A Naturalistic Investigation of Former Olympic Cyclists’ Cognitive Strategies for Coping With Exertion Pain During Performance

Jeffrey L. Kress
California State University, Long Beach

Traci Statler
California State University, Fullerton

In endurance sports, there is one element that all athletes who wish to excel must confront...exertion pain. The purpose of this study was to describe and explain the nature and effects of the cognitive strategies former Olympic cyclists used to cope with exertion pain during performance. Nine participants were asked to describe exertion pain and how they managed it. Two hundred twenty-two quotes formed the basis for the analysis. The quotes were coalesced to six higher-order themes. The following conclusions were extracted from the themes: (1) the degree of pain was purely a perception, (2) pain varied depending upon the satisfaction the athlete received from the experience when all physiological variables were held constant, (3) cognitive skills such as goal setting, imagery, and positive self-talk were routinely used, (4) the mind and body were viewed as a dualism when performing, (5) pain was a positive experience and part of sport and an individual’s identity, and (6) riding in a position of control tended to lessen the perception of pain. The results revealed that former Olympic cyclists used a myriad of cognitive strategies to cope with endurance pain while training and competing and that all of them attended to the pain rather than attempting to ignore it.

Address Correspondence To: Jeffrey L. Kress, California State University at Long Beach, phone: (562) 985-8762, e-mail: jkress@csulb.edu.
In endurance sports, there is one element that all athletes who wish to excel must confront... pain. There are three types of pain: emotional, injury related, and pain as the result of an intense prolonged energy-expending effort. The physical discomfort associated with injury-free performance in sport can be a limiting factor during competition. Injury-free pain associated with endurance sport can be the product of several factors: (a) an elevated heart rate, which has exceeded a comfortable level, (b) a buildup of lactate, an end product of glycolysis, (c) a depletion of muscle glycogen from the body’s stores, (d) fatigue of the respiratory muscles, and (e) dehydration (Brooks, Fahey, & White, 1996). Athletes who have developed effective coping strategies for tolerating higher levels of injury-free pain are expected to perform better than those who have not (Azevedo & Samulski 2003, Egan, 1987; Masters, 1998, O’Conner, 1992). Bill Koch, silver medalist at the 1976 Olympics in the 30 km cross-country skiing race, felt that 90% of his success could be attributed to his ability to tolerate injury-free pain (Iso-Ahola & Hatfield, 1986).

The sport of bicycle racing is an endurance event in which the athlete must cope with great amounts of physical discomfort during competition. O’Conner (1992) cites the Tour de France bicycle race as one of the most grueling tests of human athletic endurance. Typical road races for Olympic level cyclists range between 50 and 250 kilometers and can take from one (50 kilometers) to six hours (250 kilometers) to complete. Weather conditions can vary from freezing snow to the hot, humid conditions experienced at the 1996 Olympic Games in Atlanta, Georgia. Riders must deal effectively with the uncomfortable effects of dehydration, cold, heat, exhaustion, increased levels of lactate, and depletion of muscle glycogen stores while at the same time executing appropriate race strategy if they are to be successful (Ryschon, 1994). Three times Tour de France winner Greg LeMond had this to say about cycling: “...the best climbers are those who can stand the most pain... in pro cycling everything hurts, but you just ride through it...” (Avins, 1986, p.44). How are these athletes able to cope with this type of injury-free pain? Physiological testing of elite endurance athletes does not completely account for differences in performance (Bosquet 2002, Boulay, 1995, Coyle et. al., 1988, Coyle et al., 1991). Therefore, it has been suggested that psychological factors play an important role in the achievement of outstanding endurance performance (O’Conner, 1992). Currently, a void exists in the literature regarding the cognitive strategies employed by elite level cyclists to enhance performance (Cua, 1995).

Thus far, research regarding methods of pain control and the athlete has been limited. Pain tolerance research has focused on different types of athletes and non-athletes performing an isometric quadriceps task or exposure to a cold presser stimulus (Egan, 1987; Ord, 2003, Ryan & Kovacic, 1966; Scott & Gijsbers, 1981, Spink, 1988) and athletes suffering from an injury (Liston et. al., 2006, Masters & Lambert, 1989). With few exceptions, the empirical data
produced on the psychology of endurance sports have focused on the cognitive strategies used by long distance runners (Cua, 1995; Pargman, 1993), although reference has been made to long distance swimmers and cyclists (Morgan & Pollock, 1977). Morgan (1978, 1980), Morgan, O’Conner, Sparling, and Pate (1987), Morgan and Pollock (1977), Schomer (1986, 1987), and Silva and Appelbaum (1989) have examined pain tolerance during injury-free marathon running, while others (Morgan et al., 1983; O’Connor, 1992; Russell & Weeks, 1994; Weinberg, Jackson, & Gould, 1984) have conducted research based on associative and dissociative styles of attention distraction using other activities. The only investigation these authors were able to find regarding cognitive strategies used by cyclists was that of Cua (1995). With the exception of these few studies, increasing pain tolerance of the injury-free endurance athlete as a way to enhance performance has been virtually nonexistent as a topic of research.

This investigation was performed on former Olympic cyclists who raced in the “road race,” “pursuit” or “team time trial” events. It focused specifically on how these athletes managed perceived exertion pain. Perceived exertion as defined by Noble and Robertson (1996) is “the act of detecting and interpreting sensations arising from the body during physical exercise” (p.4). Individuals can distinguish between exertion and non-exercise related pain, therefore, the investigators operationally defined exertion pain as the intense discomfort felt when performing at sub-maximal to maximal levels. The investigators clearly indicated that this operational definition did not refer to injury-based pain. The cognitive strategies used by former Olympic cyclists to overcome heat, cold, rain, snow, wind, fatigue, and dehydration were further identified. By identifying these strategies, future researchers and practitioners may be able to identify patterns that could be useful when developing a cognitive training program for competitive cyclists at various levels. The purpose of this study was to describe and explain the nature and effects of the cognitive strategies former Olympic cyclists used to cope with exertion pain during performance.

