fact that after the chemicals had been released, they were able to train harder. The issue then became whether they just liked the feeling of pushing themselves, or whether they liked the fact that the results of training would be better because they could train harder once the endorphins were released.

... I think its a bit of both. I like the feeling of pushing myself really hard and even though its hurts less, because of the endorphins, you can still tell that your lungs are really working and that you are using your muscles to their fullest. I also like the fact that I can keep pushing hard and know that I will be stronger and fitter as a result. [CS12]

I think it is more related to improvement. When the endorphins are released I am into the workout and can really push myself right to the end and make sure that I get the maximum benefit from my training. [CS3]

I think I like the result. When the endorphins are released I know that I can finish the set hard... maybe work myself harder than the set call for... I guess I also like the feeling. Just knowing that I can push myself and keep pushing and pushing and my body can do it. I mean that is a really great feeling. [CS17]

I think that I like both... the feeling and the results. I like being able to train really hard because I know that it will make me stronger and faster, or at least it should. I also like the feeling that my body is working really hard and that I am in good enough shape to do it. [CS2]

The Dependency Perspective was meant to describe enjoyment of a chemical high that is naturally-induced by hard training and craved by swimmers after the training was over. While some swimmers indicated that they enjoyed their exercise “fix” after the fact, others seemed to enjoy the effect while they were training. The main source of enjoyment for the latter swimmers seemed to be that once the hormones were released, they are able to push themselves even harder during workout. In some cases the swimmers liked the fact that pushing themselves harder would result in greater

improvement. However, in other cases, the swimmers also seemed to enjoy the feeling of pushing themselves hard without regard to the results.

The dissonance perspective. This was the second least discussed perspective by the participants in the study with only four of 18 participants indicating that perspective might at least partly explain their high enjoyment ratings. The Dissonance Perspective did not appear at the lower level with two of nine athletes from the OT Group and two of six athletes from the Less 5% Group indicating that this perspective had some relevance to their ratings.

The Dissonance Perspective was particularly difficult to evaluate for several reasons. First, because the participants who were interviewed were ones who rated DP activities high on enjoyment, these were athletes who generally enjoyed the sport of swimming and so the topic rarely came up. Second, because the Dissonance Perspective may not be socially acceptable, athletes tended not to discuss this perspective. Third, because this perspective was only discussed by the athletes when specifically probed on the issue, great care had to be taken by the researcher so as not to influence the form or the content of the discussion. Some of the typical comments regarding the Dissonance Perspective were as follows.

Well, yeah the hard sets do provide you with a very satisfying feeling - otherwise I wouldn't do it... Sure sometimes when I'm not training well, the sets are not satisfying and I don't really enjoy doing them... Usually when I am tired and training hard and have a lot to do for school. Then I sometimes feel like the only reason I am still doing it is because I can't quit at this point, but that's just bad moments. I think you get them in anything that is long term. Day in an day out I like what I do. [CS16]

Well, part of it is I'd like to see how far I can go. I mean I have been in this sport for eight years now and I have come to a certain level and I want to see how good I can become before I leave it. I don't want to walk away thinking that I didn't go as far as I could... It's not really a feeling of being trapped it's more of a duty that I owe to myself so that years later I'm not saying "I wish I had toughed it out" [CS6].

You kind of have to like your teammates, I mean you spend so much time with them, in the morning, in the afternoon, on the weekends, at competitions, team events... if you didn't your life would be pretty miserable. I'm joking of course. I think it is sort of like the grass is always greener you know. I didn't go to some competitions with the team so that I could do some things with friends or family and you know they really weren't that great, don't get me wrong I love my family and friends, but I would have rather been at the competition with my team. [CS13]

I guess I sort of have to like it. I mean I spend ten practices a week at the pool pushing myself as hard as I can... I mean I don't like everything about it. I like some things, the people the racing the challenges, but not everything... sometimes I do like the hard sets... most the time... I don't think it's that I dislike any one kind of training, I think it's more that the whole training thing takes up so much of my time and you only have so much time for sleep and homework and friends. [CS8]

I'm not sure. Maybe part of it is that you look for reasons to work as hard as you do when you are training. But I think that has more to do with how you think when things are not going so well. When things are going well and you are in a routine training hard and racing well you basically enjoy the whole experience. But when things are not going so well... then maybe you do sort of look for reasons to justify what you are doing. [CS14]

In general, the dissonance perspective did not emerge in any direct or compelling way. There were some allusions to “having to like it” or “finding reasons to like it” but, in general the participants, even those who made some comments which reflected the Dissonance Perspective, also discussed several substantial reasons for enjoying the training and the sport. Of course this probably reflected that the athletes who were interviewed were selected because they gave high enjoyment ratings to DP activities.

The flow perspective. Athletes discussing the Flow Perspective enjoyed DP activities because they experienced a flow-like state or effortless immersion in the activity. All the participants in the present study who were interviewed understood the

concept of “flow” or of “being in a zone” and had experienced it during competition, training or some other activity. However, none of the athletes who were interviewed had experienced “flow” while doing DP activities with enough frequency or consistency for it to affect the manner in which they viewed the activity.

I think I know what you are talking about. Like being in the zone right?... No I don't think I ever remember it happening during practice, or maybe once but it's not a regular thing. I mean sure in competitions... but that's not really why I like racing either. [CS4]

I don't think it has anything to do with if I am in a zone or not. I mean it really doesn't happen all that often in training. I really didn't consider it. [CS10]

If a set is well structured it prepares you to put out the effort at the right time and gives you exactly the right amount of rest before you start swimming again. I mean I enjoy when a set or a practice is well-designed, at least for me. I don't know about being in a flow personally. It has more to do with the coach doing a good job setting up the workout. [CS1]

In the final determination, it appeared as if none of the participants who were interviewed rated DP activities as enjoyable, due to entering a “flow state” while performing the DP.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the framework of DP within the sport setting and, in particular, to examine enjoyment or non-enjoyment of DP activities by athletes training for their sport. Previous studies have indicated that participants in the domain of sport seemed to enjoy some of the DP activities related to their sport. This was contrary to finding in non-sport related domains where the participants found DP activities to be non-enjoyable. In fact when Ericsson first proposed the DP framework he defined DP to be inherently non-enjoyable. This study involving athletes in the sport of competitive swimming was intended to find DP activities rated by the athletes as being enjoyable and then to determine why those athletes perceived DP to be enjoyable.

Ratings Differences among the Performance Groups

Previous sport-related DP studies (Helson et al., 1998; Hodges & Starkes, 1996; Young, 1998) found that the mean practice activity ratings by different performance groups were not significantly different from each other. By contrast, this study found there to be significant differences and, in fact, differences which followed a pattern. Although it is not clear why this occurred, possibly this result was due to the larger sample size in the present study.

The present study, with 237 subjects, had a much larger sample size than the previous sport-related DP studies. The study by Hodges and Starkes (1996) involved 42 subjects. The study by Helson et al. (1998) involved 73 subjects in the soccer study, and 51 subjects in the field hockey study. The study by Young (1998) involved 81 subjects

from the sport of track. This larger sample size could have amplified differences which may not have appeared in the other studies.

Enjoyment as a Component of Sport-related DP

The second finding of this study relates to the identification of the DP activities for each performance group. This study identified training activities as being rated “high” when the mean rating for that activity along a given dimension (relevance, effort, enjoyment, concentration) was significantly higher than the mean rating for all activities along that dimension. Similarly activities were identified as being rated “low” when the mean rating for that activity along a given dimension, was significantly lower than the mean rating for all activities along that dimension.

When the dimension of enjoyment was not considered when identifying DP activities, 11 activities emerged from the three performance groups which qualified as DP. Of these activities, one of them Racing, was rated high on enjoyment, and none of the activities were rated low on enjoyment. If the activities had to be rated low on enjoyment to fall within the DP framework then no activities would have qualified as DP. Since the list of swimmer training activities was created by swimmers and coaches who were trying to formulate a comprehensive list of what swimmers do to train for their sport, it would be inconceivable that none of the items on the list would qualify as being DP. Thus the swimmer ratings of training activities provides support for the notion DP in the domain of sport may in some cases be perceived as enjoyable by the athletes engaged in the practice.

However, when evaluating this result, it should be noted that when the activity ratings were analyzed, the rating for each activity was compared to a grand mean of all

the training activities but without the inclusion of any ratings of everyday or swimming-related activities. If everyday activities had been included in the study, as they were in previous DP research (Ericsson et al., 1993; Helsen et al., 1998; Hodges & Starkes, 1996), it is likely that the grand mean for enjoyment would have been higher and that more activities would have been rated as being non-enjoyable. In previous studies in the sport setting, athletes consistently rated non-active leisure, spending time with friends and sleep as being highly enjoyable activities. The inclusion of these activities in the ratings would likely have raised the overall mean for enjoyment.

The question is whether the increase in the mean scores would have been offset by lower rated everyday activities such as school, homework, work, household chores or other similar items. Nevertheless, the indication that DP in sports may be enjoyable is consistent with the findings of other sport-related DP studies. For example, the studies by Helsen et al. (1998) and Hodges and Starkes (1996), which, did include everyday and sport-related activities, found that several activities rated high in relevance were also rated high in terms of enjoyment.

A second consideration to be taken into account when assessing the ratings data is that the activity ratings were not re-tested on any subjects in order to evaluate their reliability. In other words, we are not certain of the extent to which the participants in this study might have rated certain activities one way on the test date, and another way two days or two weeks later. The possibility always exists that unusual or inconsistent set of results could have had the effect of skewing the data. However, the sample for this study made up of 237 participants, was deliberately selected to be large in size so

that a consistent pattern would have a chance to emerge and so that the effects of any unusual or unrepresentative set of ratings would be lessened.

