

BEHIND THE VISOR: A QUALITATIVE EXPLORATION OF THE
PSYCHOLOGICAL SKILLS OF FORMULA ONE
RACE CAR DRIVERS

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ABSTRACT

This qualitative study examined the psychological demands of Formula One Racing, and the psychological skills former Formula One drivers utilized to meet those demands. The participants were nine former drivers, from six different countries, who have competed in at least one Formula One World Drivers Championship grand prix. The qualitative data were gathered using a semi-structured interview framework, developed by the researcher, to explore the psychological skills established from other validated psychological skills questionnaires, such as the Test of Performance Strategies, (Thomas, Murphy, & Hardy, 1999). Eight of the interviews were done via Skype, and one interview was performed in person. The interviews were transcribed verbatim, and then sent to the participants to make any edits or corrections.

Once the transcriptions were approved, the data were coded by the researcher using constant comparative methods as described in Charmaz (2006). Three phases of coding resulted in four themes and 14 sub-themes. The themes that emerged include: (1) Applied Sport Psychology in Formula One, (2) Psychological Skills, (3) Uncontrollable Aspects of Competition, (4) Career Components.

Drivers used various psychological skills in a focused effort to aid their performance. Drivers discussed the important role psychology plays in their sport, and the psychological resources available to them during their career. Drivers discussed the danger element of their competition, and how they and their competitors managed the fear associated with racing. The drivers in this study

competed in an era that was much more dangerous than the current era of Formula One racing (Barnes, 2013). The drivers' use of psychological skills, and perceptions of sport psychology, may guide consultants working with race car drivers and those working with other populations that have similar psychological and physical demands.

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TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
CHAPTER	
1. INTRODUCTION.....	1
The purpose of the study.....	3
Research questions.....	3
Limitations.....	4
Delimitations.....	4
Definitions of terms.....	5
2. LITERATURE REVIEW.....	7
Background.....	7
Physiological Demand of Racing.....	8
Drivers' valuation of Psychology in their Sport.....	10
Early research in motorsport psychology.....	11
Current Formula One drivers' use of Sport Psychologists.....	13
Sport Psychologists' work with drivers.....	14
Psychological skills in auto racing.....	17
Difference in events.....	23
Dealing with the danger.....	24
3. METHODOLOGY.....	28
Research Design.....	28
Participants.....	28
Data Analysis and Coding.....	28
Instrumentation.....	29
Procedures and Interviews.....	29
Researcher Bias Statement.....	30
4. RESULTS AND DISCUSSION.....	33
Presentation of Results.....	33
Theme #1: Applied Sport Psychology in Formula One.....	35

Theme #2: Arousal Regulation.....	38
Theme #3: Concentration.....	40
Theme #4: Danger.....	42
Theme #5: Financial Burden.....	44
Theme #6: Goal-Setting.....	45
Theme #7: Imagery.....	46
Theme #8: Mental Preparation.....	48
Theme #9: Physical Fitness.....	50
Theme #10: Retiring.....	51
Theme #11: Self-Talk.....	51
Theme #12: Young Drivers.....	52
Discussion.....	54
Question #1.....	54
Question #2.....	55
Question #3.....	58
Question #4.....	59
Question #5.....	61
General Discussion.....	62
Self-Reflection.....	66
Implications for Researchers.....	67
Implications for Practitioners.....	68
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH.....	71
Summary.....	71
Conclusions.....	73
Recommendations for Future Research.....	74
REFERENCES CITED.....	76
APPENDICES.....	83
A. SEMI-STRUCTURED DRIVER QUESTIONNAIRE.....	83
B. GRAPHS.....	84
C. INFORMED CONSENT.....	86

LIST OF TABLES

Table	Page
Table 1: Summary of Phase Two of Coding.....	36
Table 2: Summary of Phase Three of Coding.....	36

LIST OF FIGURES

Figures	Page
Figure 1: Comparative Graph of Drivers' Heart Rates.....	84
Figure 2: Driver's Heart Race During Grand Prix.....	84
Figure 3: Driver's Heart Race During Grand Prix.....	85

CHAPTER 1

INTRODUCTION

Formula One racing is an incredibly demanding sport. Drivers have to manage intense psychological and physiological stressors, and potentially very hazardous conditions, all of which may affect performance. Any mistake could result in death (Küçükdurmaz, 2012). Recent motorsport research has focused on the physiological stress drivers encounter during participation; however, little to no scholarly work has focused on the psychological strategies Formula One drivers, or any motorsport athletes, use to perform at their best.

Formula One's official website describes their drivers engaging in "a constant psychological struggle to counteract a mental turmoil of anxiety, disappointment, despair, anger, jealousy, resentment, sorrow and fear." And, "many believe drivers to have elements of schizophrenia, paranoia and/or various other personality disorders within their mental make-up," ("Formula One Driver Psychology," 2004, para. 1).

Many drivers indicate the role psychology plays in their sport. Three time Formula One World Drivers Champion Jackie Stewart stated:

The mind is everything. All the boys in Formula One today have gifts from God and there's 20 of them. Then there's the top six, then the extraordinary three. But the genius is the one who takes it to another level... And it's always the head that took them there. (Walker, 2012, para. 2-3).

Formula One success is decided by tenths of a second, and requires high levels of confidence, focus, self-efficacy, and other psychological factors.

Jacques Laffite, former Formula One driver from 1974 to 1986, asserted:

Bravery is still necessary for a racing driver...Before, when you had a steel barrier like in Zeltweg at the Bosch corner and you came up to it at 300 k.p.h. and you knew that if you cut it and hit the barrier at 270 k.p.h., the guy who braked two meters closer was the more courageous. (Spurgeon, 2012, para. 13-15).

Works in the popular press note the importance of psychological skills and managing stress for a driver (Spurgeon, n.d.; Walker, 2012), and also drivers' use of sport psychologists (Bedford, 2013; Walker, 2007; Weaver, 2011). Some current Formula One drivers have been outspoken about working with a sport psychologist, and even attribute some of their success to the sessions (Benson & Leggard, 2013). However, other current drivers respond negatively to working with a sport psychologist. In 2014, 2008 World Drivers Champion Lewis Hamilton said concerning sport psychology, "never had it. Never needed it, and will never have it. So we'll never speak of it again unless I start going crazy," (Young, 2014, para. 4).

Using an internet search engine, one can find numerous sport psychologists advertising their private practices, listing for prospective clients their previous and current experience working with Formula One drivers. A sport science consultancy, "Pro Performance," (<http://www.properformance.co.uk>) features the testimonials of two Formula One reserve drivers, and advertises their sport psychologist's ability to help drivers with anxiety and worry management, confidence, mental imagery/visualization, goal setting, motivation, reaction time/spatial awareness, decision making, and relaxation techniques, (Pro Performance, n.d.).

Drivers also must manage fear, and the high level of risk associated with their sport. From 1966 to 1976, drivers had a .35% chance of dying each time they got in their car, and a 4.4% chance of dying over the course of one season. In fact, if a driver participated in every race for five seasons, the driver's odds of dying from racing approached 20%, (Barnes, 2013). In the modern era of Formula One, safety has improved dramatically. The last fatal accidents in Formula One occurred at Imola in May 1994, at the San Marino Grand Prix, when two drivers were killed in one weekend, (Watkins, 2006).

Three time World Drivers Champion Nikki Lauda stated, "you have to be a guy who likes risks.... In my time we had to have 100 percent risk and no fear, and if we die, tough...Today, thank God, it is 10 times better," (Spurgeon, n.d, para. 6). While different eras in Formula One racing may result in the need for different psychological skill sets, the present study aims to identify the psychological skills and strategies used by former Formula One race car drivers, including their origin and application.

The Purpose of the Study

The purpose of this study was to qualitatively examine the psychological skills used by former Formula One drivers.

Research Questions

The following research questions were examined in this study:

1. What are the psychological skills used by former Formula One drivers?
2. What are the unique psychological demands of Formula One racing?