**Method**

**Design**

A naturalistic, grounded theory inquiry was the method of investigation chosen for this study. A grounded theory is one that is inductively derived from the study of the phenomenon it represents (Lincoln & Guba, 1985). Therefore, the researchers did not begin with a hypothesis and then test it. Rather, they began with an area of study, coping with exertion pain in performance, and whatever was relevant to that phenomenon was allowed to emerge naturally (Strauss & Corbin, 1990). Furthermore, a phenomenological perspective is concerned with the study of a particular phenomenon (in this case the experience of non-injury pain in perfor-
A Naturalistic Investigation... / 431

mance), its structures, and the underlying personal meanings associated with that phenomenon (Patton, 1990). Philosophically then, a naturalistic, phenomenological investigation would entail a recounting of one’s own experiences through description of their own perception and personal awareness. Therefore, employing this phenomenological approach to gathering information about elite cyclists’ perceptions of pain from their own personal experiences provided the most accurate basis for inductively deriving theory about coping with exertion pain in endurance performance.

Participants

In qualitative research, participants are rarely, if ever selected at random. In fact, obtaining a representative sample from which generalizations can be drawn is not the researcher’s intent (Statler, 2001). Rather, participants are purposefully sampled; that is, they are selected because of their unique values and insights to the topic. Therefore, the logic behind purposeful sampling lies in selecting information-rich cases for study in depth (Patton, 1990).

Nine American male participants took part in this investigation. The criterion for inclusion was being a former member of an Olympic team. Ages of the participants at the time of the interviews ranged from 27 to 50 years of age with a mean age of 37.8. The combined resumes of the nine participants included over 90 United States National Championships. Their careers also included a combined 15 Olympic team berths, eight Pan Am Gold medals, and 15 World Championship teams.

As a condition of anonymity, the participants have been given pseudonyms. What follows is a short description of each and some of their cycling accomplishments.

Andrew was 46 years old and a successful businessman. At the time of the interview, he was racing at the masters (30 years and older) level. Some of his accomplishments include placing second and third in the Junior National Championships, Multi-time Senior National Champion, Multi-time Masters National Champion, and four times Olympian.

Bill was 36 years old and still racing professionally. He held a world record, had been a National Champion 13 times, a two time gold medalist in the Pan Am Games, a gold medalist at the Goodwill Games, a United States National Professional Champion, and two times Olympian who had won both gold and a silver medal.

Casey was 35 years old and owned a bike shop. He still rode with the local training rides and on occasion would enter a master’s race. His list of accomplishments included eight National Championships, a Pan Am gold medal, membership on three World Championship teams, and riding on one Olympic team.
Doug was a 50 year-old businessman who still trained and raced regularly. His passion for the sport had kept him in it for 36 years and at the time of the interview it appeared he would be in it for some time to come. He had been a National Champion 21 times, a World Champion four times, and an Olympian twice.

Frank was 27 years old and still raced professionally. He had won eight National Championships, been on two World Championship teams, won a gold medal in the Pan Am games, held 9 national records, and was on one Olympic team.

Gus was a 33 year-old computer programmer. He has not competed for four years and at the time of the interview, rarely had the time to ride as work and the arrival of his first child took priority in his life. His accomplishments were being on two Junior World Teams and one Olympic team.

Howard was 34 years old and recently came out of retirement to race professionally again after being a full-time coach for three years. His list of accomplishments included winning 11 National Championships, finishing third in the Junior World Championships and United States Professional National Championships, professional victories in Europe, and an Olympic bronze medal.

Ivan (age 40) had been retired from cycling for 12 years and was a businessman. He still rode an occasional training ride with a local group of riders. He raced for ten years on the United States National team, won a bronze medal at the Junior World Champions, was the first American to ever win a stage race in Europe, and raced on one Olympic Team.

John was a 40 year-old businessman and cycling coach. He still rode regularly and competed in an occasional master’s race. His list of accomplishments included being a seven time National Champion, a Pan Am team member, and two times Olympian.

Ethics Approval
Prior to the implementation of the investigation, the methodology was examined by the Advisory Committee on Human Experimentation of a major United States University and given approval. As part of the investigation, each participant was required to complete an informed consent prior to beginning.

Instrumentation
In the present inquiry, the interviewer was the lead investigator who was qualified to be the instrument according to standards proposed by Lincoln and Guba (1985). They suggest the inquirer must have a thorough understanding, attitude, skills, and experience related to the subject area and research methodology. The following is a description of the lead inquirer’s background and experience, which prepared him to perform this investigation. The primary
researcher had been a competitive cyclist for 18 years competing in over 800 national and international races and was a member of the United States National Team for two years.

Data Collection and Recording
Data collection procedures for naturalistic inquiry as explained by Lincoln and Guba (1985) include interviews, observations, document and record analyses, and unobtrusive measures. Utilizing a variety of modes and synthesizing them into the final case report provides a means of triangulating the data and demonstrating its credibility. Due to the context of this investigation, the data collected for this analysis included the initial interviews conducted and the observation of nonverbal cues. Data were further triangulated during the analysis phase by employing the techniques of member checking and peer debriefing, which will be explained in more depth later.