Notwithstanding these cautionary notes, the results of this study support the findings of Helsen et. al. (1998), Starkes et al. (1996) and Young and Salmela (1998), that there are highly relevant and highly effortful practice activities in the domain of sport that are perceived as being highly enjoyable by the athletes performing these activities.

Enjoyment Perspectives of Sport-related DP

The second finding of this study suggests that athletes perceived sport-related DP to be enjoyable both due to the actual performance of the DP and not just because of results or outcomes related to the performance of the DP. Ericsson et al. (1993) suggested that when athletes say that they enjoy DP, what they really mean is that they enjoy the improved performance or skill level that results from DP as opposed to the actual performance of the DP. Ericsson (1996) further suggested that athletes claiming to enjoy sport-related DP actual enjoy the social interaction that accompanies much of sport-related DP as opposed to the DP itself.

Both explanations view DP as inherently non-enjoyable and as something to be endured in order to receive enjoyment from related results or effects. If DP was inherently non-enjoyable, we would expect to find that the athletes in their interviews would have discussed their enjoyment as resulting only from external sources (false enjoyment) such as improved results or social interaction rather than from inherent sources (true enjoyment) such as the excitement of challenges or feelings of mastery.

In fact the results show the opposite to be the case. The top two perspectives and three of the top five sources of enjoyment during DP related to enjoyment which occurred during DP and not after the fact. The Challenge Perspective was the most frequent (15 of 18), the Mastery Perspective was second (13 of 18) and the Sensory Perspective fifth (7 of 18). Overall, true enjoyment perspectives were discussed 35 times and false perspectives 31. Additionally, the “true enjoyment” perspectives tended to be discussed in much greater detail than the “false enjoyment” perspectives. Thus, the content of the interviews, like the activity ratings, provided support for the proposition that at least some DP activities in sport are enjoyable.

The two most frequently discussed “false enjoyment” perspectives were the Results Perspective (12 of 18) and Social Perspective (10 of 18). Although, the “true” enjoyment perspectives were discussed slightly more often and in more depth, “false” perspectives were also discussed very widely. Of the 18 participants who were interviewed, 16 indicated that they enjoyed DP at least in part due to considerations from the Results or the Social Perspectives. This lends support to Ericsson’s contention that many athletes enjoy the results of practice and the social aspects of practice as opposed to the DP itself. However, all 18, including the 16 who discussed “false” enjoyment perspectives, also provided at least one of the “true enjoyment” perspectives as the reason for rating DP activities as being highly enjoyable.

These results indicate that it may be overly simplistic to attempt to classify DP as inherently enjoyable or non-enjoyable. The results do provide strong evidence that many athletes at least perceive that they enjoy DP in sports and that perception of enjoyment comes from a variety of sources, both internal and external.

Practical Implications for Training in Sport

Given that many athletes perceive DP in sports to be enjoyable, there are certain practical implications for aspiring expert athletes and for their coaches and parents. Ericsson et. al. (1993) in establishing the DP framework, determined that the performance of a substantial amount of DP is necessary to achieve excellence in any domain, whether it be music, chess or sport. Scanlan et al. (1993), in establishing the sport commitment model, determined that the decision to remain committed to a sport, and thus complete the necessary DP to achieve excellence, is strongly influenced by several major factors of which sport enjoyment is one.

The present study, investigating athletes' perspectives of enjoyment of DP, has determined that athletes performing DP receive enjoyment from several sources, which interact to provide an overall perception of enjoyment of DP. If these perspectives can be structured into practice, promoted as part of the sport, or taught to athletes, then athletes may perceive DP to be more enjoyable and remain committed to a sport for a longer period of time, perhaps long enough to achieve the status of expert performers.

A review of the top four perspectives of enjoyment related to DP suggests some basic guidelines that might help athletes to better enjoy DP and remain committed to their sport. Given that 50% of the athletes interviewed regarding enjoyment perspectives were from the most elite group and while less than 17% of the interview group were from the lowest performance group it should be kept in mind that these recommendations will be more relevant to athletes performing at the higher levels within their sport.

Promote challenges. The interviews revealed that the most common enjoyment perspective related to training viewed the personal challenges that confront athletes

performing DP to be a highly enjoyable aspect of training. Since sports are, by their very nature, physical and skill-related challenges against an opponent, is not that surprising that the athletes in this study enjoyed the challenges of DP. What was more interesting was that some of the athletes who enjoyed the challenges of DP were extremely competitive people who structured their own personal challenges into the DP above and beyond the obvious challenges posed by the DP itself.

This procedure of setting personal challenges within the context of a practice activity, which is very similar to the act of setting of short-term practice goals, is a skill that can be taught to athletes. Similarly, the design of practice can be structured so as to emphasize performance benchmarks and encourage the setting of mini-goals or challenges during training.

The second important practical suggestion related to challenges emerges from what participants had to say about the difficulty of their particular sport. Some of them commented that they chose the sport of swimming over others because it was difficult, while in a similar vein, others commented that they probably would have left the sport if it had not been so challenging. Clearly this suggests to coaches that making training easy is not the way to promote enjoyment and long-term commitment to a sport. On the contrary, it appears that ensuring that DP is consistently challenging may actually help to increase athlete enjoyment of DP.

Recognize moments of mastery. The second most common enjoyment perspective of DP was the feeling of mastery that athletes had when performing DP. This finding is not that surprising and reflects the fact that people like being competent. These athletes

liked doing what they knew that they did well and in the case of swimming, they enjoyed doing the DP associated with a sport in which they knew that they were highly skilled.

There are two important implications related to this perspective of enjoyment. The first is that athletes are more likely to enjoy a sport and the DP associated with it if they believe that they are highly skilled in at least some aspects of that sport. This suggests to coaches and instructors that it is extremely important to ensure that athletes are aware of what they are doing well. If athletes believe that they have some ability, they are more likely to enjoy the hard work of DP necessary to further improve.

The second implication of this sport enjoyment perspective is that the more that athletes believe in their abilities, the more that they are likely to enjoy the DP that is necessary for improvement. It is possible that this may partly explain the seemingly exponential increase in DP by athletes at higher levels. While it may be the case that increased DP is necessary to achieve higher levels of performance, it may also be that it is only as athletes achieve the higher levels of performance that will enjoy and willingly perform the more demanding amounts of DP performed at those levels.

In other words, even though it takes increasing amounts of DP to improve, it may be advisable to maintain a balance between the amount of DP performed by an athlete and the amount of success that they are having. The greater the success, the more DP that an athlete is likely to enjoy and perform. Similarly, if an athlete is struggling, regardless of conventional physical training guidelines, that may not be a time to increase the amount or the intensity of the DP.

Demonstrate positive results. The third most common perspective of enjoyment of DP related to the benefits of performing DP. This concept, of athletes enjoying

practice because of the results of that practice, is part of the traditional model for motivating athletes to perform the DP necessary to develop abilities in a sport.

The interviews supported the proposition that athletes perform DP and perceived that they enjoyed DP because they welcomed the performance improvements that resulted from DP. Accordingly, the results suggest that athletes will perceive that they enjoy DP more when efforts are made to demonstrate that their performance was improving and that there was a direct correlation between the DP and the performance improvements.

What the athletes had to say about the enjoyment of the results of DP also sheds some new light on the effective use of training results as a motivational tool. Although sport has traditionally used the results perspective as the primary motivational tool to encourage athletes to train, it was only the third most common perspective of enjoyment of DP. Thus, perhaps this enjoyment perspective has received too much focus by those seeking to keep athletes interested in and committed to a sport. In fact, the interviews would appear to suggest that the most effective way to keep athletes enjoying training and committing to a sport would be to focus on promoting several different perspectives of enjoyment in addition to enjoyment of improved results.

In addition to the relative importance of performance improvements as a motivational tool, the interviews also revealed that many athletes enjoyed another natural result of DP: improved health and fitness. This secondary component of the enjoyment of the results of DP strongly emerged from the comments by some of the athletes in the follow-up interviews. Since they enjoyed the improved health and fitness of DP,

demonstrating to athletes that their health or fitness was improving as a result of the DP they performed, was likely to help those athletes to perceive DP as being more enjoyable.

Provide teammates and training partners. The fourth most common enjoyment perspective of DP related to enjoyment of the social aspect of DP in sport. What is interesting is what the athletes had to say with regard to what it was about the presence of teammates that athletes found enjoyable. Very few athletes indicated that they attended or performed practice in order to be with teammates. However, having teammates or training partners around clearly enhanced the enjoyment of the training experience. Just the presence of teammates made the athletes feel that they were part of a community or family. It was not so important that the athletes be close friends with the teammates, but rather that they be in the company of others pursuing a similar goal and undergoing a similar experience.

What was most clear was the effect that a lack of teammates or training partners would have on the perceived enjoyment of the training experience. Training without teammates would have made otherwise enjoyable training into an entirely foreign and definitely non-enjoyable experience. It was not so much that the athletes attended practice for the presence of teammates, it was more that the hard training without teammates would have created a distinct sense of isolation that would have been non-enjoyable.

On a simplistic level, it appears as if the only practical implication of the social perspective of enjoyment is that practice is more enjoyable with teammates than without them. However, if the comments are looked at more closely, there is a distinct underlying theme dealing with the avoidance of isolation and the search for others with something in

common. When one considers the enormous time demands associated with training to achieve an expert level in sport, it becomes obvious that to some extent the training will have the effect of isolating the athlete from much of society. Thus what the athletes seem to be looking for in teammates is simply someone else following a similar path, making similar sacrifices. Given that this is the case, in order to minimize feelings of isolation what needs to be provided is not teammates with social compatibility, but rather, teammates with sport-commitment compatibility. It is only these teammates with similar levels of commitment who, by their daily presence in practice, will be able to effectively diminish feelings of isolation and create a sense of community.