3. How do Formula One drivers manage the objective danger inherent in Formula One racing?
4. How do Formula One drivers prepare for competition?
5. How much value do Formula One drivers place on psychology in their sport?

Limitations

The following limitations were present in this study:

1. Drivers did not necessarily share all their thoughts and feelings about their driving experience.
2. The researcher's presence during data gathering may have affected the participants' responses.
3. Drivers' memory recall of past events may have been inconsistent, flawed, and/or diluted by time.
4. Drivers may respond dishonestly in order to portray themselves favorably.
5. Drivers may not have felt comfortable sharing personal experiences with the researcher, or having those experiences recorded and shared, and withheld revealing information.

Delimitations

The following delimitations were present in this study:

1. Only former Formula One drivers were included in this study.
2. Only drivers who were fluent in English were interviewed for this research.

Definition of Terms

Arousal regulation: a driver's ability to manipulate his level of arousal, the neural excitation on a continuum ranging from a comatose state to a state of extreme excitement (Malmö, 1959), and an energizing function responsible for harnessing the body's resources for intense and vigorous activity (Sage, 1984).

Attentional control: a driver's "ability to selectively attend to appropriate cues in the task at hand, such as some aspect of the environment or internal stimuli, while screening out irrelevant and distracting external and internal stimuli," (Williams et al., 2012, p. 570).

Formula One: the highest caliber of auto racing; "the ultimate test of man and machine - pushing car and driver to their absolute limits in pursuit of one simple goal. Speed... Formula [refers] to the unique set of regulations governing the cars, while the '1' denoted the championship's status as the highest level of international motorsport recognized by the governing body, the FIA," (The F1[®] brand - a powerful symbol of excellence, n.d., para. 1-3).

Goals: an "objective or aim of action... a specific standard of proficiency on a task, usually within a specified time limit," (Locke & Latham, 2005, p. 705). Goal-setting will be viewed as the driver's use of establishing goals to influence progress.

Imagery: a cognitive process where a driver imagines he is producing a movement without actually performing it. It is a dynamic state, where representation of a specific motor action is internally activated without motor output, (Jeannerod, 1994; Lotze & Cohen, 2006).

Psychological skills: a driver's use of attentional control, arousal regulation, goal-setting, imagery, and self-talk.

Self-talk: a driver's use of engaging in an internal dialogue, such as giving himself instructions and reinforcement or interpreting what he is feeling or perceiving (Hackfort & Schwenkmezger, 1993).

CHAPTER 2

LITERATURE REVIEW

Background

The Formula One World Championship began in 1950, attracting the world's best racing teams and drivers to compete in the most prestigious races, (Potter, 2011). The first official World Championship race was held at Silverstone, England, May of 1950, although Formula One grands prix had been held earlier that season. At that time, not all grands prix counted towards the championship. Non-championship grands prix were held until 1983, at which point they were deemed unprofitable and discontinued, (Williamson, n.d.).

Formula One is regarded as one of the most dangerous sports in the world. Fifty-four injuries and twenty deaths occurred during races, qualifying, and practice sessions from 1950 to 1996, (Potter, 2011). Thirteen of those deaths occurred in the first decade of the sport. The danger reached a watershed the weekend of the San Marino Grand Prix at Imola in 1994. Two drivers: Roland Ratzenberger, and three time World Drivers Champion Ayrton Senna died. After that point, safety measures increased dramatically, and no drivers have lost their life racing (Williamson, n.d.).

Success in Formula One results from a combination of technical advancements by designers and engineers, and a driver's ability to maximize the potential of the cars they are given. Formula One strives to emphasize the importance of the drivers' skill level, and the governing body makes regulations

and restrictions on mechanical elements that diminish the relevance of the drivers' skill (Williamson, n.d.).

Physiological demand of racing

A relatively small amount of scholarly literature exists on motorsport in general; however, a fair amount of literature exists on the physiological demands of race car driving. Several studies exist that examine the heart rate values of race car drivers as they compete. During a race, a driver's heart rate has been shown to reach anywhere from 140 to 180 beats per minute, (Jacobs & Olvey, 2000, 2002; Schwabberger, 1987).

Although race car driving is physically strenuous, the high heart rate is not necessarily just a physiological response to the physical demand of driving. In 2011, Matsumura and colleagues found that drivers' heart rate values during races (168.8 beats per minute) were significantly higher than their heart rate values during solo driving (140.9 beats/min), leading to the conclusion that competition heightens heart rate in drivers, (Matsumura, Yamakoshi, Yamakoshi, & Rolfe, 2011). Figure 1 shows the average heart rate of two former Formula One drivers compared to the average speed of their laps. Figures 2 and 3 show how those driver's heart rates vary during the course of a non-competitive practice session at Monaco. At top speed, Gilles Villeneuve's heart rate seemed to be continually lower than Didier Pironi's (Watkins, 2006).

The physiological demands of race car driving are not limited to high heart rates. During a race, drivers' core temperature can rise to 40–41°C, and they can lose 5–10% of their body weight due to dehydration (Jareno, De La Serna, Cercas,

Lobato, & Uya, 1987; Klarica, 2001). Cockpit temperatures during hotter courses such as Sepang in Malaysia, or Interlagos in Brazil, can reach 50°C (Küçükdurmaz, 2012). These high temperatures have been shown to decrease reaction time, and potentially performance (Walker, Ackland, & Dawson, 2000). Ayrton Senna would run in the heat of Brazil a distance of 8 kilometers, 16 kilometers, and 24 kilometers on successive days to acclimatize himself to these brutal conditions (Watkins, 2006).

High heat is not the only physical stressor a Formula One driver must endure; drivers must manage very powerful g-forces from all directions (turning left, turning right, accelerating, and braking) with the muscles of their neck. During a turn, a driver can experience lateral g-forces up to 5G (Küçükdurmaz, 2012). The average head and helmet weighs around 4kg, meaning that during a 5G turn, the muscles of the neck would have to support up to 20kg of force at each high G turn for the duration of the grand prix, (Jutley, 2003). Formula One grands prix are limited to a distance of 305km, or duration of two hours (“Race Distance,” n.d.)

Drivers’ oxygen uptake while racing has been shown to be more than 75% of their peak oxygen consumption, and 9– 13 times their resting metabolic rates, (Jacobs & Olvey, 2000, 2002). Drivers also have a greater level of visual acuity than sex-matched controls (Schneiders, Sullivan, Rathbone, Thayer, Wallis, & Wilson, 2010).

All of these stressors, plus the uncomfortable seating position drivers adopt, put a high degree of stress on the neuromuscular system (Backman,

Häkkinen, Ylinen, Häkkinen, & Kyröläinen, 2005). In a study of Formula One racers, after races, 63% of the drivers reported wrist problems, (Masmajeán, Chavane, Chantegrett, Issermann, & Alnot, 1999). In 1982, Burton administered a back-pain questionnaire to 8 of the 32 regular grand prix drivers, and it was found that 88% of the drivers were regularly experiencing low back pain during and after races, and 63% felt driving related cervical symptoms, (Burton, 1983).

Driver's valuation of Psychology in their sport

Although there is a fairly substantial body of literature in the popular press concerning the psychological aspects of driving, no scholarly work has thoroughly examined psychological skills and strategies Formula One drivers utilize, even though top Formula One drivers have advocated in interviews the importance of the psychological component of their sport. Two time World Drivers Champion Fernando Alonso attests:

It's always in the mind...it's difficult because you need to control the stress and the adrenaline of pushing and winning the championship and winning races, and on the other hand, to be calm because you have enough advantage to not risk too much; it's time for the others to risk it. (Spurgeon, 2009).

Paul Newman, who began a successful racing career after learning the sport for a role in a film, posited:

Winning depends as much on what's in your head as what's under your hood. If you let yourself think another driver is better than you or quicker than you or more aggressive than you, then he's got you. It doesn't matter if his car is faster than yours or not. If you look up in the mirror and say, "Oh, Christ, here he comes," he'll beat you every time. ("Speed", 1985, p. 27).