To insure fidelity, the investigators used a tape recorder to record the interviews. All of the athletes interviewed in this investigation gave verbal consent to the use of a tape recorder. In addition, field notes were taken that provided both for ready access to return to an earlier point, and for the primary investigator to note his own thoughts and observations of the participants. Transcripts of each interview were generated from the tapes, which were then reviewed concurrently with the original tape recording. Finally, transcriptions were sent to each participant to allow them to ensure that the transcriptions matched their original message. This process of member checking ensured that the transcribed reconstructions of each interview were adequate representations of the participants’ realities (Lincoln & Guba, 1985).

Phases of Inquiry
A series of basic questions were asked of all participants. This minimalist approach was selected because it allowed the interviews to remain extremely conversational and situational (Patton, 1990). Furthermore, it allowed the participants the opportunity to freely discuss their thoughts and examine their experiences without investigator bias or interference.

The interviews all began with the cyclists being asked to review their career highlights as a means of getting basic demographic information, getting them to feel comfortable, and to stimulate thoughts about racing. Following this, a brief definition of exertion pain and injury pain was given so that the participants would have a clear understanding of the subsequent questions. More specifically, after each of the participants described their prior accomplishments, the interviewer told them that he was interested in how they dealt with the pain involved in the sport. He then clarified that he was interested specifically in exertion pain, not injury pain, stating “the pain you feel when you are riding very hard, not the pain you feel when you have sustained an injury.” He then asked them to describe what that exertion pain felt like and how they each dealt with it.
They were then asked, “Describe your perception of exertion pain when you were racing or training.” The third question asked of all was, “Tell me about pain in bicycle racing and what you did to cope with it.” The purpose of this question was for the investigator to gain some understanding of what was important to them in dealing with pain. Responses to these initial questions were then further probed to tease out the performers’ most complete meanings. This process led to the identification of themes and information that could be pursued in more depth during the later part of the interview. As may be surmised, the nature of the questions during this later phase of the interview varied from participant to participant, dependent upon how they answered the previous questions.

Analysis

According to Lincoln and Guba (1985), data analysis in naturalistic inquiry cannot be marked out as occurring at a singular time of the inquiry. Instead, it must begin with the first data collection in order to assist the emergent design, grounded theory, and emergent structure of later data collection phases (p. 242). The procedure followed for this inquiry echoed the analytic procedure outlined by Marshall and Rossman (1995) that proposes organizing the data; generating categories, themes, and patterns; testing the emergent concepts against the data; searching for alternate explanations of the data; and finally, writing the report. During the few days after each interview, the taped data were transcribed. This allowed for re-familiarization and absorption of not only the words that were spoken, but also of the feelings that were expressed through the participant’s intonation. It also allowed the investigator to match his field notes describing the nonverbal cues during the taping to the transcription. The next phase involved reading the transcripts several times to further increase familiarity with the contextual meaning of the interviews.

In the present investigation, the lead investigator had limited accessibility and only one opportunity to interview each participant. The participants were all asked the same three guiding questions described earlier and then probing questions were asked to clarify points or to expand and talk in more depth about them. Thus, the first two phases occurred at a rather close time interval and the investigator analyzed the data as the interview proceeded.

To compensate for the limited time available for data analyses between interviews, and in an attempt to further triangulate the researcher’s interpretations, the investigator had peer debriefers read the transcriptions and provide comments. This form of peer debriefing served two purposes: (1) At this stage (in the midst of data collections) the debriefers served as a checking system to ensure the investigator remained true to a phenomenological approach, and did not bias his questions, and (2) when all interviews were completed, they assisted in clarifying the data analysis, often bringing to light salient issues that may have been over-
looked. Both peer debriefers used in this investigation had extensive experience with the process of generating an inductive content analysis from qualitative interview data.

Using the process described by Miles and Huberman (1994), intercoder consistency was calculated. Transcriptions were independently coded by the lead investigator and two peer debriefers. The results were then examined alongside each other. The value of the coefficient (i.e., the number of meaning unit labeled agreements divided by the sum of the total number of agreements and disagreements) was determined to be 86.4%, which approximates the 90% value recommended by Miles and Huberman (p.64).

As each interview was transcribed and reviewed by the investigator and peer debriefers, new salient issues emerged that could potentially be explored in future interviews. Caution was used at this stage of the investigative process: The investigator asked the same three main questions of all of the participants thus allowing them to bring to light what was salient to them. If a participant brought up an issue that had previously been mentioned by one of the other participants, the knowledge gained by the investigator during that previous interview was then utilized to probe deeper. This was essential for two reasons: (1) the participants would be free to tell their story and not be restricted by another’s view, and (2) it allowed the investigator to remain open to issues that may not have emerged from the other interviews (Skrnic, 1985).

After each interview was carefully transcribed, a copy was sent to the participant to review along with a postage-paid return envelope. This phase incorporated the final member checks to insure accuracy of the information and to allow the participants to add, delete, or clarify any data they supplied. They were asked to thoroughly read the transcription and make any changes they felt necessary. Once changes were made and the participant was satisfied with their supplied data, the document was mailed back to the investigator. There were minimal revisions to each transcript, ranging from correction of typographical errors to the addition of a few clarifying comments.

**Unitizing**

After all interviews were completed, the data were processed by a method described by Lincoln and Guba (1985) as “unitizing.” Each transcription was examined thoroughly for bits or units of information. These individual units, or quotes, form the components of lower order themes discovered in the data.