CHAPTER VI

CONCLUSION

The original DP framework presented by Ericsson et al. (1993) viewed DP as having clear characteristics that were transferable across different domains of expertise. The findings of this study corroborate others from a growing body of sport-related research into DP (Helson et al., 1998; Hodges & Starkes, 1996; Young & Salmela, 1998) which suggests that the characteristic of enjoyment is not transferable across domains, particularly into the domain of sport.

Concerns with previous research indicating that the athletes were rating highly relevant, highly effortful activities as enjoyable were that such athletes either enjoyed the interaction with teammates or were rating the results of training rather than the training itself. However, this study, in addition to finding high relevance, high effort activities rated as being enjoyable, also determined through follow-up interviews, that some athletes rated such activities as enjoyable because they liked certain aspects of the activity itself, as opposed to only the results of the training or the interactions with teammates.

These findings, in concert with the previous sport-related research, suggest that when classifying DP in the domain of sport, a sport modified DP framework ought to be applied. Such a framework would vary from Ericsson's original framework in that the enjoyment or non-enjoyment of a practice activity would be irrelevant when determining whether or not the activity could be classified as DP.

Also, this study provided some clarification regarding the nature of enjoyable DP in the sport domain. Based on the results of interviews with athletes conducted during

and after demanding training, this study revealed that the enjoyment of sport-related DP comes primarily from five different perspectives including: the enjoyment of challenges, mastery, results, social interactions and of the sensations of training. Three of these perspectives (challenge, master and sensory) view the enjoyment of sport-related DP as being inherent to the performance of the practice activity. The other two perspectives viewed athletes as deriving enjoyment from the results of training and the training environment (results and social).

By deliberately attempting to promote these perspectives of enjoyment it may be possible to induce or enhance enjoyment of sport-related DP and thus, increase the likelihood that athletes will remain with a sport long enough to perform sufficient DP necessary to become an expert performer. In fact, given the demands of training, it is possible that viewing DP as enjoyable through one or more of these perspectives of enjoyment is critical for an athlete to remain committed to a sport for long enough to achieve a high level of expertise.

Directions for future research might be to determine if there is a pattern to the number, the quality or the kind of enjoyment perspectives utilized by athletes at different levels of expertise. The present study while involving three different levels of athletes did not attempt to determine if there was a relationship between level of expertise of the athlete and the dominant enjoyment perspective for DP. In addition, this study involved an individual sport and the investigation into perspectives of enjoyment for team sports might provide another direction for future research.

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Appendix A:

**Deliberate Practice in Swimming
Questionnaire Booklet**

INSTRUCTIONS TO COACHES

Administering the Questionnaire

Prior to the Administration Date

1. **Contact Garry Watanabe by phone (613) 230-0823 or email Garryw@cyberus.ca, when you have received the questionnaire package. Schedule a date and time for Garry to attend a practice and administer the questionnaire.**
2. **Hand out the explanatory letter and consent forms two (2) weeks prior the date that Garry will attend to administer the questionnaire. Advise swimmers that only those swimmers who have returned signed consent forms will be permitted to participate in the study.**
3. **Reserve a location where the swimmers can meet and complete the questionnaire. A warm, dry area with writing surfaces, such as a meeting room would be ideal. The questionnaire will take approximately 30 minutes to complete.**

On the Administration Date

1. **Meet with Garry and arrange for him to have access to the meeting area 15 minutes prior to the arrival of the swimmers so that he can set-up the materials.**
2. **Verify that every athlete present has handed-in a signed consent form. Distribute the questionnaire booklets and writing instruments to the swimmers. Introduce Garry to go over the instructions for completing the questionnaire.**
3. **Have the swimmers turn to page one and complete the Athlete Profile. Swimmers will have to refer to page two and determine from the Table of Performance Times the sample group in which they belong. (OT / Less 5% / Less 15%)**
4. **Have the swimmers then turn to page three and read through the training activities. Swimmers should be advised of the following:**
 - **every activity they do to train for swimming should fit under one of the categories**
 - **if any of the activities seem unclear they should ask for clarification. These questions should be discussed in front of the entire group so that the questions help to clarify matters for the entire group.**

5. Have the swimmers then turn to page four and complete the ratings of each of the activities along the four dimensions of relevance, enjoyment, effort and concentration. Swimmers should be advised of the following:
 - a low rating such as a zero (0) means a very, very small amount.
 - a high rating such as a ten (10) means a very, very large amount.
 - try to be honest and accurate but do not spend too much time trying to find the exactly correct answer for each rating.
 - if you believe that you have not performed an activity, first clarify with the coach, and then write “NA” in the space
 - “relevance” means the degree to which the activity will make you a better swimmer.
 - “effort” means the amount of physical effort required to properly perform the activity.
 - “enjoyment means the degree to which you find the activity to be enjoyable while you are performing the activity. This is different from enjoying the results of the activity. For example often when people say that they enjoy cleaning, what they really mean is that they like having a clean house. We want you to evaluate the activity itself.
 - “concentration” refers to the amount of mental focus required to properly perform the activity

6. Collect the completed questionnaires, place them in an envelope. Conduct a debriefing session to answer any additional questions. Advise swimmers that some MAY be contacted for interviews relating to their ratings. The decision whether or not to participate in the interview afterward is completely voluntary. Thank the swimmers all participants for their assistance.

[University of Ottawa Letterhead]

July 1, 1998

Re: "Enjoyment During Effortful Practice" Research Project

The purpose of this letter is to inform you of research that I am performing and to solicit your cooperation in this project. Your coach has been fully informed of this study and has advised me that he/she is prepared to offer his/her full cooperation.

I am a Master's student in the Faculty of Human Kinetics at the University of Ottawa working with Professor John Salmela who, along with colleagues, is performing research to determine the processes and mechanisms by which athletes acquire the skills necessary to perform at the highest levels in their chosen sport.

This particular project is part of that ongoing research and seeks to look into some motivational issues regarding why people participate in their chosen sport. This study will take place in two parts. During the first part, all participants will be asked to complete a questionnaire which rates qualities of various practice activities. During the second part, a few participants will be selected for one or more in-depth interviews which will take place during and after training sessions.

Your participation in this study is entirely voluntary. You may choose not to participate at the outset or you may change your mind and withdraw at any time without fear of reprisal. You also have the option of completing part of the questionnaire. Further, if you complete the questionnaire and are selected for an interview, you may refuse the interview, again without fear of reprisal. All information collected in the course of this study will be kept completely confidential and, once the data has been collected, any identifying information will be destroyed and only the anonymous responses will be maintained.

Your cooperation would be very much appreciated. If you are willing to participate, please return the signed consent form to your coach. If you do not return the signed consent form you will not be permitted to participate in this study. If you have any further questions regarding the study, please do not hesitate to contact me by telephone at (613) 230-0823 or by e-mail at garryw@cyberus.ca.

Sincerely,

Garry Watanabe

Consent to Participate in Research

Please complete only the first OR the second portion of this consent form.

PART ONE (Only to be completed if you are 18 years of age or older)

I, _____ (full name) am 18 years of age or older. I have read the letter explaining the study by Garry Watanabe into “Enjoyment During Effortful Practice” and understand the nature of the study. I hereby give my consent to be a participant in the study.

SIGNATURE OF SWIMMER

DATE

PART TWO (To be completed by Parent/Guardian if you are under 18 years of age)

I, _____ (parent/guardian’s full name) have read the letter explaining the study by Garry Watanabe into “Enjoyment During Effortful Practice” and understand the nature of the study. I am the parent / legal guardian of _____ (swimmer’s full name) and hereby give my consent for him / her to be a participant in the study.

SIGNATURE OF PARENT/GUARDIAN

DATE

SWIMMER PROFILE

Test Group: OT / Less 5% / Less 15%

Club:

Initials:

Age:

Sex: M / F

At what age did you start taking swimming lessons at any level?

At what age did you start swimming for a club?:

How many times per week do you train right now?:

What is the average length of your practices?:

How many months will you train this season?:

What has been the performance highlight of your swimming career so far?:
(ie. qualifying for Jr. Nationals, bronze medal at Provincials)

During what year was this highlight achieved?:

TABLE OF COMPARISION TIMES
For Classifying Athletes into Performance Groups

Less 15%	WOMEN Less 5%	OT Standard	EVENT
:31.28 mins.	28.56mins.	:27.20 mins.	50m Freestyle
1:08.43 mins.	1:02.48 mins.	:59.50 mins.	100m Freestyle
2:27.78 mins.	2:14.93 mins.	2:08.50 mins.	200m Freestyle
5:12.11 mins.	4:44.97 mins.	4:31.40 mins.	400m Freestyle
10:46.07 mins.	9:49.89 mins	9:21.80 mins.	800m Freestyle
1:17.51 mins.	1:15.02 mins.	1:07.40 mins.	100m Backstroke
2:47.21 mins.	2:32.67 mins.	2:25.40 mins.	200m Backstroke
1:26.83 mins.	1:23.24 mins.	1:15.50 mins.	100m Breaststroke
3:07.57 mins.	2:51.26 mins.	2:43.10 mins.	200m Breaststroke
1:15.21 mins.	1:08.67 mins.	1:05.40 mins.	100m Butterfly
2:45.26 mins.	2:31.60 mins.	2:23.70 mins.	200m Butterfly
2:47.10 mins.	2:32.57 mins.	2:25.30 mins.	200m Individual Medley
5:55.58 mins.	5:24.66 mins.	5:09.20 mins.	400m Individual Medley

To convert to SC meters divide times by 1.03
 To convert to SC yards divide times by 1.13

EVENT	OT Standard	MEN Less 5%	Less 15%
50m Freestyle	:24.40 mins	:25.62 mins.	:28.06 mins.
100m Freestyle	:53.20 mins.	:55.86 mins.	1:01.18 mins.
200m Freestyle	1:57.00 mins.	2:02.85 mins.	2:14.55 mins.
400m Freestyle	4:10.20 mins	4:22.71 mins.	4:47.73 mins.
1500m Freestyle	16:37.90 mins	17:27.80 mins.	19:07.59 mins.
100m Backstroke	1:00.20 mins.	1:03.21 mins.	1:09.23 mins.
200m Backstroke	2:09.70 mins	2:16.19 mins.	2:29.16 mins.
100m Breaststroke	1:07.80 mins.	1:11.19 mins.	1:17.97 mins.
200m Breaststroke	2:29.90 mins.	2:37.40 mins.	2:52.39 mins.
100m Butterfly	:58.20 mins.	1:01.11 mins.	1:06.93 mins.
200m Butterfly	2:09.20 mins.	2:15.66 mins.	2:28.58 mins.
200m Individual Medley	2:12.30 mins.	2:18.92 mins.	2:32.15 mins.
400m Individual Medley	4:43.90 mins.	4:58.10 mins.	5:26.49 mins.