In Butch Miller's book, "Short Track Driving Techniques," mental awareness and sharpness was described as, "the most important asset for a race car driver" (1989, p. 11).

It is important to note that not all Formula One drivers acknowledge psychology's role in their sport. Former driver Jarno Trulli claimed:

I've never had any problems mentally... When you are out there and you want to reach a target, you don't think "what I have to do." The only thing you want to do is to drive the car the best you can. It's difficult to think about the mental situation at a difficult moment. Sometimes I have problems, and when I step into the car suddenly my head becomes open, it is free, clear - in the car I am a happy man, and then maybe when I jump out of the car I can start thinking about problems. (Spurgeon, n.d. para. 17).

Early research in motorsport psychology

One of the first studies published that examined psychology in motorsport was, "Auto Driver Fitness: An Evaluation of Useful Criteria," by Benton et al. in 1961. Benton et al. addressed the dangers associated with motor vehicles, and examined members of an amateur sports car racing club for their physical, ophthalmological, and psychological characteristics. Results of the tests indicated a significant negative correlation between driver conformity and driver error ($r = -.57, p < .01$). However, a significant positive correlation existed between 'driver adventure versus security,' and driver error ($r = .41, p < .05$), implying that drivers who like to take personal risks commit more driving errors. The findings also suggested that drivers who reject social customs are deficient in ethical awareness, take personal risks, are interested in abstract thinking, and are likely to commit the greatest number of errors during a race (Benton, Mills, Hartman, Crow, 1961).

In 1965, Krickler examined a group of British Motor Racing drivers in an effort to compare their results to a motor racing driver patient of her's. Krickler's patient had suffered a severe head injury. She was curious to see how the patient's results would compare to men of similar skills, and the likelihood of the patient's return to the sport. Krickler administered various psychological assessments to the five grand prix road racers, and five ordinary motorists (controls). She compared the racers and ordinary motorists on intelligence, as measured by the Wechsler Adult Intelligence Scale (W.A.I.S.; Wechsler, 1955), accuracy of driving judgment, as measured by the Track Tracer Task (Krickler, 1965), mental speed, as measured by the Nufferno tests (Furneaux, 1955), reaction time, as measured by the Miles Trainer (Krickler, 1965), impulsiveness, as measured by the Porteus Mazes (Porteus, 1952) visual motor coordination, concentration, and level of aspiration, (Krickler, 1965).

Results of independent *t*-tests suggested that between the racing drivers and ordinary motorists, the drivers were more stable in their judgment of their performance ($p < .001$), and the drivers' reaction time decreased in conditions of stress, while the controls' reaction time increased. Through qualitative interviews and observations of behavior, Krickler gained impressions of the drivers, and noted, "personality is of considerable importance in becoming a successful motor racing driver" (p. 193). She describes drivers as perfectionistic, tolerant of frustration, highly competitive, and, "constantly seem to have to test themselves out against both an external and an internal criterion" (Krickler, 1965, p. 194).

Current Formula One drivers' use of Sport Psychologists

Information regarding sport psychologists' role in Formula One is limited; however, Dr. R.S. Jutley claims, "most top motorsport teams now have sports psychologists who use mental training to help their drivers to achieve performance," and that, "most top motorsport drivers now have very similar skills, fitness levels and competition cars. This means the margin for success is often very slim and not uncommonly down to the competitor who remains focused," (Jutley, 2003, p. 56).

Several sport psychologist/mind coaches/performance enhancement consultants advertise their previous experience working with motorsport athletes. On "mind coach" Don Macpherson's website, (<http://www.donmacpherson.co.uk>) he acknowledges his previous experience with Formula One drivers, and advertises his ability to help the drivers, "overcome their phobias, lack of confidence, stress – in fact, with any psychological aspect of their performance," ("About Don Macpherson," n.d., para. 2).

Two current Formula One drivers have publicly acknowledged their personal use of a sport psychologist: Romain Grosjean and Felipe Massa (Benson & Leggard 2013; ESPN Staff, 2013). Romain Grosjean addressed the potential stigma associated with seeing a psychologist, and argued:

I think I started because I was clever enough to think I needed help. It's not a proof of weakness, it is more a strong point because you can always improve yourself and that is why I still work with her now. There is a lot that goes on with her... What we talk about depends on which mood you are in and what you need to work on. Once a week I meet her and we speak - a little bit about self-confidence and also not caring too much about what other people think. It's very specific but it's hard to say exactly what we have been working on. I do think you can always improve

yourself and I do think it makes me a better man at home and a better driver on the track. So it makes my life much easier! (ESPN Staff, 2013, para. 4-10).

There is less information available online regarding Felipe Massa's work with a sport psychologist, but during a slump in his 2012 season with Ferrari, he attested that he "did work with a professional psychologist, sporting psychologist," and, "that was just the beginning. After that I was able to change the direction to think, the direction to work and I think it was like training I did," (Benson & Leggard 2013).

Conversely, some drivers remain openly averse to using a sport psychologist. Although Lewis Hamilton stated, "the conscious and subconscious part of your mind is very important in this business [race car driving]," he clarified, "I would never work with a sports psychologist – I never have and I never will," (Weaver, 2011, para 4-7).

Sport Psychologists' work with drivers

In 2009, A. J. Klarica wrote of his experience working with race car drivers and teams as a sport psychologist and fitness consultant. Klarica stressed that while a certain amount of work will be reactive, such as in a crisis situation, sport psychologists in motorsport should emphasize a non-reactive, preventative environment. Klarica advocates: "skill development, team building, and equipping individuals and teams with the tools necessary to perform to their maximum," (Klarica, 2001, p. 290). Several tools he mentions as useful working with drivers are guided imagery, where "the perfect lap" is described to the driver.

He also discussed breathing techniques as a useful tool to allow the driver to remain calm in stressful situations (Klarica, 2001, p. 290).

Dr. Patrick Cohn's website, "RacePsych," (www.racingpsychology.com)

offers motorsport athletes the opportunity to:

1. Develop prerace routines and mental strategies to enter the zone
2. Maintain composure and momentum after mistakes
3. Take your practice lap times to competition consistently
4. Uncover doubts and be proactive with your self-confidence
5. Increase the consistency of performance with prerace routines
6. Manage distractions and perform with laser-like focus

His website features the testimonial of NASCAR driver, AJ Allmendinger, who notes:

I think Dr. Cohn's mental coaching has helped me immensely. It has taught me what to focus on in and out of the race car. How to stay calm and focused have been key skills that I have learned which are important in helping me be a better and more confident race car driver. ("Mental Training for Auto Racing," n.d.).

Professor of Sport Psychology Kevin Burke (2010) released a podcast concerning psychological skills in motorsport, and tools drivers could utilize to increase their performance. The podcast focused on concentration, dealing with mistakes/problems with the car, and dealing with anger. He pointed out that in motorsports such as NASCAR and Formula One, races can last hours, without a specific stopping point, like a timeout or halftime, that allows the competitors to fully relax physically and mentally.

A mental skill he suggested adopting is to use the caution flags as a moment to relax and regain composure. When a car crashes during a race, or another issue presents itself that requires racing to be momentarily delayed, caution flags are waved, speed is reduced, and overtaking is prohibited until the

debris is removed. These can be considered lulls in intensity, although important and strategic pit-stop decisions are often made during these times. He advocated against maintaining a high level of intensity during the entire race, and suggests that drivers pick their spots (Burke, 2010).

Concerning dealing with mistakes and/or problems with the car, Burke suggests refocusing on the present, with a task-oriented thought or a cue word. He stated that drivers should use imagery in advance of their races, and to have a set and rehearsed plan on how to respond to adversity. Burke also noted that anger is common in motorsport athletes and, depending on the driver, it is best to either have a set plan to manage anger during the race, or before the start (Burke, 2010).