During the unitizing phase, the investigators erred on the side over inclusion. Some of the units included more information than was necessary for an inquirer to have an understanding of the phenomena. Over inclusion reduced the chance that material would have to be recaptured later. Once the units were placed into categories (as will be explained), irrelevant material was removed.
Categorizing

The next step was to begin the inductive content analysis by bringing together those units that related to the same content (Glasser & Strauss, 1967). This process involved (1) reading a unit, noting its contents, and setting it aside in a computer file as an unnamed category, (2) the next unit was read and its contents were compared with the first unit for similarities. If it was related, it went into the same unnamed category. If its information differed, it was placed in its own, yet to be named, category. This process continued for the remainder of the units until eventually several distinct categories emerged.

In the event that a unit could fit into one or more established categories, a copy of it was made, and it was placed in each relevant category. As a category grew to include three to five units, it was operationally defined and rules were established for further inclusion of data. The operational definition and rules for each category were placed at the top of the computer file. After a definition and rules were established for a category, the units that had already been placed in it were reviewed to insure their conformity.

The nine former Olympic cyclists were interviewed over times ranging from 30 minutes to two hours. From these interviews, 222 quotes specifically addressing the issue of exertion pain as it related to cycling performance were extracted and used for the inductive content analysis. These quotes were units of information that could stand by themselves without need of any further explanation. Similar units were then grouped into lower-order themes and the lower-order themes were given an operational definition and a name. Due to the dual content in some of the units, and the nature of the subject matter, some units were placed into more than one lower-order theme. Using this process, 222 individual quotes were synthesized into 16 lower order themes, which were then categorized into six higher order themes.

Results

Higher and lower order themes can be seen in Table 1. What follows are exemplary quotes or data units of higher and lower order themes from the participants that demonstrate their value and content.

Pain

Pain in this investigation includes only the physical pain felt as a result of exertion. This higher-order theme consists of those lower-order themes that directly address the pain. They are description of pain, perception of pain, and time to termination.
**Table 1. Higher and Lower Order Themes**

<table>
<thead>
<tr>
<th>Higher Order</th>
<th>Lower Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Description of pain / suffering</td>
</tr>
<tr>
<td></td>
<td>Perception of pain</td>
</tr>
<tr>
<td>Preparation</td>
<td>Time to termination</td>
</tr>
<tr>
<td>Mental Skills</td>
<td>Focus</td>
</tr>
<tr>
<td></td>
<td>Awareness</td>
</tr>
<tr>
<td></td>
<td>Goals</td>
</tr>
<tr>
<td></td>
<td>Imagery</td>
</tr>
<tr>
<td>Mind / Body</td>
<td>Positive self-talk</td>
</tr>
<tr>
<td>Optimism</td>
<td>Confidence</td>
</tr>
<tr>
<td></td>
<td>Positive results of pain</td>
</tr>
<tr>
<td></td>
<td>Maintaining a positive perspective</td>
</tr>
<tr>
<td>Control</td>
<td>Accepting pain as part of the sport</td>
</tr>
</tbody>
</table>
Description of pain. In this quote from Ivan, exertion pain was described as being something quite out of the ordinary and unpleasant.

Obviously, there is a big difference between the exertion pain and any other physical kind of pain. The exertion pain I would term as a kind of fire...a burn pain. I have never had a severe burn from a fire but if it were to be like that, it would be throughout your whole body. Every square inch of it. If you are really exerted and you are going flat out, I can’t think of much worse. It’s like a burn or an electric shock type thing. It’s there and it really hurts. Your lungs are gasping for air while your legs are on fire...or worse.

I think cycling is really a pretty sick sport. It’s masochistic for what you get out of it... I don’t know why anyone starts sometimes if you really look back on what you have to go through. You have got to give up a lot trying to get good and once you are there, it’s a long painful ordeal.

Perception of pain. There is a philosophical view built on the premise that one’s perception is one’s reality. In this investigation, the participant could have been putting forth the same amount of exertion under similar circumstances yet, the pain could be perceived as different. The amount of pain encountered was inversely proportional to the enjoyment of the experience. Ivan summed it up by saying, “The pain thing I think is really interesting, because when things are not going great, it sure hurts a lot more. When things are really clicking, it hurts a lot less.” Frank echoed a similar statement:

I don’t think the pain actually changes; your perception of it increases and decreases depending upon where your focus is. If you are trapped thinking only of how bad your legs feel you can quickly forget about everything else. The more you concentrate on it the more it is going to slow you down. Suffering really isn’t suffering when you are at the top of your form. When you are really going well and going for the win and performing the way you ought to and want to, very few people would call that suffering even though the pain may be equal.

Time to termination. Exertion pain is finite. There is a point at which it will stop and the athletes in this investigation were aware of that while competing or training. They knew that pain was only a temporary phenomenon and that their competitors could only maintain an excruciating pace for a limited amount of time. In this quote, Frank provides insight into viewing pain as a short-term phenomenon:

...the only thing I can think of during those times is “I hope this ends soon. I hope whoever is up there pushing this pace isn’t as fit as I am or as close to it, and that they can only do this for a little bit longer.” I keep thinking, “Okay, I am going to keep pushing through this pain because I know that this person up there isn’t
Preparation.

A connection was found in this investigation between being prepared physically and mentally, and the ability to manage pain. Andrew shared his thoughts on the subject:

It's hard. (He laughs.) It's very difficult to put into words. You come to a race, you build up to it, and you do your training. I know in the past when I was not well trained and had the time to put in the right effort and didn't, I didn't perform well. My mind knows I haven't done it. If I have done my homework, my body is ready for the event. Mentally that is the next step. That last little bit is the mental thing. If I have put my time in training and given a good effort, I know in my mind that I am ready physically for this event and then I have no excuses. I just do it. As a result, when I get out there and I am on, I just don't feel the pain.

Mental Skills

This higher order theme consists of the following lower-order themes: focus, awareness, goals, imagery, and positive self-talk.