SWIMMER TRAINING ACTIVITIES (Should Include All Forms of Practice)

Systematic Training/ Fitness

<u>Activity</u>	<u>Description</u>
Basic Endurance	long sets; 50-1500 meter repeats at 60%-75% effort; 5-15 seconds rest; pulse 120-140
Threshold	long sets; 50-400 meter repeats at 80% -85% effort; 0:15-1:00 mins. rest between repeats; pulse 150-170
VO2 Max	long sets: 50-400 meter repeats at 85%-90% effort; 1:00-2:00 mins. rest between repeats; pulse 180-190
Lactic	race pace swims; 25-200m repeats at 90%-95% effort; 4:00-8:00 mins. rest between repeats
Alactic	fast explosive sprints; 10-25m repeats at 100% effort
Kick	kick only sets with or without a board
Pull	pulling only sets with or without paddles

Technical Work

<u>Activity</u>	<u>Description</u>
Drills	stroke drills during sets to improve swimming technique
Skills	practicing starts, turns, relay takeovers
Equipment	using training equipment such as buckets, cords, fins
Strategy	preparation and practice of race plans, pacing, tactics
Racing	racing at meets or in practice
Coach	one on one or small group work with a coach
Video Review	observing own performance on video

Dry Land Training

<u>Activity</u>	<u>Description</u>
Flexibility	various forms of stretching to increase flexibility
Free Body	strength training using body weight: sit-ups, pushups, jumps
Weights	strength training using equipment: weights, medicine balls, tubing
Cross Training	non-swimming aerobic training such as running, cycling, rowing
Mental Training	visualization, relaxation, goal setting

ATHLETE RATINGS OF TRAINING ACTIVITIES
(Rated from 0 - 10, minimum to maximum amounts)

ACTIVITY	Relevance to improving performance 0=least possible relevance 10=highest possible relevance	Effort physical effort required to perform the activity 0=least amount of effort 10=highest possible effort	Enjoyment obtained from performing the activity 0=least amount of enjoyment 10=high possible enjoyment	Concentration mental effort required to perform the activity 0=least amount of concentration 10=highest possible concentration
1. Basic End				
2. Threshold				
3. VO2 Max				
4. Lactic				
5. Alactic				
6. Kick				
7. Pull				
8. Drills				
9. Skills				
10. Equipment				
11. Strategy				
12. Race				
13. Coach				
14. Video Rev				
15. Flexibility				
16. Free Body				
17. Weights				
18. Cross Tr				
19. Mental Tr				

Appendix B:
Follow-up Interview Guide

FOLLOW-UP INTERVIEW GUIDE

Probes Relating to Enjoyment of DP

Preamble

You rated certain activities as being highly relevant, requiring a high amount of effort and concentration and as being highly enjoyable at the same time. I would like to clarify what you mean when you describe these activities as being enjoyable. Please think back to some recent training sessions in which you performed these activities and keep these sessions in mind when you answer the follow questions:

Descriptive Probes

Describe what you mean when you say that you find the activity to be enjoyable? What is it about the activity that you find enjoyable? Is it a physical feeling, a sense of satisfaction or something else? Is the activity always enjoyable in the same way and for the same reasons?

Clarification Probes

Often when people say that they enjoy housecleaning, what they generally mean is that they enjoy the results of housecleaning - a clean house - but they do not enjoy the activity itself? Did you rate any of the activities as being enjoyable when in fact what you actually enjoyed was the result as opposed to the activity itself?

Does the enjoyment occur while you are doing the activity or after you are done. Do you look forward to doing the activity or do you look forward to completing the activity?. What sort of things do you say to yourself before you start the activity?

Does your enjoyment of the activity have to do with how you physically feel right after you complete the activity. Does it have something to do with how you physically feel some time after completing the activity?

Does it matter that you that performing these activities will make you a faster swimmer? If the activity were not so relevant to improving performance, would this affect how much you enjoyed performing it?

Have you always found these activities to be enjoyable? If you did not find these activities to be enjoyable, would you be troubled by the fact that you perform them on a regular basis? Would you continue to perform these activities?

Did you at any time when performing the enjoyable activities, feel as if you were “in the zone” and everything was effortless and going right for you? Was this the source of your enjoyment of the activity or would the enjoyment still be there without that feeling?

Does the opportunity to interact socially with team mates, coaches or opponents form the basis of any of your enjoyment of the activities you rated as being enjoyable. Would you still enjoy these activities if there were no opportunity for social interaction?

Contrast Probe

Do you recall any occasions when you performed these activities and the enjoyment was not present? What was it about these instances that caused the activity to not be enjoyable? What factors were present in the enjoyable instance and absent in the non-enjoyable instance?

Authenticity Probe

Is there anything else you feel is important to explain about this topic that we have not discussed? Do you think that you have described your experiences and perceptions as completely as is possible given language constraints? Did I lead or bias you in any serious ways? Is there anything that you would like to clarify now?

Appendix C:
Ethics Approval Documentation

Garry Watanabe
36 Halldorson Crescent
Kanata, Ontario
K2K 2C7

July 19, 1998

J. Roger Proulx, Ph.D.
Chair, Human Research Ethics Committee
The University of Ottawa
Faculty of Health Sciences
Office of the Dean
451 Smyth Rd
Ottawa, Ontario
K1H 8M5

Dear Dr. Proulx:

Re: The acquisition of exceptional performance in sport

By letter dated April 18, 1997, the Human Research Ethics Committee granted ethics approval to a project by Professors John Salmela, Pierre Trudel and Jean Cote entitled "The acquisition of exceptional performance in sport".

I am a student of Professor Salmela's in the Master of Human Kinetics (Sport Psychology), thesis program. I am writing this letter to you at the request of Professor Salmela to notify you of research that I am performing as part of Professor Salmela's study into the acquisition of exceptional performance.

Attached to this letter is an outline of my study as well as a copy of the documentation in which the Ethics Committee granted ethic's approval to the project. If you require any further information or documentation regarding this matter, please do not hesitate to contact me by telephone at 613-592-4452 or by e-mail at garryw@cyberus.ca.

Yours truly,

Garry Watanabe

cc. John Salmela

SUMMARY OF RESEARCH PROPOSAL

Explanatory Perspectives of Enjoyment during Effortful Practices for Swimmers of Varying Levels of Expertise.

Ericsson et al. (1993) in a study into expert musicians, proposed a framework of deliberate practice in which exceptional performance is explained entirely by the kind and amount of practice done by the performer. In the sport setting, several studies have indicated that deliberate practice activities share three common dimensions: they are very relevant to the demands of the particular sport, they require a high level of mental concentration and they require a high level of physical effort. Unlike studies from the domain of music, the studies in the sport setting did not find that deliberate practice activities were rated as being inherently non-enjoyable.

This Study will proceed in two phases. During the first phase, coaches at several different Swim Clubs and University Swim Teams will be contacted and access to their senior training group will be requested. Coaches will be asked to distribute an explanatory letter and a consent to participate in the study, to all swimmers in the relevant group. The coaches will then administer the questionnaire several days later to all swimmers who have returned signed consent forms. The swimmers will be asked to take a comprehensive list of swimmer training activities and to rate all of the activities according to four (4) dimensions: relevance to improving performance, amount of enjoyment, amount of mental concentration required to perform the activity and amount of physical effort required to perform the activity.

Following this, certain swimmers who rated highly effortful activities as being highly enjoyable will be interviewed to determine the nature of their enjoyment of the highly effortful training activities. It is hoped that if the enjoyable characteristics of practice activities can be identified, then this information can be applied more widely to make all kinds of training activities more enjoyable to the participants. Since, under Ericsson's framework, the motivation to practice in sufficient quantities is one of the chief constraints to achieving expert performance, the results of this study could significant tools to coaches and teachers.

Attached to this document is the explanatory letter and consent form that must be signed and returned in order to participate in the study.

[University of Ottawa Letterhead]

July 1, 1998

Re: "Enjoyment During Effortful Practice" Research Project

The purpose of this letter is to inform you of research that I am performing and to solicit your cooperation in this project. Your coach has been fully informed of this study and has advised me that he/she is prepared to offer his/her full cooperation.

I am a Master's student in the Faculty of Human Kinetics at the University of Ottawa working with Professor John Salmela who, along with colleagues, is performing research to determine the processes and mechanisms by which athletes acquire the skills necessary to perform at the highest levels in their chosen sport.

This particular project is part of that ongoing research and seeks to look into some motivational issues regarding why people participate in their chosen sport. This study will take place in two parts. During the first part, all participants will be asked to complete a questionnaire which rates qualities of various practice activities. During the second part, a few participants will be selected for one or more in-depth interviews which will take place during and after training sessions.