Morgan (2013) looked at the psychological skills of road racers and oval racers, by giving amateur road and oval racers the Test of Performance Strategies, and comparing the two groups results. In 2013, Morgan found, “road racers scored significantly higher than oval racers on emotional control ($p < .001$) and significantly lower than oval racers on negative thinking ($p < .004$).” Formula One was and is predominately road racing. At certain times, the Indianapolis 500, an oval course, used to be part of the Formula One World Drivers Championship.

In a study concerning sport psychology interventions on drivers, Edmonds et al. (2008) examined the effect of biofeedback training on affective regulation and performance in a racing simulator. The subjects of the study were not race car drivers, but participants familiar with the racing simulator used for the study; the testing instrument was the Gran Turismo videogame for the Playstation 2,

hooked up to a steering wheel controller and projector system in a closed environment. The nine different participants were assigned one of three arousal regulation treatment conditions: (1) optimal, (2) poor, and (3) attention control. Attentional control was used as the control in the experiment in an effort to determine if such treatments would result in the expected performance increase, decrease, or stasis, respectively. Results showed the expected changes for each participant, but that there were large individual differences among the participants, demonstrating idiosyncrasy in the subjects' zones of optimal performance (Edmonds, Tenenbaum, Mann, Johnson, & Kamata, 2008).

Psychological skills in auto racing

In 2012, Ebbon and Gagnon set out to research the relationship between mental skills, experience, and performance in stock car racers. Performance was measured by observing track points rankings, and regional and national rankings. Mental skills were measured by the Psychological Skills Inventory for Sports-R5 (PSIS R-5; Mahoney et al., 1987). The variables were examined using a Pearson's correlation coefficient. The researchers found that rankings were negatively correlated with mental preparation ($r = -0.46$, $p = 0.004$), and anxiety coping ($r = -0.53$, $p = 0.028$). The age of the participants was negatively correlated with motivation ($r = -0.56$, $p = 0.023$). Participants' motivation was correlated with self-confidence ($r = 0.48$, $p = 0.047$), mental preparation ($r = 0.48$; $p = 0.03$), and team emphasis ($r = 0.46$, $p = 0.04$). The participants' concentration was correlated with self-confidence ($r = 0.64$, $p = 0.002$) and anxiety coping ($r = 0.65$, $p = 0.002$). The participants' self-confidence was

correlated with anxiety coping ($r = 0.64$, $p = 0.003$). Mental preparation was correlated with team emphasis ($r = 0.50$, $p = 0.024$) (Ebben & Gagnon, 2012).

Also In 2012, Ebben and Suchomel observed the physical demands, injuries, and conditioning practices of stock car drivers qualitatively by interviewing them. The interviews were intended to identify background information, the physical demands of racing, injuries associated with racing, and the athletic and fitness background and practices of the subjects. Following those questions, opened ended questions were asked and analyzed using inductive content analysis (Ebben, & Suchomel, 2012).

When the 40 stock car racers were asked, “What other [besides physical] performance abilities are required for racing?” 26 answered with, “Mental Skills.” The “Mental Skills” responses were categorized into ‘mental strength,’ ($n = 12$, Mental conditioning is huge; you have to be mentally fit; need to keep sharp, lots of head games), ‘focus,’ ($n = 9$, Stay focused and keep my head straight; diversify attention between track, gauges, and flagman), ‘anticipation,’ ($n = 3$, Anticipate what is about to develop, thinking ahead to avoid wreck), ‘judgment,’ ($n = 2$, You need to have good judgment out there), and ‘calmness,’ ($n = 2$, You have to stay calm) (Ebben & Suchomel, 2012).

Two of the drivers stated that they perform resistance training to increase their mental toughness (“It helps to push you mentally”), and four perform cardiovascular training for mental acuity for racing. One of the drivers performs cardiovascular training to, “give me an edge mentally, so I don’t feel drained and lose concentration” (Ebben & Suchomel, 2012, p. 1195).

Butch Miller's *Short Track Driving Techniques* is among several books intended to serve as a manual, or source for general information for novice drivers about how to get started in racing. Physical and mental preparation is included in the book, featuring psychological skills and attributes encouraged in racing. He advocates for drivers to develop self-efficacy, and that:

You can't succeed as a race driver unless, when you get in the car, you feel that you are the best...you have to believe in yourself. I believe that attitude is one of the most important parts of succeeding in racing. (Miller, 1989, p. 12).

In Dr. R.S. Jutley's book, *Fit for Motorsport*, he outlines physical and mental training for those who wish to compete in motorsport, and he displays how the top motorsport athletes train. There is a chapter titled "Spirit," that outlines psychological skills and strategies involved in race car driving, (Jutley, 2003, p. 56). He notes the inverted-U theory for arousal, and that there are multiple techniques for hitting your personal arousal level: "Relaxation, Imagery, Focusing, Centering, Positive self-talk, and Target setting," (2003, p. 58).

Butch Miller suggests to his readers that on the night before a race, to go over the starting lineup, and think about how the cars in front, behind, and next to you will react on the track (1989). Jutley proposes similar imagery sessions the day before a race; however, not right before bedtime, because he pointed out that often imagery can elicit similar arousal levels as the actual performance, so it would be difficult to sleep (2003).

Miller also suggests games such as table tennis, racquetball, checkers, chess, and backgammon to improve mental conditioning, and, "help you make quick decisions as well as develop strategy" (1989, p. 15). In Jackie Stewart's

diary, he mentions that he and 1970 World Drivers Champion Jochen Rindt would often play table tennis together (Stewart, 1972).

Miller makes a case for an imagery program outside the car, where one can think through track situations. He even advocates mental imagery's ability to increase the likelihood of accident avoidance, and crash survival. He posits, "by mentally picturing specific situations such as a car spinning in front of you, you can precondition your mind to take the proper course of action to avoid the situation" (p. 15). Miller discusses his strategy of using mental imaging as a "play-back," to review his races (Miller, 1989).

Jutley suggests that to aid in imagery, a driver should adopt a driving position with his/her hands on an imaginary steering wheel, and feet on pedals, and, "hear the engine revving, feel the force of the acceleration and the change in body position as you drive or power around corners," (2003, p. 59). In Burke's podcast, he shares his experience hearing of a young driver who would wear his racing helmet and lie in a bathtub for imagery sessions. The angle of the tub was similar to the driver's seat position, and it helped aid in the vividness of the driver's imagery (Burke, 2010).

Former Formula One driver Giancarlo Fisichella practiced imagery by visualizing himself driving through the Monaco circuit. During these imagery sessions, he accelerated, braked, and changed gears according to how he planned to do so in the race, and his imagery sessions were usually within a few seconds of his actual in-car practice laps (Jentley, 2003, p. 59). World Drivers Champion

James Hunt (in 1976) was depicted as using this same tactic in the 2013 movie, *Rush*.

Miller proposes that, during a race, a driver's emotional state should be neutral, and that drivers, "should be experiencing no emotion when in the race car" (1989, p. 17). Miller advocates that a driver should not be "psyched-up" before a race, and:

There is no useful purpose in being psyched-up...If a driver is excited before a race, his ability to make judgments and to have a clear mind to determine a proper course of action, particularly at the start of a race, can cause him to get in over his head. Having a clear mind and a very quiet emotional state are important to achieving maximum performance. (1989, p. 17).

Jutley makes a case for something more in line with what could be described as a flow state, which he defines:

A state of mind which makes everything go your way on the day of the event...*being in the groove* or *being in the zone* or *on a roll*...Whatever it may be called, it is a great feeling of confidence that results in consistent results that may even supersede expectations. (Jutley, 2003, p. 56).