Focus. During critical moments in a race, the athletes in this investigation focused their attention on very specific aspects of their performance. They focused on the mechanics of a pedal stroke, maintaining or getting into an efficient body position, race strategy, the rider in front, breathing, or just survival. As the pain built, they found that the best way to manage it was to focus on those aspects of performance that got them to the finish line in the most efficient way possible. Howard said this the most succinctly. “Your mind cannot be elsewhere. That’s the thing. You need to be focused on the moment.” Doug explained in more detail how he did it:

Maybe that’s it. Maybe I’m not blocking it. It’s a term that I use “blocking it.” Some people say, “Think of something else.” Then, all of a sudden, you are not going fast. If you are thinking about your girlfriend or laying next to the river watching the water flow or some other nice thing, that’s nice for a while. It takes away from the pain. All of a sudden, your speed drops five miles per hour or something (he says laughing). You have got to concentrate on what you are doing, but at the same time, you don’t want to concentrate on the pain either because that will back you off too. You have to be very aware of what you are doing.
Awareness. This lower order theme consists of data that reflected the riders' knowledge of themselves and the important role that played in pain management. The participants possessed a keen awareness of their bodies and an understanding of its limitations.

Doug talked about what he became keenly aware of during critical moments:

Just focus on all of the aspects of technique. That would be the cleanest way to define it. Just all aspects of technique and that would be peddling and body movement. Any energy used not to pedal in an efficient circle is wasted energy. If you take a peek at your shadow, it should be dead still, whether you are doing 40 miles per hour or 20. Your breathing should be smooth and efficient. Your body posture when tucking should be relaxed yet as small as possible. Those basic things would be factors that would allow me to focus and thus turn off anything that might be floating in my mind.

Goals. Preparing a plan and adhering to it was another method of pain management. Entering into a race, training ride, or season these riders had specific goals to achieve. At times, the goal was distant such as making a World Championship or Olympic team. Armed with the knowledge of a desired product, they were at times able push themselves a little bit more. Howard described how he overcame body aches during long rides in bitter cold weather while preparing for the upcoming season:

I just spent 11 days in Ohio where it averaged in the low 30’s and it was overcast. I was going out for five-hour rides... I had specific goals and it was easy! I was going out and doing this stuff that used to be hard because I was focused. I was like, “Right now, this is going to put bread on the table, a cycling job for ’98 so I have got to go out and train.” So I did it, and I went out and had a good time. Then came the period where it was close to Christmas, the weather turned even worse and it was rainy and snowy. I thought, “Well, I can go into a rest phase now.” Suddenly, that same weather was horrible. I did a ride the next day and the weather was the same and I was like, “Ah, this sucks.” The mental focus I had set myself to was to do six or seven days of really hard work regardless of the conditions. I pushed through it and it was almost easy. My back was hurting and this and that but, I would come back and think, (Howard snaps his fingers and gets excited) “Wow, that was cool.” The last couple of days I was going out for little two hour rides and it was like, (Howard’s voice now gets a little whiney) “Gawd, that sucked.” That was because I didn’t feel I had to do it at that point. I think so much of it is really having mechanisms to push through it.

Imagery. Preparation for a race and the pain that one might experience involved more than just riding endless hours to develop the physical, it also involved mentally rehearsing the
course and possible feelings one might experience during the race. Casey said:

I would visualize riding up the hill and saying to myself, “Hey, it’s going to be really hard right now. I’m going to be suffering right now and this is the part of the ride that is going to be painful. When I get to the crest of the hill when it flattens out or goes downhill there will be less pain”. Knowing what to expect when you are going to suffer allows me to deal with the pain better.

Positive Self-Talk. This theme is comprised of statements the riders told themselves while riding as exemplified by Casey when he said, “I always say, ‘Hey, I’m trained for this. I’ve prepared myself. I can get through this. It will get easier soon. Everybody else is suffering too. If I’m suffering, everybody else must be suffering worse.’” Frank echoed a similar statement: “If you look around and you see other people in about the same shape or worse than you then that has to be a boost. ‘This is what I am supposed to be feeling right now. Nothing is going wrong and this is a correct response to the work.’”

Mind/Body

Like any performance, bicycle racing requires that both the physical and cognitive work together. This metaphysically dualistic view implies that the mind works with the body, and vice versa. It could however be argued that the two are actually one; metaphysically monistic, they are inseparable, always working seamlessly as a cohesive unit. Some of the participants in this investigation addressed a dualistic view perceiving the mind and the body as two separate entities, one having the ability to control the other as Frank describes:

Legs are burning. Lungs are searing. It’s what you can keep composure of that aids in the suffering. If you can control your breath, that’s good. If you can keep your mind focused on something other than concentrating on the things that are hurting... If you have a knee that’s hurting or more generally your legs, the muscles are just dying and you are not delivering enough oxygen to them...there’s that. The body is trying to pull the mind away from what it should be concentrating on. That’s really a big struggle.

Doug said this on the subject: “Yeah. I think the pain is always there but the mind can block it out at times and at other times I won’t block it out.”

Optimism

This higher-order theme illustrates a tendency for the participants to display a hopeful or cheerful view of the painful experience and expect a good outcome from it. This theme is comprised of the lower-order themes; confidence, positive results of pain, maintaining a positive perspective, and accepting the pain as part of the sport.
Confidence. Having the confidence that one was prepared for competition and could be competitive with the other racers was seen as having a big influence on the amount of degree or pain one would experience. Casey said:

I always felt that if I was side by side with the person, I could beat them like a drag race situation. I think at that point you mentally say, “Hey, I’m supposed to beat this guy. I can beat him!” You block out the pain until the second it is over, and then you know it hurt. The same thing in cycling, if you have the perception, “Hey, I’m supposed to beat this guy,” then you can push harder because of confidence.