Your participation in this study is entirely voluntary. You may choose not to participate at the outset or you may change your mind and withdraw at any time without fear of reprisal. You also have the option of completing part of the questionnaire. Further, if you complete the questionnaire and are selected for an interview, you may refuse the interview, again without fear of reprisal. All information collected in the course of this study will be kept completely confidential and, once the data has been collected, any identifying information will be destroyed and only the anonymous responses will be maintained.

Your cooperation would be very much appreciated. If you are willing to participate, please return the signed consent form to your coach. If you do not return the signed consent form you will not be permitted to participate in this study. If you have any further questions regarding the study, please do not hesitate to contact me by telephone at (613) 230-0823 or by e-mail at garryw@cyberus.ca.

Sincerely,

Garry Watanabe

Consent to Participate in Research

Please complete only the first OR the second portion of this consent form.

PART ONE (Only to be completed if you are 18 years of age or older)

I, _____ (full name) am 18 years of age or older. I have read the letter explaining the study by Garry Watanabe into “Enjoyment During Effortful Practice” and understand the nature of the study. I hereby give my consent to be a participant in the study.

SIGNATURE OF SWIMMER

DATE

PART TWO (To be completed by Parent/Guardian if you are under 18 years of age)

I, _____ (parent/guardian’s full name) have read the letter explaining the study by Garry Watanabe into “Enjoyment During Effortful Practice” and understand the nature of the study. I am the parent / legal guardian of _____ (swimmer’s full name) and hereby give my consent for him / her to be a participant in the study.

SIGNATURE OF PARENT/GUARDIAN

DATE

Appendix D:
Corrected Thesis Proposal

**Explanatory Perspectives of Enjoyment During Deliberate Practice Sessions
for Competitive Swimmers of Varying Levels of Expertise**

**by
Garry Watanabe**

THESIS PROPOSAL

**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**

Date of Submission: February, 1998

REVIEW OF LITERATURE

Although it is not yet clear what role inherited or innate characteristics have to play in determining if an individual becomes an expert at performing a particular activity, numerous studies now suggest that expert performers require at least 10 years or 10,000 hours of practice to acquire the necessary skills to perform at an expert level.. This 10-year rule was first proposed by Simon and Chase (1973) and has subsequently been found to be relevant in domains as diverse as chess (Charness, Krampe, & Mayr, 1996), music (Bloom, 1985; Ericsson et al., 1993), art (Bloom, 1985); science (Bloom, 1985) and more recently, sports (Bloom, 1985; Kalinowski, 1985; Ericsson, 1990; Ericsson, Krampe & Tesch-Romer, 1993; Hodges & Starkes, 1996; Helsen, Starkes & Hodges, 1998; Starkes, Deakin, Allard, Hodges, & Hayes, 1996; Young, 1998)

The study in which Chase and Simon (1973) initially proposed the 10-year rule involved the cognitive assessment of the skill of memory retrieval within the game of chess. The results revealed that chess skills could only be acquired by performing chess-related activities and led Chase and Simon to conclude that the characteristic skills of experts could only be acquired through practice within their domain of expertise.

Subsequent research by Bloom (1985), profiling the developmental history of expert performers in a number of domains, revealed the significant role of the social context in the development of the expert performer. Bloom spearheaded a group of investigators who studied the developmental patterns of expert artists, scientists and athletes along with the roles that family and mentors or coaches played in their careers. The developmental profiles of these 120 expert performers revealed how the social

context played a significant determining role in shaping the development of talented performer across the early, middle and late stages of their careers. Bloom thus suggested that the situational context and the role of family, mentors and coaches overrode innate abilities possessed by the developing performer.

The Deliberate Practice Framework

Following up on the work of Bloom and colleagues, Ericsson et al. (1993) more closely examined the role of practice in the development of expert musicians. The investigators contrasted measures between three skill levels of violinists, all of whom had practiced the violin for more than 10 years. Using retrospective recall of the performers' career's, the investigators were able to estimate each violinist's amount of accumulated practice from the time they commenced playing their instrument until the date of the study. In the first part of the study, the violinists were asked to rate their practice and everyday activities according to three dimensions: relevance to improving performance, inherent enjoyment of the activity, and effort required to perform the activity. The results failed to yield any differences between the three performance groups in terms of their perceptions of practice. In other words, the mean ratings for the three skill groups were not significantly different which allowed the ratings of all three groups to be evaluated as if they were one large group.

In the second part of the study, the violinists were asked to retrospectively estimate weekly amounts of practice each year from the year they first took up playing the violin until the age of 18 years. Analysis of the results indicated that differences in the amount of practice could be used to reliably predict the differences in skill level. By the age of 18 years of age, the "best" groups of violinists had engaged in significantly more

practice alone with the violin than the “good” group. Further, both the “best and “good” groups had significantly higher totals than the “lower criteria” violinists. Since all three groups started playing the violin at similar ages, the differences in total accumulated amounts of practice were attributed to differences in the weekly amounts of practice.

These results were replicated in similar studies involving pianists (Krampe, 1994; Krampe & Ericsson, 1996). In these studies, expert pianists provided estimates of the weekly amounts of practice for each year from the time that they had taken up the piano until the date of the study. These estimates were then used to calculate estimated total amounts of practice performed by each pianist. The results indicated that the expert pianists practiced significantly more than the amateurs on a yearly basis and that by the age of 18 years of age, the expert pianists had performed exponentially more practice than the amateurs.

Based upon their research Ericsson, Krampe and Tesch-Romer (1993) proposed a framework of *deliberate practice* (“DP”) in which innate talent plays no role in the development of expertise. According to the DP framework, the amount of DP of relevant skills is the primary cause and therefore the most significant predictor of mastery over a task, whether it be in the field of chess, music, art, athletics or scientific achievement. This framework essentially discounts any determining role of inherited characteristics in the development of the ability to perform a task at an expert level.

The framework describes DP as being highly structured, purposeful forms of practice that are highly relevant to improving performance in a domain and which are not inherently enjoyable (Ericsson et al., 1993). In addition, the practice is described as being designed to achieve specific goals and built into the practice are opportunities to obtain

feedback and correct errors. The definition distinguishes DP from non-effortful practice-like activities and from enjoyable or play-like activities in which the performer may accumulate hours of experience without acquiring much in the way of skill development. The definition also distinguishes DP from work-like or volunteer work-like activities which lead to immediate monetary or social rewards.

Deliberate Practice and Sport

Although this DP framework was not developed on the basis of sport research, Ericsson in several publications has used sport research by others to infer that the DP framework was applicable to the development of expertise in sport domains. (Ericsson, 1996; Ericsson & Charness, 1994; Ericsson et al., 1993; Lehmann & Ericsson, 1996). More recently Hodges and Starkes (1996) and Helsen, Starkes and Hodges (1998) tested the DP framework in the domain of individual and team sports. The study by Hodges and Starkes (1996) looked at the individual sport of wrestling. The study compared “international” and “club” level wrestlers who had been wrestling for 10 or more years. In the first part of the study, the wrestlers were asked to rate a list of sport-related and everyday activities according to their relevance, enjoyment and physical effort, as well as a fourth dimension: concentration or mental effort. As was the case for Ericsson et al. (1993), the results failed to yield differences in the mean ratings of relevance, effort, enjoyment or concentration for the skill groups. Once again this allowed the groups to be collapsed and the ratings analyzed as if they were from one large group.

In the second part of the study the wrestlers retrospectively recalled weekly amounts of practice at the start of their careers and at stages three years apart up until the date of the study. One significant improvement of this study was that during the recall

segment of the study several steps were taken to verify the accuracy of the estimates, including randomly selecting athletes from the sample and comparing their retrospective estimates with the results of a one week in-season training diary. The results showed that “international” wrestlers devoted significantly more time to practice than did the “club level” wrestlers from as early as three years into their career. In addition, the difference in practice time between the two groups increased as wrestlers progressed into their respective careers.

While Ericsson et al. (1993) had found differences in the skill groups between cumulative amounts of individual practice, Hodges and Starkes (1996) found there to be significant differences in the skill groups between cumulative amounts of group practice but not individual practice. This difference may be due to the fact that wrestling is an activity that requires the presence of an opponent and therefore, the most relevant training activities required the presence of others. Alternatively, this finding may simply reflect that both the expert wrestlers and violinists engaged in higher total amounts of practice than their less skilled counterparts, but for the wrestlers, there were more opportunities to practice with others while for the violinists there were more opportunities to practice alone.

In addition, the study found that practice activities judged to be the most relevant were also perceived as relatively more enjoyable than the majority of practice exercises which was contrary to what Ericsson’s DP framework would have predicted.

Following the study with wrestlers, Helsen, Starkes and Hodges (1998) replicated the results in a related study when they applied the DP framework to the development of expert athletes involved with team sports. In the first part of the study, international ,

national and provincial soccer and field hockey player recalled the amounts of time they spent in individual and team practice, sport-related activities and everyday activities from the start of their career and every subsequent 3 years. In the second part of the study, the practice activities were rated in terms of their relevance for improving performance, inherent enjoyment and required effort and concentration. As in the study of athletes from individual sports, a monotonic relationship between total amounts of combined individual and team practice and skill level was found. In addition, the authors found that at around nine years into their careers, the expert team-sport athletes showed steep increases in the amount of time spent practicing with a team.

More recently, Young (1998) applied the DP framework to the study of middle distance runners. In this study, Canadian middle distance runners were recruited and divided them into three groups: an elite group who had achieved 1996 Olympic Trials Provisional Qualifying Standard times, a group who had achieved times within 5% of the 1996 standard, and a group who had achieved times within 15% of this criterion time.

In the first part of the study, runners in the three groups rated running-related and everyday activities according to the same four dimensions of relevance, effort, enjoyment, and concentration used by Hodges and Starkes (1996). Similar to the findings of Hodges and Starkes, Young (1998) also found that that elite runners and runners in lower skill groups had the same perception of practice according to the four dimensions allowing the groups to be collapsed for analysis.