In opposition to both those sentiments, supersport (motorcycle) athlete Iain McPherson argues, "it is good to feel a bit of pressure before a race. It shows that you are switched on...I sometimes tell myself that this will be the last day I live, so I can push myself to the limit," (Jutley, 2003, p. 86). World Drivers Champion Mario Andretti (in 1978) revealed:

The moment I put on my uniform and my gear all of a sudden I go into a kind of trance. I walk away from this life and step into another, and I find that I cannot fully relax when I have it on...I feel like I am 'on duty.' You've got that on. It's for a purpose. You're doing a job. ("Speed!", 1985, p. 89).

Anecdotally, some drivers mention specific instances that mimic what can be described as a flow-state, or a peak experience in exercise. Ayrton Senna, three time World Drivers Champion, detailed his experience competing in Monaco (one of Formula One's most difficult tracks). He revealed:

That day I suddenly realized I was no longer driving conscious. And I was in a different dimension, for me. The circuit for me was a tunnel, which I was just going, going, going, and I realized I was well beyond my conscious understanding. (Kapedia, 2010).

Senna won at Monaco six times: once in 1987, and consecutively five times from 1989 to 1993. That is the most any driver has ever won at the Monaco circuit. Senna was killed racing at the San Marino Grand Prix at Imola, in 1994. The San Marino Grand Prix was scheduled one week before the Monaco Grand Prix that year, (StatsF1.com).

Miller also establishes the importance of concentration, and that a driver must focus on concentrating. He defines concentration as, “your mind acting like a computer, processing all kinds of inputs coming from all different aspects – the feel of the car, the sights, the sounds, the peripheral visions and past mental images,” and that only practice will improve concentration (1989, p. 17).

During the course of a race, inevitably a driver will make a few errors, and Miller suggests that a driver should “accept that fact that you will make mistakes and continue, trying to maximize your concentration instead of trying to make up for lost time...The mark of a good driver is one who acknowledges his errors and continues undeterred” (Miller, 1989, p. 51).

Difference in events

A Formula One driver participates in several different forms of driving before and during the season. Drivers participate in testing sessions, practice sessions, qualifying sessions, and race days, and no literature, scholarly or otherwise, differentiates if Formula One drivers prepare for the various sessions differently, or utilize different psychological skills for each. As mentioned earlier, Matsumura et al. (2011) observed that drivers' heart rate was significantly higher during race day than qualifying, and concluded that the competition of race day heightens heart rate, as opposed to practice sessions. Former driver David Coulthard confessed, "one area that I wasn't so strong in was qualifying, and there was a time when I was over-analyzing rather than focusing on driving" (Spurgeon, 2009).

Former driver Jody Scheckter also mentioned that practice sessions and qualifying were particularly stressful. The 1979 World Drivers Champion admitted:

I've been crazy as hell and felt so mad I could have jumped out of the car at 200mph. I've changed gears without taking my foot off the accelerator, wanting to destroy the engine. I used to get really upset in practice and qualifying; that was the worst time. The races were more about controlled aggression. But when you're really desperate and there's only a few laps left you get angry and it gets really dangerous. But you just don't care. You hold your foot down. (Walker, 2012, para. 16).

Mario Andretti said qualifying, "is a time when you don't even know your own name, and occasionally I go through it and forget a lot of things, because I'm like in a trance." He added, "you have so many people who think you need a

word of encouragement, and you don't need anything. All you need is yourself at that point" ("Speed", 1985, p. 131).

Andretti also mentioned that he prefers to be the first car out during practice sessions. He mentioned, "I think it is a big game of psych, just to let everybody know you're ready and that your machine is ready" ("Speed", 1985, p. 98).

Dealing with the Danger

Formula One racing is inherently dangerous, and as auto safety improves, drivers will engage in more reckless behavior, known as the Peltzman effect, (Potter, 2011). Nikki Lauda, whose famous crash was depicted in the 2013 film, *Rush*, stated, "all of those who choose to compete in Formula One – indeed in any category of motor racing – are acutely aware of the hazards involved" (Watkins, 1996, p. xiii).

The two competing theoretical perspectives of automobile safety regulation are the rationalist and behaviorist. The rationalist perspective suggests, "as cars become safer, drivers will become more reckless" (Potter, 2011, p. 1). The behaviorist perspective suggests:

Drivers might even ignore the chance of injury from driving a car, based on the heuristic that when probabilities drop below some threshold, they are treated as if they are zero. Likewise, the engineer assumes that driver behavior will not be affected by improvements in safety. (Potter, 2011, p. 1)

Many race car drivers acknowledge that death is a possibility in their sport. Several drivers in various racing series mention that the fear/death component of race car driving is something that is managed, but mostly ignored.

7 time NASCAR Champion Richard Petty clarified, “you get a guy who drives a race car, he’s a little like a hunter who could get shot, but he’s never thinking about getting shot,” (Chandler, 2001, p. 4). Jackie Stewart confessed that, “a lot of drivers have the philosophy that it’s always someone else that has an accident, it’s not themselves, But of course you’re always on a very thin line between survival and disaster, most certainly death” (“1”, 2013). Former president of the FIA, Max Mosley, said, “once drivers start worrying seriously about safety you know that their fastest days are over” (“1”, 2013). Driver Stirling Moss shared a similar statement, that he “would rather lose a race driving fast enough to win it than win one driving slow enough to lose it,” (Potter, 2011, p. 5).

Dating back to 1965, Krikler’s article addressed the fear and death component of motor sport in that era, stating:

Almost each week of their lives they take considerable risks of death. They obviously do not consciously think of this, but it seems that it is not enough to compete with other people or against their own inner criterion of perfection; they almost gamble with death, going to the limit, and again this seems to be to prove that ultimately they are in control, and in some way a fantasy of total omnipotence is satisfied. (Krikler, 1965, p. 194).

In the modern era of racing, safety measures have improved so much that current drivers have much less to worry about with regards to safety than drivers of previous eras. Lewis Hamilton, who has raced in Formula One since 2007, stated he, “never had that fear, never worried about death or the danger of getting hurt,” (“1”, 2013).

In Ebbon and Suchomel’s study interviewing stock car drivers, in response to the question, “What racing-related injuries are you concerned about in the future, if any,” the drivers’ biggest fear was fire (n = 20), followed by an injury to

the head or neck (n = 19), and “none” (n = 7). Death was the fourth biggest fear (n = 5), and drivers who responded with death as their answer said things such as, “death, but I try not to think about it; death from crashing is in the back of my mind,” (Ebben & Suchomel, 2012). In Formula One, since May 1978, there have only been three burn incidents: one moderate and two minor. With regards to the two minor burn incidents, one involved a defective set of gloves leading to burns on the hands, and the other was a burn to the back of the neck when the driver removed his helmet while his rear engine was on fire (Watkins, 2006).

Youth Driver Development Academies

Similar to other international sports, such as soccer and tennis, in motorsport, an emphasis is placed on developing athletes at an early age to later compete at the highest level. Several current Formula One teams have young drivers programs, geared to develop young drivers’ careers. The McLaren Mercedes Young Driver Development Programme is one such program, and features its aims and objectives on their website:

(<http://www.mclaren.com/formula1/team/young-driver-programme/>), which include:

1. Accurately-graded physical training and nutrition programmes
2. Meaningful career information and contractual guidance
3. Thorough and exacting assessments of skill and ability
4. Media and PR improvement tools
5. The necessary funding to ensure career development
6. Public endorsement from one of motorsport’s most well-established names
7. A reputation that will enable them to continue their careers with increased independence

Current Formula One drivers that have been involved in this program are Jenson Button, and two-time World Drivers Champion Lewis Hamilton (“Young Driver Development Programme,” n.d.).

Red Bull also has a prestigious junior racing team, that offers international talents the opportunity to “receive professional and continuous training in all relevant areas of motorsport following the credo: 'competition from the beginning'” (“Red Bull Junior Team - About” n.d., para.1). Daniel Ricciardo, current Formula One Driver for Infiniti Red Bull Racing, and product of the Red Bull Junior team, commented that, "It was perfect; it was all the motivation I needed. It's great. It gives you not only the opportunity, but the experience working with different teams and at different levels,” (Walthert, 2014, para. 3)

The effectiveness of sport psychology interventions with youth athletes is not fully understood, due to a lack of literature concerning cognitive developmental processes associated with learning and using psychological skills (McCarthy, Jones, Harwood, & Olivier, 2010). There is a great deal of proprietary involved in Formula One racing, so information regarding sport psychology’s role in these developmental academies is not readily available.