Positive Results of Pain. There are positive results to be achieved from experiencing the pain of sport. The rewards can come in many forms, such as winning a race or making an Olympic team, having the satisfaction of accomplishment, (“I enjoy sweating and doing something with my body,”) or the satisfaction of knowing someone else was hurting as a result of one’s effort. All of these and more contribute to the justification of enduring the pain and seeking it out in future endeavors. Ivan spoke about how the act of going so hard that others had to suffer to stay with him was a boost to his ego:

...I don’t know if you really ever mask pain when you are riding but sometimes you just get into this state of mind, the zone or whatever. I remember the best race I ever had where the pain was almost enjoyable because you see other people hurt more than you. If nothing is going wrong and there are no mechanical problems during the race then sometimes you can just turn the volume up a little higher and then a little higher and other people suffer and you almost enjoy it, even though you are in pain.

Maintaining a Positive Perspective. Enjoyment of what one was doing and recognition of the value of the moment were critically important methods for dealing with the pain. This lower-order theme consists of those quotes that demonstrated the participant maintaining a positive perspective concerning his present condition. All of the participants spoke about the need to remain positive. The following quote from Bill best exemplifies this idea:

I knew it was good for me. Hard racing builds character. You’ve got to get through it. It’s part of paying your dues. When negative thoughts come through my mind I just go back to “Star Wars” when Luke is hanging by one arm and Darth Vadar says, “Luke, walk with me on the dark side.” No, just let go and fall off! Don’t ever be tempted to let those negative thoughts do that to you.

Accepting Pain as Part of the Sport. There is no doubt that pain exists and is an integral part of bicycle racing. Bill summed it up most succinctly saying, “It’s part of it. It’s just something that is unwritten that you learn to deal with. It’s indescribable and you just learn to
deal with it.” For these riders, it is an accepted part of the sport and just another aspect that needs to be attended to...not feared, run away or hidden from.” Casey said this in his interview:

I always say, “Hey, I’m trained for this. I’ve prepared myself. I can get through this. It will get easier soon. Everybody else is suffering too. If I’m suffering, everybody else must be suffering worse.” That’s again when you are going well. (He laughs). I heard a comment from someone, “Attack when you are hurting the most because that is when other people are hurting too.”

Control

This theme has in it those statements that demonstrate the participant’s perception of pain was influenced by events going on around him or the situation he was in, not necessarily his physical abilities. Similar to a chess game, there are many players or competitors with varying degrees of physical talent and strategy capabilities in a bike race. Of those, some have the ability to control the tempo of the race while others cannot. As this investigation found, the perception of pain differs from being in a position of control versus a position of being controlled. When the participants were riding or racing well, pain did not seem to be noticed as much as when the race was not going well. To quote Bill, “It’s easier to deal it out than it is to take it.” Gus spoke in more detail about his experiences:

A lot of it comes down to controlling it, the pain, the pace, or the threshold you are set at. If I am controlling it then it is usually while I am hurting... Whereas when somebody else is, even though it may be exactly the same pace, I may be second in line right behind them and it still feels like they are killing me. They are just setting this pace that is torching me. If you get on the front I think to some degree you feel like you are in control and you are making them suffer and so you get a little bit of a lift from that as well as just knowing that you are at the front. You don’t always want to be at the front. Climbing tended to be more that way. I think the further back you got the more you felt like you were suffering.

Discussion

Cyclists know that endurance pain exists and that it is part of the sport. The ability to manage more than one’s opponent is a highly sought after quality or skill in the bike racing community and thus, the purpose of this investigation. As Bill stated, “It’s part of it. It’s just something that is unwritten that you learn to deal with. It’s indescribable and you just learn to deal with it.” This investigation focused on the psychological methods employed by some of
the most elite level cyclists in the United States to manage the pain. From the investigation, the six themes that emerged were Pain, Preparation, Mental Skills, Mind/Body, Optimism, and Control. This section will briefly discuss the key points of each and offers some conclusions and applications.

Pain

Many of the participants referred to “others” dictating the pain. “Suffering is when somebody else is dictating the speed you have to ride at...” said Andrew. Bill concurred, saying, “Somebody is really hurting you...,” as did Gus who stated, “It’s as if somebody else is putting you in pain when you are competing.” Among the questions that these statements raise is how can a competitor cause their opponent physical pain in a non-contact sport? The logical answer is he cannot. An opponent cannot “force” another to ride at a specific pace or to be in a state of pain. It is instead the choice of the competitor to ride at that pace. He is the one who is creating the pain that he ironically tries so hard to avoid. Frank addressed this point when he said, “the first word that comes to mind is ‘pain.’ The experience of pain is voluntary. What we do is not an involuntary thing...You do this by choice.” The conclusion then is that if one accepts the pain, then one can employ effective coping strategies.

Another phenomenon found in this investigation was how the perception of pain was related to the performance. Several of the participants discussed that if all physical variables (heart rate, level of fitness, etc.) were held constant, pain could still be perceived differently from one situation to the next. Positioning in a race was the most frequently mentioned determinant of pain perception. The further a participant was up in the race or group of riders, the less pain he experienced. Conversely, the farther back he was, the more pain he experienced.

Again, the issue of choice arises. If a rider was having a “good day,” he chose to view it as “good” and reacted in ways that lessened the perception of the pain. If he was not positioned, where he wanted to be in the race due to circumstances either beyond or within his control, such as others superior riding ability, a mishap, or inadequate physical preparation, he chose to react in a way that intensified his perception of pain.