In the second part of the study, the current and past levels of practice for the three skill groups were compared. A significant strength of the study was that the subjects' estimates of current and past practice were assisted by reviewing training logs rather than

relying solely upon their retrospective recall. Unlike some of the previous studies, Young (1998) found no significant differences in practice amounts between the three groups. This finding may reflect the fact that the comparison groups were all fairly close in terms of level of performance and, therefore, any differences in practice amounts were too subtle to register a significant difference without using larger sample size. Alternatively, this finding may reflect the possibility that expert performers in previous studies overestimated their retrospective amounts of practice. This tendency would have been curbed in Young's study as all his subjects recalled all practice amounts with the assistance of training logs for all of the years covered in the study. It is likely that a combination of both factors explains the apparently similar amounts of practice among the three skill groups.

Re-defining the DP Framework

All of the DP studies related to sport suggest that the original framework proposed by Ericsson et al. may require some modification in the sport setting. The first such modification, which was proposed by Hodges and Starkes (1996), involves evaluating the "effort" component of DP splitting that component into two separate concepts, "concentration" to signify mental effort, and "effort" to signify physical effort. While it did not appear that musicians required the distinction when evaluating practice activities, all the previously mentioned sport-related studies found that athletes were readily able to distinguish between those activities that they perceived as requiring high effort as opposed to high concentration. (Helsen, Starkes and Hodges, 1998; Hodges & Starkes, 1996; Young, 1998). Given the significant physical nature of sport compared to musical performances, this distinction is not that surprising. What is more problematic is to

determine the nature of the relationship between these two concepts and how they fit into the DP framework.

On the one hand, given that concentration seems to relate more closely to what the musicians perceived as effort, it could be argued that only the concentration dimension and not that of physical effort should be central to the definition of DP. On the other hand, given the physical demands of sport, it seems clear that if athletes did not perform practice activities which required great physical effort, they would not undergo the long term developmental physical adaptations necessary for the achievement of expert performance as athletes. There certainly is an argument to be made that both dimensions should be a part of the DP framework in the sport setting.

The issue then becomes whether an activity should be categorized as being DP if it requires either high mental concentration or high physical effort, or if it should only be categorized as DP if it requires a high amount of both. On the one hand, demanding that activities be rated highly in terms of both physical and mental “effort” in order to be considered to be DP may raise the threshold too high and exclude pertinent practice activities. On the other hand, classifying as DP, all activities which are rated highly in terms of either mental concentration or physical effort may dilute the definition and allow virtually every sport-related practice activity to meet the definition.

For the purposes of this study it was decided to choose a more inclusive framework and define training activities as DP if they were rated highly in terms of relevance and either effort or concentration. This decision was made for several reasons. First, previous studies involving DP and sport found that athletes were readily able to distinguish between the two concepts of physical versus mental “effort” which indicates

that the demands of sport and practice in sport may from time to time require either effort or concentration alone. Second, in the earlier DP studies with chess players and musicians, since there was only the dimension of “effort” which corresponds with “concentration”, activities in the chess and music studies were essentially being identified as DP if they were rated high in terms of relevance and “concentration” without regard to any physical demands of the practice activity. This being the case, it is likely that many of the DP activities from the music studies (Ericsson et al. (1993), Krampe (1994)) would not have qualified as being DP under the more restrictive criteria. This result simply would not make sense.

It may well be that the concentration aspect is central to the DP framework and that the presence or absence of the physical requirements of practice are largely irrelevant. However, since the realm of sports clearly has an additional and significant physical component that is not present in music or chess, it makes sense to expand the framework of DP to recognize the additional dimension of physical effort as being sort of a “brother” or “sister” dimension to mental concentration. In the absence of further research to clarify the distinction as to how “effort” and “concentration” work together as part of the DP framework, this study cannot at this time justify making DP framework more restrictive by adding further criteria to the framework.

The second proposed modification of the DP framework in the sport setting relates to the inclusion of “inherently non-enjoyable” as criteria for a training activity to be considered to be DP. Ericsson et al. (1993) argued that DP is not inherently enjoyable, but that individuals engaged in it as an instrumental means to improve their performance to attain the highest levels. In support of this claim, Ericsson et al. (1993) reviewed

studies showing that individuals who abandoned their goal to compete in a domain shortly thereafter, reduced their level of practice to that of other amateurs.

However, in each of the previously discussed DP studies in the sport settings (Helsen, Starkes & Hodges 1998; Hodges & Starkes, 1996; Young, 1998), the authors found that some of those activities that were rated most relevant were also judged to be most enjoyable. This creates an issue as to how to address those activities which athletes rate as being highly relevant, requiring high amounts of concentration or effort and at the same time as being highly enjoyable. If we strictly apply the DP framework proposed by Ericsson et al. (1993) then, any activities rated as being enjoyable cannot be considered to be DP. Yet the non-enjoyability dimension of the DP framework is in a sense fundamentally different from the other three dimensions. After all, the fundamental essence of DP is that it improves performance. It makes sense that practice activities would have to be highly relevant to the skill demands of a domain and that these practice activities would have to be executed with high amounts of concentration or effort in order to bring about performance improvements. By contrast it is not evident on the face of it that activities would have to be non-enjoyable to the performer in order to bring about performance improvements. It does seem to follow that performing highly specific tasks requiring high amounts of effort or concentration would tend to be non-enjoyable, but there is no compelling reason to suggest that this would necessarily be the case in all circumstances. Support for this position comes from the fact that sport is, at its essence, a recreational activity. Sports are “played” not performed and most people start and continue playing a sport because they enjoy doing so. There may in fact be components of sport and sport practice for which the enjoyment to the athlete cannot easily be destroyed

even by significant amounts of regimented repetition. Additional support for this position can be found in the results of the DP studies that have been performed in the sport setting (Helsen, Starkes & Hodges 1998; Hodges & Starkes, 1996; Young, 1998). While many training activities fit the original DP framework and were rated as being non-enjoyable, there were some that were rated as being highly relevant, requiring high amounts of effort, concentration or both and yet were still rated by the performers as being highly enjoyable.

For the foregoing reasons, this study will not require that activities be rated as being significantly non-enjoyable in order to fit within the DP framework. In fact this study will embrace and investigate the suggestion that athletes may perceive at least some DP activities as being enjoyable in spite of their demanding nature. Given the enormous amounts of practice required in order to achieve expert performance probably the biggest constraint to athletes achieving expert performance is for an athlete to find the necessary motivation to perform sufficient DP in order to achieve expert abilities. Thus, determining whether or not athletes truly enjoy training activities and if so, the nature of that enjoyment, has tremendous relevance to determining how and why excellence is achieved in sport.

This important relationship between the motivation to perform high amounts of DP and the effects of performing high amounts of DP was discussed by Helsen, Starkes and Hodges (1998) who compared sport enjoyment under Ericsson's framework of deliberate practice with sport enjoyment under Scanlan's sport commitment model. According the sport commitment model (Carpenter, Scanlan, Simons, & Lobel, 1993); Scanlan et al., 1993a, 1993b) the decision to stay with a sport , and perform the requisite DP, is a consequence of athlete commitment. Commitment in turn derives from several

factors including: sport enjoyment, involvement alternatives, personal investments, social constraints and involvement opportunities. Of these factors, sport enjoyment, personal investments and, to a lesser degree, involvement opportunities explain more than 68% of commitment variance. The fact that participation in sport involves significant amounts of time spent in training as opposed to competition suggests that the sport commitment model views practice for sport as being inherently enjoyable. This would directly contrast with the deliberate practice framework which looks at practice for sport as being inherently non-enjoyable. This apparent contradiction caused Helsen et al. (1998), to propose that either Ericsson's DP framework under-estimates athletes' enjoyment of practice, or the enjoyment of sport as seen by Scanlan, comes almost exclusively from performance and not practice. In either case it is evident that whether or not athletes enjoy practice has tremendous relevance as to whether or not an athlete will achieve expert performance capabilities in their sport.

Explanatory Perspectives of DP Enjoyment

In considering the question: "Why do athletes rate certain DP activities as being enjoyable?" it is helpful to consider the question in two parts. First, do the athletes actually enjoy the DP itself or is it some other aspect related to performing the DP that they enjoy? Second, if athletes actually enjoy DP, what is the nature of that enjoyment and can it be facilitated in other activities? In addressing these questions, a number of perspectives will have to be addressed which might explain either why non-enjoyable activities would be rated as enjoyable or, alternatively, why seemingly non-enjoyable tasks might actually be enjoyable to athletes.

The following discussion of the explanatory perspectives is essentially divided into two parts. The first part of the discussion will look at the possibility that the athletes might not actually find the DP activities to be enjoyable and yet rate them as such. To put it another way, the first part will look for “false enjoyment” where the true source of the enjoyment stems from a source separate from the actual performance of the DP activity. The second part of the discussion, will look at the possibility that the athletes truly enjoy performing some DP activities that are a part of their training. Put another way, the second part will look for the “true enjoyment” where the source of the enjoyment is an integral part of the training activity.

“False” Enjoyment of Practice. The perspectives discussed under this heading relate to athletes enjoying something other than the actual performance of the practice activity itself. The first such explanatory perspective relates to athletes rating training as being enjoyable when in fact what they actually enjoy is the results of the training - usually in the form of improved performance. In a study into sources of enjoyment in elite figure skating, Scanlan, Stein and Ravizza (1989) found that two of the four major sources of enjoyment by athletes in that sport, did not actually relate to enjoyment of the training itself, but rather to the results of successful, hard training. The first source involved social and life opportunities provided by participation and success in the sport. Many athletes stated that they enjoyed travel opportunities, or financial assistance to attend post-secondary education as a result of being good at their sport. The second source related to social rewards resulting from participation and success in sport. These athletes stated that they enjoyed the social recognition, both from their peers and from society at large due to their athletic success. In each of these cases the common factor is that the enjoyment

occurred after the training or practice had occurred rather than during training sessions. However, because the outcome is desirable the athletes tend to generalize that enjoyment and interpret as enjoyable, practice activities that they believe improve their abilities and make them more likely to obtain the desirable results.