CHAPTER 3

METHODOLOGY

Research Design

A qualitative research design was used in this study. Nine former Formula One drivers were interviewed regarding the psychological skills they used during their career. The questions asked are attached in Appendix A.

Participants

To be eligible for this study, participants must have reached the highest level of motorsport competition: they must have competed in a Formula One grand prix. Formula One and the World Drivers Championship began in 1950, and there have been 743 drivers who have raced in a grand prix since then. Because no study like this has been done before, any former Formula One driver became an eligible participant. The participants were nine male former Formula One drivers. The average age of the drivers was 69.1 years of age, (SD = 8.6). The average number of grand prix the participants have competed in is 32.9, (SD = 38.8) (StatsF1.com).

Data Analysis and Coding

The raw data were coded and organized to themes and sub-themes by utilizing constant comparative methods as described in Charmaz (2006). Line-by-line coding helps the researcher to remain open to the data, and identify nuances in it (Charmaz, 2006). Additionally, the line-by-line coding method allows the researcher to examine more in depth what the participants say (Charmaz, 2006). The initial codes were descriptive in order to organize the introductory concepts.

The second phase of coding was focused, during which the initial codes were studied carefully in order to merge the data into more general codes.

Instrumentation

The researcher created a semi-structured interview framework specifically for this study; however, the interviewer can modify the questions as the situation requires. This way, a certain degree of flexibility is maintained during the interview. The questions were developed with the intent to allow the drivers to examine and reflect on psychological skills that have been identified in previous questionnaires and tests. The Test of Performance Strategies identifies goal setting, relaxation, activation, imagery, self-talk, attentional control, emotional control, and automaticity as 8 of the most salient psychological skills, (Thomas, Murphy, & Hardy, 1999). The Psychological Skills Inventory for Sport Form-5 measures cognitive skills such as concentration, confidence, motivation, anxiety control and mental preparation, (PSIS R-5; Mahoney et al., 1987). Other questions on the interview guide were designed to allow the drivers to reflect on sport-specific psychological issues in Formula One, such as the differences between driving events.

Procedures and Interviews

A sample of convenience was used for this study. Thirty-five potential participants were identified by a connection at the Road Racing Drivers Club. Each driver's career information was also collected from a Formula One database, StatsF1.com. The possible participants were initially contacted by email, asked if they were interested in participating in the study, and a short description of the

study was provided. Those who agreed to participate were provided a more detailed description of the study and the uses of the data collected.

Additionally, participants were sent an electronic version of the consent form and a separate electronic consent form allowing the author to record the interviews.

The interviews were conducted in English, as it is the language of the interviewer and the interviewees. Lastly, the participants were requested to email the signed consent forms to the author. Each interview was recorded and then transcribed verbatim, resulting in 62 pages of single-spaced text. Interviews lasted an average of 40 minutes, ranging from 25 to 75 minutes.

Because there have been so few Formula One drivers, confidentiality was maintained by referring to the participants' as Driver One [D1] through Driver Nine [D9]. Identifying information was discussed with the participants before the interview, and redacted.

The study was conducted as a qualitative, phenomenological research by interviewing the participants. The interviewees were asked to talk about their driving careers, the psychological skills they utilized, and other psychological factors involved with their sport.

Research Bias Statement

This study examines the psychological skills of Formula One drivers. As a fan of the sport, and Master's Student studying Exercise and Sport Psychology, I may have bias that could skew my ability to remain objective.

I am not a race car driver. In my youth I was a lacrosse player. I participated in the sport almost exclusively from age five to fifteen. By that time, I had lost interest and quit, but continued exercising regularly by weight-lifting and other more cardiovascular sports, such as running and swimming. I gained interest in motorsport throughout my childhood, predominately from video games, television, and movies. I do have an interest in eventually driving race cars; however, race car driving is an expensive sport, and I plan to pursue that endeavor (at a much lower level of competition than Formula One) later in my life. My interest in motorsport has been broad and, until recently, not specifically focused on Formula One.

Upon starting the process of becoming an Exercise and Sport Psychologist, I thought about which athletes and sports I would like to work with most, and the answer established itself as Formula One drivers. The combination of international prestige, competition, risk, and reward associated with the sport captivates me, and, ideally, I would like to develop and operate a performance enhancement psychological skills program for a Formula One team. I am deeply impressed by the drivers' abilities to tread the dangerous line between precision and recklessness. I am sincerely interested in gaining a deeper understanding of those who can perform at their peak consistently in an incredibly challenging environment.

Since initiating the process of researching the psychology of Formula One racing, I have also accepted the opportunity to assist a researcher performing a program evaluation of two international young drivers development academies. It

is possible that the information we discover in that program evaluation might inadvertently inform my questioning and framing of my interaction with the former drivers that take part in my thesis. I also accepted an internship position in the sport psychology program for a youth soccer development academy for a Major League Soccer team. Part of my responsibilities includes giving psychological skills training presentations to young soccer and lacrosse players. It is possible that my psychological skills instructions might influence how I interpret the data collected from former Formula One drivers. I also have begun working with a University supported Formula racing club as a mental conditioning coach. My involvement with the Formula racing club may similarly affect how I interpret the data as well.

Throughout my literature review, it has been revealed that a large amount of drivers place importance on psychology's role in their performance; however, some drivers do not agree. Also, most current Formula One teams and drivers seem to use the services of a Sport Psychologist; however, others vocally turn down these services. From the articles, movies, documentaries, memoirs, and biographies I have read and viewed, I believe that it is important to research the value drivers place on psychology. This believed importance might cause a bias in how I develop and ask my questions in the semi-structured interview, and will be an issue I address in the conclusion section.

CHAPTER 4

RESULTS AND DISCUSSION

Presentation of Results

The purpose of this study was to qualitatively examine the psychological skills used by former Formula One drivers. A constant comparative method was used to analyze the transcriptions of the interviews. After the interviews were transcribed and approved by the participants, the data were organized into specific codes by the researcher. The semi-structured interview format, along with the constant-comparative method, allowed the interview to cover much more than what was specifically asked in the question guide, as each participant had individualized and personal experiences which were unique to them. Once all nine interviews were coded, the researcher organized the specific codes into more general categories of themes and sub-themes.

The first wave of coding presented 45 unique codes. Certain codes, such as “self-talk,” featured every driver, and potentially multiple comments on the code from the individual driver. This did not mean that every driver used self-talk; however, each driver was asked if he used self-talk, and whether he used the skill or not; all of their responses were placed in that code.

Some themes, such as “psyching out,” were brought up only once, by one driver, during the interview process. Certain comments, such as those about a sport psychologist’s assistance with imagery, were coded multiple times. A comment such as “Years ago we didn’t have any simulators or anything like that, but you try to still run through the course in your head,” by Driver Eight, would

be placed in both the codes “Imagery,” and “Difference in Eras.”

The following are the 45 codes from the first round of content analysis:

First racing experience	First Formula One experience	Preference of Cars
Participating in multiple racing series at once	Financial Burden	Networking
Lying about age to race	Retiring	Differences in eras
International pressures	Wars	Heat
Physiology	Physical fitness	Self-talk
Imagery	Focus	Shifting focus while driving
Reliability	Nerves	Goal Setting
General Mental Prep	Psyching out	Tricks to keep calm
Motivation	Night before a race	Difference in Events
Racing drivers talking amongst each other	Most stressful part of grand prix	Intimidation
Race pre-performance routine	Talking with crew	Need for more practice
Safety	Drivers Dying	Crashes
Driving after a bad crash	Managing Danger	Working with a sport psychologist
Mental differences between drivers	Important of psychology in racing	Importance of car over driver
Mentors	Working with young drivers	Greatest moment.