The implications of this data again support the notion that the perception of pain is a choice. The participants “chose” to feel the pain at different levels of intensity. The circumstances were just circumstances, nothing more. They chose to view the governing factors as either “good” or “bad” and responded in a way that affected their performance. This issue reinforces a quote by William Shakespeare, who stated, “There is nothing either good or bad, but thinking makes it so.”

Based upon the results of this data some specific questions are raised: What would happen if while in a “disadvantageous position” a rider viewed the situation as advantageous
or a positive experience? Could the perception of pain be instantly changed and/or lessened if he were to choose to do so? Would that lessened perception of pain then allow him to advance into a more advantageous position in the race? Extrapolating from the data gathered in this investigation, it seems possible.

Another key finding of this investigation regards how these cyclists viewed pain as finite. Pain was a condition they knew would end in a relatively short amount of time. Frank said, “I guess that’s it. Keep your mind on the fact that suffering is very temporary and that it’s not bad.” The implications of this statement and those of the other participants are that pain can be easier to manage when the participant believes that it will end within a short amount of time.

**Preparation**

This theme uncovers that there was a connection between being prepared physically and mentally and the ability to manage pain. Physical preparation took the form of training and knowledge that the body had been properly trained for the demands of racing. Mental preparation was the development of confidence and considered by some to be the “next step.” The participants in this investigation made it very clear that if they felt they were prepared for the race, the perception of pain would be lessened. This indicates the importance of being properly prepared both physically and mentally for a contest.

**Mental Skills**

According to Weinberg and Gould (2003) concentration is, “focusing attention on the relevant cues in the environment and maintaining that attentional focus” (p. 334). The participants in this investigation indicated that those cues that contributed to their performance were the mechanics of their pedal stroke, efficient body position, race strategy, the rider in front, and/or breathing.

It is interesting to note the different types of concentration or attentional strategies that were utilized by the participants in relation to each other, and the different types of concentration each used for himself. These could be identified using Nideffer’s (1976) model of attentional focus. The model identifies the different types of focus athletes utilize when performing. Examples gathered from this investigation that reinforce this model are as follows: 1) Broad-external focus: “I’m focusing on the finish line, on other riders, on getting to the finish line. Your mind can only think of so many things at one time.” 2) Broad-internal focus: “Just focus on all of the aspects of technique. That would be the cleanest way to define it. Just all aspects of technique and that would be peddling and body movement.” 3) Narrow-external focus: “I don’t know when I was suffering what kept me there beyond just the real narrow
focus of staying on the wheel in front of me.” 4) Narrow-internal focus: “It’s gotta be smooth (the pedal stroke). You have got to get into the rudimentary pushing up and down on the pedals. Even when you are an excellent bike racer with a beautiful stroke, if you lose that focus look what happens, you just go wrong.”

It is apparent from the data that there is no one specific focus that was utilized by all of the participants. As the situational needs changed so too did their attentional focus. Of particular note about attentional focus is that while the focus shifted from one dimension to another, it remained on the task relevant cues of enhancing performance. Most importantly, their attentional focus was not on the pain. When they felt the pain, their way of “blocking” it out was to attend to situationally relevant cue.

The section on awareness addressed the athletes’ arousal level or zone of optimal functioning (Hanin, 1986). The data provided evidence that the participants had an acute awareness of their own level of optimal arousal and had techniques for getting themselves back into it. Awareness is a critical skill necessary for elite level performance that according to Ravizza (1993) can be developed. “The underlying basis of psychological interventions for performance enhancement involves teaching the athlete the importance of the recognition, or awareness, of the need to do something to gain control.” (p. 148)

The participants in this investigation had developed a heightened sense of their bodies and what was “normal” or best for them when performing. Most expressed a need to remain as relaxed as possible when racing. They realized that as they experienced stressors (other riders, the duration of the race, weather, etc.) they needed to remain as relaxed as possible or else they would perceive more pain, which would then have an adverse effect on their performance. This quote from Ivan illustrates his need and desire to remain relaxed:

I always looked at Andy Hampsten and he was almost dead on his bike. He was so relaxed and so focused. Things just seem to not bother you as much when you are relaxed. I think when it comes to pain management; if you are totally relaxed, things are definitely going to go a bit better.

Ivan recognized two things: first, he realized that when he was riding in a tensed state, he had the awareness or the sense of self to recognize the tension. In order to be aware of the tension, he needed a reference point of what his optimal arousal zone was, which meant that sometime in his career he had made a conscious effort to recognize that zone. Second, he acknowledged the tension was a detriment to his performance and would result in pain, and that riding while relaxed was a more effective method for managing pain.

The participants also had strategies in place to help them either maintain or regain control. The strategy of choice by these participants was to first gain control over their breathing. Ravizza (1993) suggests that changes in breathing are another bodily cue that often
A Naturalistic Investigation

signals too much stress. One of the participants in the investigation said, “The easiest thing I have found is breathing. If you can get your breathing under control and get it back... have it as a point of focus. It is the most important thing to keep control of... That’s the doorway back to gaining control.”

Controlled breathing not only induced relaxation, but also according to one participant increased the amount of oxygen available for work by the body. Harris and Williams (1993) discussed the same benefits of controlled breathing in their chapter titled “Relaxation and Energizing Techniques for Regulation of Arousal.” In it they state, “Breathing properly is not only relaxing; it facilitates performance by increasing the amount of oxygen in the blood. This carries more energy to the muscles and facilitates the removal of waste products” (p. 188). Whether it was for stress reduction or performance efficiency, the participants in this investigation found focused or relaxed breathing to be one of the biggest techniques for performance enhancement and the management of pain.