If we take the sport that is the focus of the present study, competitive swimming, the goal of the sport is to swim a specific distance in a given stroke in the shortest time possible. If the swimmers can swim the distance faster than most other swimmers, they will win a lot of competitions, they will have opportunities to travel, they will receive recognition from their peers and in the media for their accomplishments and they may receive offers of athletic scholarships. Accordingly, any practice activity that the swimmers believe is making them faster will tend to be interpreted as being enjoyable. In particular, this would explain why athletes might rate those practice activities that they deem to be most relevant as also being the most enjoyable. Under this paradigm, perceived enjoyment may be outcome-contingent in that athletes will only tend to rate training as being enjoyable if the athlete evaluates his or her performance during or after practice as reflecting or a successful training session. Although the athletes may enjoy the belief that they will receive increased social recognition, social opportunities or life opportunities, in the end all the possible outcomes relate back to the perceived performance improvements resulting from practice. Because this perspective rates the results of training rather than the training itself, this perspective will be labeled the “Results Perspective”.

Second, it is possible that athletes rate perceived physiological effects of training, rather than the training itself as being enjoyable. For example, in the sport of running, several studies have suggested that endorphin addiction might provide a physiological

explanation for the high enjoyment ratings or hard training activities. This was initially suggested by Dishman (1982) and later by Sachs (1991) to explain enjoyment of practice sessions by runners. The investigators speculated that runners become addicted to or dependent upon their exercise experiences. Researchers have found that following bouts of sustained vigorous exercise, various chemical changes in the body such as the elevation of endorphin levels seem to result in positive shifts in mood (Dishman, 1982; Markoff, Ryan, & Young, 1982). Dishman theorized that as the runner continues to train he or she develops a tolerance for the chemicals and develops a corresponding increased threshold for the subjective "runner's high" and an increased severity of withdrawal symptoms following the conclusion of the training. Swimming practice, similar to running, consistently makes great physical demand upon the swimmer which will likely trigger endorphin release. Thus, it is possible that high enjoyment ratings of practice may in fact reflect enjoyment of physiological effects involving endorphins and other naturally occurring chemicals in the body as opposed to the practice activity itself.

In a related effect, it is possible that psychological processes resulting from the experiences of hard training, may cause athletes to rate non-enjoyable training activities as being enjoyable. Opponent-process theory (Hatfield, 1991; Solomon, 1977) theorizes that, psychological processes interact dynamically such that an opposing or unpleasant state follows engagement in any pleasurable activity. According to this theory, athletes experience unpleasant withdrawal stressors following the termination of a physically demanding practice as they come down from their "endorphin high". This experience suggests to the athlete that the preceding event, a demanding training activity, must have been an enjoyable experience. The real difference between physical/chemical effect and

the psychological effect is a matter of timing. The first effect looks at the chemically induced positive mood shift that immediately follows intense training. The second effect looks at the negative withdrawal following the positive shift that occurs some time after intense training when the “chemically induced” changes begin to recede. Since both of the previously discussed perspectives relate to an “addiction” to the chemical result of hard training, these perspectives will be considered together and labeled the “Dependency Perspective”.

Another psychological effect provides the third perspective which might explain why athletes would rate highly relevant and effortful activities as being enjoyable. Cognitive dissonance theory (Festinger, 1957) suggests that the reported ratings may represent “expressed” rather than genuine perceptions of enjoyment. The athletes have voluntarily chosen to engage in long-term periods of highly effortful systematic training. It is possible that insufficient justification for the difficult and often painful training has compelled these athlete to inflate their ratings of enjoyment for the activities in order to reduce uncomfortable feelings in this “Dissonance Perspective”. Because the effect seeks acceptable justification for continued participation in the sport it is likely that the effect will tend to inflate overall enjoyment ratings rather than specific ones so this effect alone will not explain any unusually high ratings of particularly difficult DP activities.

A fourth explanatory perspective which may explain “false” high enjoyment ratings of DP activities was suggested by Ericsson (1996). Ericsson noted that the DP activities in sports tend to involve social interaction. In Ericsson’s opinion, it was the social aspect of DP in sports that the athletes were finding to be enjoyable, as opposed to the practice itself. While this may be true, it may be impossible to separate the social enjoyment of

sports activities from everything else. Human beings are social creatures and sports activities are for the most part, inherently interactive. Accordingly, many highly relevant DP activities will necessarily involve the presence of others and to remove the social aspect would also be to remove the relevance of the activity. Thus, it may be fair to say that athletes who are rating the social interaction of DP activities as being enjoyable are rating an integral component of the DP itself as being enjoyable. It is also important to note that in the study by Helsen, Starkes and Hodges (1998) of elite soccer and field hockey players, many athletes rated certain technical practice activities performed totally alone to be highly enjoyable. Clearly such ratings cannot be explained by the social aspect of the sport setting. Nevertheless, while this "Social Perspective" cannot provide the complete picture, it may provide an explanation for some of the positive rating of DP activities.

A fifth possible explanation for the high enjoyment rating of DP activities was mentioned by Ericsson (1996) and proposed both by Scanlan, Stein, and Ravizza (1989) and by Csikszentmihalyi (1990). This perspective relates to the phenomenon of "flow" or the complete immersion within and effortless mastery of an activity. This perspective can be termed the "Flow Perspective". While the experience of flow experiences may be highly enjoyable, due to their effortless nature they should not tend to appear as a DP activities which by definition require a high amount of effort and concentration. However, if an athlete has a "flow experience" while performing what is normally a difficult and highly effortful activity and if they remember the flow experience when they think about the activity, then this could explain a high rating for a DP activity. Accordingly, the "Flow

Perspective” will be examined in this study to determine if “flow” experiences might explain some of the high enjoyment ratings of DP.

In order to counter the possibility that athlete rated the training to be enjoyable because of the results of the training, Ericsson, Krampe and Tesch-Romer (1993), as well as Starkes et al.(1996), instructed their subjects to try to disregard the consequences of the corresponding activity. An example provided by Ericsson (1996) was that rating the inherent enjoyment of cleaning one’s house should reflect the enjoyment of the actual activity (cleaning) and disregard the enjoyment of the outcome (a clean and attractive house). If these instructions are followed, this should have the effect of minimizing athletes rating activities as being enjoyable due to “false enjoyment” reasons. Although it is not certain to what degree these instructions promote more accurate ratings, similar in instructions will be provided to the participants in the present study in an effort to encourage athletes to rate the DP itself as opposed to any related results or effects.

As an additional step to encourage athletes to rate the DP itself, some of the interview sessions will be conducted while the athletes are actually performing the training activities rated to be highly relevant, effortful and enjoyable. Collecting data when the experience is fresh will allow the athlete to express what he or she is feeling at the time and before physiological and psychological effects come into play.

“True” Enjoyment of Practice. These perspectives relate to athletes actually enjoying some aspect DP activities as they are being performed. The two perspectives in this category are the remaining two of the four major sources of enjoyment found by Scanlan, Stein and Ravizza (1989) in their study of elite figure skaters.

Scanlan et al. (1989) found that many of the athletes interviewed enjoyed the feeling of mastery that they enjoyed when practicing and competing in their sport. Because the athletes that were interviewed were all elite figure skaters, they were already at the top end of their sport and were aware of that fact. These athletes enjoyed knowing that they were very good at the sport and found that performing the key activities of their sport, whether during practice or during competition, was enjoyable to them. This enjoyment resulting from a feeling of mastery when performing practice activities will be labeled the "Mastery Perspective".

The second of the "true" enjoyment perspectives and last of the four major sources of enjoyment found by Scanlan et. al (1989) relates to enjoying the sensations related to performing the practice activities of their sport. A number of the skaters that were interviewed expressed that the movement sensation, the feeling of athleticism and the opportunity for self-expression all provided a source of enjoyment. Similar to the Mastery Perspective, this perspective views enjoyment as coming from the performance of the practice activities at the moment that they are being performed. This perspective, enjoyment of the sensations associated with DP, will be labeled the "Sensory Perspective".

Statement of the Problem

Furthering the research into the enjoyment of practice in sport, his study will help to clarify whether the DP framework in the sport setting should be modified so as not to exclude relevant, high effort, high concentration practice activities that are also enjoyable. In addition, this study will look into the nature of "enjoyable" DP activities and determine what it is about these activities or the way that they are perceived by the athletes that makes them enjoyable despite their demanding nature. A number of possible perspectives

exist which might explain why non-enjoyable DP might be rated as being enjoyable and why highly specific, highly effortful DP might be enjoyable to performers. To date, while several studies in the sport setting have noted that some DP activities are rated by performers as being highly enjoyable, this author is not aware of any which have performed research to explain these ratings. The purpose of the present study is attempt to fill this gap. If the nature of the “enjoyment” is such that it can be applied to training activities to make them more enjoyable then perhaps this information can be used to help athletes to commit to performing the amount of practice necessary to achieving expert abilities.

METHOD

Participants

Two hundred and thirty-seven Canadian and American competitive swimmers participated in the study. The participants were selected from 11 different swimming teams including 6 Canadian club teams, three American club teams, one Canadian university team and one American university team. The largest number of participants from any single team was 34 swimmers (14.3%) and the fewest number of swimmers from any single team was 11 swimmers (4.6%). The sample included 137 female swimmers (57.8%) and 100 male swimmers (42.2%). Each participant voluntarily participated in the research following the administration of a letter of information and informed consent. Each participant was currently training for and competing in events in the sport of competitive swimming within one of the following sport organizations: Swimming/Natation Canada (SNC), USA Swimming, The National Collegiate Athletic Association (NCAA), or The Canadian Inter-university Athletic Union (CIAU).