After the first wave of coding, the data went through another wave of coding, where the data were organized, assimilated, and distinguished into more all encompassing themes and sub-themes. This resulted in 12 unique themes, with varying degrees of sub-themes for each. The twelve themes and sub-themes are presented on Table 1. Once the second phase of coding was completed, the 12 themes were condensed further, so that four overarching themes emerged. The four themes that emerged from the third phase of phase of coding are presented in Table 2.

Table 1: Themes are bolded and capitalized, sub-themes are listed under their respective themes.

APPLIED SPORT PSYCHOLOGY Importance of psychology Use Value of sport psychology	AROUSAL REGULATION Being Nervous before the race Calming the nerves	CONCENTRATION Time Dilation Danger and Focus Distractions Targeting Focus Correctly
DANGER Death determining career Managing the danger Crashes	FINANCIAL BURDEN Finances determining career path Going as far as the money takes you	GOAL SETTING No Great Goal Goal Is World Drivers Champion
IMAGERY Informal Use Formal Use	MENTAL PREPARATION Use Night Before a Race Working Through the Race Before Routines	PHYSICAL FITNESS Need Early Adoption
RETIRING Mixed feelings Positive note	SELF-TALK Before the Race During the Race	YOUNG DRIVERS Racing tips Career Advice

Table 2: Themes are bolded and capitalized, sub-themes are listed under their respective themes.

APPLIED SPORT PSYCHOLOGY Importance of Psychology Use Value of Sport Psychology	PSYCHOLOGICAL SKILLS Arousal Regulation Concentration Goal Setting Imagery Mental Preparation Physical Fitness Self-Talk
UNCONTROLLABLE ASPECTS OF COMPETITION Danger Financial Burden	CAREER COMPONENTS Young Drivers Retiring

Applied Sport Psychology in Formula One

Because the study was presented to the drivers as an exploration of the psychological skills of former Formula One drivers, many of the drivers spoke about the importance of psychology in their sport. Driver Two admitted:

Yea, I accept, probably the weakest area of me as a competitor was the mental side. I did make too many mistakes under pressure. Key times in the race made the mistake. All time, if you put it down to driving on the limit, driving over the limit, doing what you need to do. It's only years and years and years after that I was in a position of knowledge sufficient to be able to examine my own performance as an athlete, and look back and see the glaring shortfalls in my abilities, and I would say 80% of it was mental.

He went on to describe how other drivers' psychological skills shortcomings were exploited as well:

So when we raced, we knew drivers who were bulletproof, bombproof we called them, where they just didn't make mistakes. We knew drivers who were quite likely to make a mistake any time they were put under pressure. We knew drivers who would make mistakes and be unstable when lots of cars got around them. So you tended to categorize drivers as wild or controlled. They were the two different things. What we didn't realize back then, was once you put a driver under pressure, his mental capacity to absorb the pressure, and be mistake free, was ultimately what let him down, therefore he made a mistake and flew off the road. We didn't know what, we just saw the end results. That the end results at the late 80's and early 90's people began to understand why was that end result there.

The drivers did not compete at a time where applied sport psychology was as ubiquitous as it is today, although two of the drivers did work with psychological professionals to aid their racing performance. Driver Five worked with two professors familiar with exercise physiology and sport psychology, and Driver Nine worked with a psychologist. Driver Five explained his work by remarking:

It was more focused on physical training. I was actually one of his very first disciples years ago, and it was a lot to do with physical training, and then later on the mental training element became more and more involved, so there wasn't anything that I would say that was terribly regimented or formalized that I would do during my Formula One time to help me with it...I think that the professor was a calming influence on me, I think that he has the ability of making you realize that everyone that's out there puts on their pants the same way in the morning, and that you have the same potential as everybody else out there.

Driver Nine became connected to a psychologist by participating in the psychologist's study concerning drivers' behavior. Driver Nine discussed his issues with debilitating nervousness at the start of races, and clarified:

I visited a psychiatrist who was doing a study much like yours, and I explained the nervousness and he gave me some exercises, and deep breathing to do, and it made a big difference... I wouldn't have thought of it except for the study that he was doing...I was a pro, and willing to participate in a further test, a more intimate test. My reward for doing this was that I was allowed to go and visit with the psychiatrist, and he and I hit it off, and we became friends, so that sort of blurred the edges between what was professional and what was just friendship.

Opinions concerning work with an applied sport psychology professional were varied. Driver eight communicated:

I never really thought about working with a sport psychologist for myself, but I don't say I wouldn't use that as a tool if I thought that I needed that or recommend it to anyone else. I can only speak for myself. Sport psychologists can help you with motivation, the ability to concentrate, with a lot of things that maybe you are lacking to get maximum performance. Personally, I didn't feel that I needed to be motivated on any level. Why? Because I had such a burning passion and genuine love for what I was doing...I'm sure there are some drivers today who could benefit from seeing a sport psychologist and avoid it because there tends to be a stigma about it. You can look at it as a weakness or you can look at it as utilizing another tool to enhance your performance. If you look at it as a tool to improve yourself, then you're doing the right thing and the psychologist can definitely help you. But if you're going in there with the wrong attitude, saying I don't need anybody, I know how to deal with myself, then you're just kidding yourself. Now if you're winning and producing good results, you know what, I'm ok there. I don't want to be confused by someone telling me

stuff that I don't think I need. So it's a very individual thing. I think drivers benefit the most whenever they haven't reached their peak performance or are falling off their peak. It can be a psychologist, it can be another pro, but it's a tool to get you back on track.

Not all of the drivers communicated in support of work with an applied sport psychology professional. Driver Three stated, "I think if they're using a psychologist then they're looking for a crutch. I mean if they can't get into a car and drive it properly, and they need somebody to psych them up, that's not a good thing."

Several drivers commented that they would speak with other drivers for guidance, but indicated that the interaction was continuously mired in deceit and withholding information. Drivers commented that amongst teammates and competitors, advice could be shared concerning safety, but tools to gain an edge were never shared. Driver Eight spoke of his frequent use of psyching out strategies. He mentioned:

I remember on one of the challenging tracks that we ran with sprint cars, or on some of the road courses, someone would come to me and say "oh man, my arms are falling off, after 12 laps, I just have a hell of a time" and he asked if I had the same problem. And I had the same problem, but said "no man, it's no problem with me." Again all you're doing is playing with the other's head. You made them think only they had a problem and wanted them to believe they'd have no chance that day. Of course, no one was totally naïve but there was always that second thought. Do I believe him or not? That used to go on all the time.

Arousal Regulation

Because of the drivers' potential unfamiliarity with terms such as arousal regulation, the researcher approached the topic by asking drivers if they ever got nervous. Often, drivers would describe arousal regulation using more colloquial terms, such as "butterflies," "nerves," or "jitters," and discussed their

ability to calm themselves down or get more excited.

All but one driver discussed how he would get nervous before races. Driver Three was asked if he ever was nervous before races, and stated, “No, my position was that I thought if you got nervous, or you were frightened, then you shouldn’t be doing it. So no, I was never nervous, I was loving every minute of it.”

Some of the other eight drivers discussed the inability to manage the intensity of nerves they felt before the race. Driver Two remarked, “Some drivers would get sick, literally puke, because what they were about to do, the arena they were about to step into.” Driver Nine mentioned, “I was so nervous my arms would go tight, that I’d have to turn my shoulders to get the wheel to turn going into the first turn. It would always be easy halfway around the first lap, but that first turn was brutal.”

Drivers clarified various reasons they felt more or less nervous in various circumstances. Driver One stated:

Well, I was always nervous really, especially in certain cars, which I knew weren’t very safe in themselves, on the very high-speed circuits, like Spa-Francorchamps and Le Mans in France, and Monza, where you are going tremendous speeds. Yes I was always nervous. In the one car I drove, which broke in half if you hit anything hard enough, the night before the race I’d hardly sleep.