A goal is defined by Locke and colleagues (1981) as “attaining a specific standard of proficiency on a task, usually within a specified time limit (p. 126).” According to Gould (1993) goal setting in sport has “not only been shown to influence the performance of athletes, but it has also been linked to positive changes in important psychological states such as anxiety, confidence, and motivation” (p. 158). For the participants of this investigation, goal setting was a method of keeping them focused on the task, which in turn aided them in overcoming the pain. An example of this is found in this quote from Howard, “The mental focus I had set myself was to do six or seven days of really hard work regardless of the conditions. I pushed though it and it was almost easy.”

The implication of this statement is that entering into the event or ride without a focus can allow outside distractions such as pain to interfere with performance. When pain begins and a rider does not have a definite direction, it was easier to give up or quit. Having specific goals gave the participants the motivation and/or the focus to continue through the pain.

Vealy and Walter (1993) have defined imagery as “using all the senses to recreate or create an experience in the mind” (p. 201). Athletes in many sports (Suinn, 1993) have successfully utilized it for sport performance preparation. As the athletes in this investigation reported, it can be successfully utilized in cycling not only as a method of strategizing but also for managing the pain.

The participants in this investigation indicated that they would prepare for an event by going over the course in their minds incorporating many of their senses. They would “see” the road and the other riders; “hear” the other riders; and “feel” the fatigue in their bodies, as they would imagine how the race might progress. Keeping the imagery positive was a key. They saw themselves doing what they wanted to do. None of the participants mentioned, “Seeing”
themselves perform poorly. The implications of this data are that mental preparation in the form of imagery is a viable resource for managing the pain involved in the sport.

**Mind and Body**

This theme illustrated the control one believes the mind has over the body, or the body has over the mind. It was interesting to read these quotes and learn that Olympians can function with more pain by "telling" their bodies to do so. On the other hand, a few mentioned that their bodies will "tell" their mind that they cannot go that hard. Among the questions this raises is, who or what is really in control?

In the awareness theme, the participants discussed at length their ability to know themselves. That theme clearly illustrated a union of both the mind and the body. A tandem working relationship existed where there really was no separation. Through the data in this theme, it appears that the two may work separately. However, the investigators speculated that the mind/body relationship in this theme represented a method or strategy for getting into a work mode (if, hypothetically speaking, the mind is controlling the body) or into a rest mode (if, hypothetically speaking, the body is controlling the mind). Getting tough when one is fatigued sometimes requires a bit of self-talk. Through the data, it is implied that the self-talk is directed toward the body or toward motivating one to move the body.

**Optimism**

As has been thoroughly explained throughout this report, pain is part of the sport of bicycle racing, and a characteristic all of the participants shared was their optimism toward the frequent painful experience. They accepted the pain as part of it and viewed it as a means to an end. They were optimistic about the outcome of their performance and this was illuminated by their quotes regarding confidence. Having the confidence that one was prepared for competition and could be competitive with the other racers was seen as having a vital influence on the amount or degree of pain one would experience.

Many factors contribute to the development of confidence. According to Weinberg and Gould (2003), those factors that can improve confidence are performance accomplishments, acting confidently, thinking confidently, imagery, physical conditioning, and preparation. Throughout this investigation, all of those factors have been explained by the participants as having been their experience. When a participant had all of those factors in place and working for him, his perception of pain was less, sometimes significantly so as exemplified in this quote by Ivan, “There were very few days in my career where I could do that. I remember a few very distinctly where you can go harder and harder and harder and it just doesn’t hurt that day.”
Control

The implications of this higher-order theme are again that the perception of pain can be drastically changed or altered just by how one perceives the circumstances. According to several of the participants, the exertion required to go up a climb first in the group was the same as being last. The speed or pace was the same and the rider was putting out the same effort, yet the pain was greater while riding at or near the back.

This suggests that if a rider could consistently maintain the mindset of being in control, even if he was not in such a position, he would experience less pain. Maintaining that mindset of control would likely involve positive self-talk as was explained in the Mental Skills higher-order theme. For example, when a rider becomes aware that he is thinking negatively about his position his self-talk might sound like, “I’m sitting ten guys from the front and am really hurting. I can’t control the pace right now and I really could use a break.” He could turn that negative self-talk around by saying, “I’m ten back and hurting, but those guys at the front are doing just as much work as I am. They are using just as much energy as I am. Relax and get as comfortable as possible.” This could possibly lead to greater performance because of having been less stressed psychologically.

Summary

Former Olympic cyclists used a myriad of cognitive strategies to cope with endurance pain while training and competing. All of them spoke about how they attended to the pain rather than attempting to ignore it. They viewed it as a necessary part of the sport and something that was very short term. They also spoke about how using skills such as goal setting, imagery, and positive self-talk helped to lessen the intensity of it. Additionally they felt that if they were prepared for a race, the feelings of pain would be less.

A potential limitation of this research is the possibility that cyclists will not have full and detailed recall of their experiences. However, researchers who have conducted qualitative investigations on Olympic athletes have found that the participants had excellent recall of past events (Gould, 2003; Orlick & Partington, 1988). The participants in this investigation provided very rich and sometimes colorful memories of their experiences with pain and the methods they used to manage it.

The findings from this research can be applied not only to endurance cyclists, but also to any endurance athlete who wishes to increase their performance through cognitive means. Future research might focus on the cognitive strategies of professional women cyclists, as well as elite level amateurs and club level cyclists. The results of this research might be applied to other endurance sports such as running, swimming, cross-country skiing, or skating as well.
References

A Naturalistic Investigation