The participants were assigned to one of three performance groups based upon their personal performance over the previous 12 months of competition using the 1996 Canadian Olympic Trial Time Standard (the Standard) as the basis for separating the groups. The *OT Group* consisted of sixty-four (64) swimmers (27% of the sample) who had achieved times equal to or faster than the Standard. The *Less 5% Group* consisted of seventy-six (76) swimmers (32% of the sample) who had not achieved the Standard but who had achieved performance times within 5% of the Standard. The *Less 15% Group* consisted of ninety-seven (97) swimmers (41% of the sample) who had not achieved times

within 5% of the Standard but who had achieved times within 15% of the Standard. See Appendix A for the complete questionnaire package including the time standards.

Procedure

The head coaches of six Canadian competitive swimming clubs, three American competitive swimming clubs, one Canadian university swim team and one American university swim team were contacted. During the contact, the nature of the study was explained and the participation and cooperation of athletes from their senior training group was requested. Senior training group was defined to the coaches as being those training groups where all or almost all of the swimmers had times that were at a minimum within 15% of the 1996 Canadian Olympic Trials Time Standard. Once agreement to participate in the study had been obtained each head coach was mailed a copy of the **Deliberate Practice in Swimming Questionnaire Booklet**. The Booklet consisted of three main components. The first component consisted of a letter to the head coaches, thanking them for their agreement to participate in the study, a brief written a written summary of the study and an action plan and time table for the head coaches to follow. The second component consisted of a letter to participants or their legal guardians explaining the study and a consent form to participate. The third component consisted of an athlete profile, a table of times for placing athletes in performance groups, a list of swimmer training activities and a chart for the participants to use to rate the training activities on a Likert scale anchored at 0 - 10. A copy of the **Deliberate Practice in Swimming Questionnaire Booklet** is attached as Appendix A to this document.

The head coaches contacted the researcher once they received the questionnaire packages in the mail and scheduled a date and time for the researcher to attend and

administer the questionnaire. Based upon the results of a pilot study, the decision was made to have the researcher personally administer all the questionnaires to ensure that the training activities and the rating scales were all explained to the participants in a similar manner using similar terms. The head coaches were instructed to distribute copies of the explanatory letter and consent form two weeks before the questionnaire administration date to each member of the senior training group. The head coaches were further instructed to inform the prospective participants that the letter and consent were to be read by each adult participant or by the parent or guardian of each participant under the age of 18 years and that only those swimmers who returned signed consent forms by the administration date would be permitted to participate in the study.

On the administration date the researcher met with the head coach and all athletes who had returned signed consent forms. In each case the questionnaire was administered on the pool deck or in a team meeting room immediately before or immediately after the afternoon practice for that day. The researcher, instructed the participants to perform three steps. First the participants were asked to determine the performance group in which they should be placed (Elite, Less 5%, Less 15%). In all cases participants were able to determine this quickly and easily. In several instances the coach came to the administration session already having placed the athletes in the performance groups based upon each athletes "best times" achieved over the previous 12 months of competition. Second, the participants were asked to complete an athlete profile to collect basic background information as well as a contact phone number in case the athlete was selected for a follow-up interview. Finally, each participating athlete was instructed to rate 19 different swimmer training activities on a scale of 0-10 in terms of four dimensions. As in

the previous studies of DP in the sport setting, the four dimensions were the activity's relevance to improving performance in the athlete's primary event, the effort required to perform the activity, how much the participant enjoyed the activity, and the concentration required to perform the activity. Effort was described as physical work required to perform the activity while concentration was described as the mental focus necessary to complete the activity. Zero (0) was to indicate the minimum possible amount of relevance, effort, enjoyment or concentration. Ten (10) was to indicate the maximum possible amount of relevance, effort, enjoyment or concentration.

As was done by Ericsson et al. (1993) and Starkes et al. (1996) participants were instructed, when rating the various training activities, to disregard the consequences of activities. It was anticipated that these instructions would help to prevent participants from rating enjoyment of the consequence of an activity rather than enjoyment of the activity itself.

Once the participants rated the various activities, a preliminary analysis was conducted to identify DP activities. As discussed in the review of literature it was decided that, for the purposes of this study, activities would meet DP criteria if they were rated high in terms of relevance and either effort or concentration and that the enjoyment rating would not be considered. Once a list of DP activities had been compiled for each performance group, a second list was then compiled of participants in each performance group who rated one or more of the listed DP activities as highly enjoyable. Participants were selected from this list for one-on-one interview sessions to probe into the source and the nature of the enjoyment of the DP activities. In order to assist the participants' recollection of their enjoyment of training activities, some of the interview sessions were

conducted during practice, while the athletes were performing the DP activities that they had rated as being highly enjoyable. It was believed that by soliciting the participants' thoughts while the activity was being performed or very shortly afterward, the participant would be better able to express what he or she was feeling at the time and before his or her perspective could be altered by any physiological and psychological effects.

Instruments

In order to identify DP activities it was necessary to first develop a list of swimmer training activities. To produce the list six swimming coaches were contacted and requested to list all of the training activities that they currently or in the past have had swimmers perform in the course of a season. All six coaches had a minimum of five years of experience and as full-time competitive swimming coaches and four of the six coaches had at least 10 years of experience. The list of coaches included: one coaching at the University level in the United States, one coaching at the University level in Canada, two coaching at the Club level in the United States and two coaching at the club level in Canada. The lists were collected, consolidated and then re-distributed to the coaches for feedback. Based upon this feedback a master list of 22 training activities was prepared. Through pilot work with one club team and one university team, it was determined that two activities should be combined into one category and that two other activities ought to be eliminated as they were not really considered to be "training" activities by a significant majority of the swimmers participating in the pilot study. The result was a comprehensive list of 19 swimming training activities which, in the opinion of ten coaches and over thirty swimmers, contained sufficient categories which comprehensively described all training activities that might be performed by competitive swimmers. The list of training activities

and the chart for rating each of the activities along the dimensions of relevance, effort, enjoyment and concentration are included as part of the Deliberate Practice in Swimming Questionnaire Booklet (Appendix A).

An interview guide was developed for the follow-up interviews with those participants who rated DP activities as being enjoyable to probe if the athletes truly enjoyed the DP itself as opposed some results or consequence related to the performance of DP. In addition, the interview guide was designed to probe the athlete's perceived enjoyment of DP from each of the explanatory perspectives discussed in the review of literature. Format for the interview guide including the use of descriptive probes, clarification probes, contrast probes and authenticity probes was modeled after the form of interview guide used by Partington (1995) in his study involving the development of talented musicians. The Follow-up Interview Guide is attached as Appendix B.

Analysis

Biographical Data. The first part of the analysis will be a side by side comparison of the biographical profiles of the three performance groups to see if any interesting patterns emerge.

Ratings Data. Next, the ratings for the 19 swimming training activities will be analyzed for the different performance groups (Elite, Less 5%, Less 15%) and dimensions (relevance, effort, concentration, enjoyment) using a multivariate analysis of variance (MANOVA) to determine any significant differences among the performance groups for activity ratings, among the individual activities and among the interaction between groups and activities. This will be done to determine if the skill groups can be collapsed for analysis of the ratings to identify DP activities. In previous studies into the nature of DP

involving more than one performance groups (Helsen et. al. 1998, Starkes et. al. 1996, Young, 1998) the investigators found no significant differences between the performance groups for activity ratings. All participants, regardless their performance group, tended to rate any particular activity in a similar manner. Because there were no differences amongst performance groups, those studies were able to collapse the practice activities across performance groups and treat all the participants as if they were one big group for the purpose of running t-tests to identify DP activities.

Identification of DP. The next step in the analysis will be to administer t-tests in order to identify DP activities for the list of training activities. Consistent with previous research (Helsen et al., 1998, Hodges & Starkes, 1996, Young, 1998), a grand mean of activity ratings will be calculated for each dimension of relevance, effort, concentration and enjoyment for each of the three performance groups (Elite, Less 5%, Less 15%). Next t-tests will be performed to compare the individual activity rating means to the respective grand mean for each dimension. Measures of significance will be based on an adjusted alpha level calculated by dividing the significance level by the number of training activities, and therefore the number of t-tests performed. In other words, to be considered significant the value had to differ from the grand mean by $p < .05/19 = 0.026$ in order to be indicated as significantly different at $p < 0.05$.

Analysis of the Interviews: Once the DP activities have been identified for each performance group, the researcher will review the Activity Rating Table and identify a list of participants for each performance group who had rated the DP activities as being significantly enjoyable. This list will then be randomized and participants will selected from the randomized list for follow-up interviews to probe the nature of each participants

enjoyment of the DP. Rather than set any particular number of interviews the decision was made to continue conducting interviews until the content of the answers starts to become repetitious indicating that the enjoyment perspectives had been thoroughly probed.

Conclusion

It appears that DP in the domain of sport can be and in some cases is enjoyable. The earliest studies into DP from non-sport domains indicated that DP is inherently non-enjoyable. Subsequent DP studies from the sport domain found that many of the most relevant and effortful practice activities were rated as enjoyable. It has been hypothesized that in sport, DP is rated as enjoyable because the athletes enjoy the results and the social aspects of training, but not the training itself. The purpose of this study is to investigate the nature of enjoyment of DP in the sport domain and to determine if the enjoyment is inherent to the activity or if it comes from external sources.

In addition, to determining if DP in sport is inherent or external, this study will seek to determine the enjoyment perspectives which most commonly occur in the sport domain. If these perspectives can be deliberately promoted it may be possible to induce or enhance enjoyment of sport-related DP and thus, increase the likelihood that an athlete will remain with a sport long enough to perform the DP necessary to become an expert performer.