An area that has not been researched thoroughly in the literature is the difference in events, such as test sessions, practice sessions, qualifying, and race day, and whether or not arousal levels were comparable during such events. Most drivers agreed that qualifying caused more nerves than practice or test sessions, and that they were most nervous on race day. Driver Eight suggested:

Well, you're not particularly nervous before you go out to practice or test. It's very different when you are about to go out to qualify, when your performance makes a real difference. You want to put the car on pole or go for a track record so you're more uptight when you have to perform because you only have one shot at it. It's as natural as breathing to be apprehensive and to be nervous before qualifying and just before the start of a race.

The only driver to mention feeling nervous every time he stepped in the car was Driver Nine; however, it was not during his time in Formula One. He said:

Indy it was every time I went out in the car... **Why in Indy was it every time?** You try Indy someday, and you'll find out. It's one hell of a place for a road racer who has no background in that kind of racing; it was really tough. Those cars were mightily fast. A driver was killed right in front of me on the road.

Driver Nine, who struggled with nervousness before, including the start of a race, saw a psychologist to help manage those nerves. Other drivers felt nervous building up to the race, but quickly targeted that energy into their performance when the race began. Drivers would adopt general and un-refined strategies to manage their pre-race excitement; however, most of the drivers commented, as Driver Eight said, "You feel ready and you just want to get on with it, but once the green flag drops, all the butterflies are gone and then you do your job."

Concentration

Formula One drivers have a great deal to pay attention to while they drive, and all of the drivers provided unique feedback when answering "What do you focus on while you are driving," and the subsequent follow-up questions.

Two drivers commented on an aspect of time dilation while competing at such tremendous speeds. Driver Two elaborated:

Suddenly, your life is in danger, you process at such an unbelievably fast rate, you actually slow the video of your life down. You slow the video of your world down. That's happened to me multiple times when I had a mechanical failure, because then, you know, here's a crash, I could die, and so that allows you to process that information. It's all part of your focus. And some drivers can do it at a higher level than others. Some drivers can do it and they got no spare capacity left. Some drivers can do it physically and mentally, and have spare capacity to actually be thinking strategically at the race, instead of just thinking reactively about saving your life at that particular corner right at that particular moment. And so the ones who have the ability physically to be on the limit, capacity to be reactive and put the car on the limit every single corner, but have spare capacity to think through the race, in addition to drive through the race, I believe they become the champions.

Drivers also discussed how they targeted their focus while they were driving. In Formula One racing, there is risk every time you overtake another car. It may not be advantageous to risk an overtaking maneuver if your current position will give you sufficient points in World Drivers Championship standings. All of the drivers were asked if they ever focused on championship standings during the race, and all of them stated that they did not; however, some of their competitors did. Driver Seven spoke to this, by stating, "you start worrying about the big picture, you stop thinking about what you actually have to do in that moment, you're not concentrating right at that moment, trying to win that particular race."

Drivers also discussed, besides Championship standings, other factors that may steal away from their focus on racing. Driver Two commented that unchecked emotion was the largest source of distraction for drivers. Driver One commented that cars with less reliability provided constant distraction.

Driver Four commented on a unique aspect of Formula One racing, the proximity of the fans. He commented:

In the racing you're right there, the crowds right there, you get out of the car people are right there at the start of the race, people are coming up shaking your hands, saying hey good luck, whatever, they're right there, so you really got to be able to shut all that out, and get in a zone.

Driver Eight agreed with this sentiment, and commented on his desire to remain alone during the hoopla of the event. He mentioned, "I just wanted to be left alone prior to the race... Many thought, ok, he's all alone there, maybe go over, maybe he needs somebody to talk to, and I used to detest that."

All of the drivers competed at a time before radio communications were fully integrated into Formula One. The communication that the drivers had with their pit team was by means of a pit-board, which communicated the seconds behind the driver ahead of them, and the seconds ahead of the car behind them. Driver Seven had a very basic signal for his pit crew: if he pointed ahead as he passed by, he wanted to know about the car in front of him, if he pointed behind, he wanted to know about the car behind.

Driver Five did have radio communication later in his career. When asked if there were components that distracted him during his driving, he explained:

There were times where the team talked to me on the radio; I like to have communication with my team constantly, depending on the relationship with the engineer that I had... there were some times that they would just start talking, in just a really wrong moment, to kind of pull my distraction, distract me very slightly while I was on the track.

In Formula One in the modern era, drivers are in constant communication with their pit chiefs, and there are many examples of drivers

asking their pit chief to stop communication for a while.

Danger

Danger, risk, and the abilities to manage fear were explored with all of the drivers. Often, the topic of safety and danger came up when the drivers were asked if they were ever nervous racing. Sometimes, in response to the “did you ever get nervous?” question, drivers would only talk about pre-race “butterflies,” so follow-up questions were asked targeting the danger component of their sport.

In the earlier days of motorsport, in several instances, drivers’ careers, advancements, and opportunities arose because fellow drivers died. Driver One’s first professional contract came to be because another driver died on the Nurburgring in Germany, and the team owner needed a replacement.

Although the drivers freely admitted that Formula One racing was dangerous, they all seemed to be completely comfortable with the danger.

Driver Five commented:

The danger element, I don’t think it ever really comes in to your mind in my view, I mean you’re obviously aware of it as a racing driver you’ve made your peace that you could be badly hurt or killed in a race car, but you’ve made that decision long before that these things could happen, so if you were to let the danger element come in at the moment, there’s no way that you would be able to perform, you tune that out completely.

The following exchange between the researcher and Driver Seven paints a very clear picture of the outlook on danger and safety portrayed by the drivers:

Were there ever drivers who were uncomfortable with the danger aspect, because it was a lot less safe in those days than it is now?

Yes, I did see guys that became extremely frightened of it. They would be throwing up before a race, and I thought they should stop. And a lot of guys did stop, and said it’s not worth it anymore. I didn’t stop until I

was forced to do so by injury. My attitude was: I wanted to do it so badly that I eliminated the danger aspect, I put it in the back of my mind, and I didn't seriously expect to survive my Formula One career, that's how I adjusted my mind. **You didn't expect to survive?** No I didn't. The odds were not good. If you researched those days, you look at the mortality rate, **Yes I have. It's bleak.** My first year in Formula One, I was the third driver, and new kid in there, and about 9 months later, I was the only one of the 3 still alive, in one team. **So you believe that your motivation allowed you to put it totally in the back of my mind.** Absolutely, absolutely, I knew it could happen to me, but I just parked it. My desire to do it outweighed the danger. Maybe that's a bit naive, but that's how I was. **That seems to be one of the better ways to go very fast.** Yes, exactly, well I've always said if you're frightened of it, stop right away, and I used to see guys that were frightened of it, but they initially didn't stop, but eventually they did.

Financial Burden

Entry into the sport of Formula One is difficult for many reasons, primarily the amount of money it takes to become a good race car driver. Karts, cars, track time, fuel, and tires are expensive. Driver Nine spoke of his early career, and mentioned:

When I began to get into actual racing, I had two things going for me: 1, my dad's money, he died in the war, and I had an inheritance, not substantial, nothing like what people had said it was, but it was enough to get going, which a lot of very talented drivers I'm sorry to say never had.

Often, a driver would have to pay for the opportunity to drive the car.

Finances played a role in several of the drivers' early careers. For Driver Six, he explained:

Things fell into place for me as the years go on, that really worked in my favor, that allowed me to get into Formula One, the time was right, had I come in a bit earlier, when money was not a factor, I probably couldn't have gotten a look, had I come in a bit later, when money was much greater a factor, I wouldn't have had the resources, I came in the sweet spot of the evolution of the sport.

Formula One racing is a challenging sport because of the important role money plays. Teams with more money can buy better parts, hire better engineers, develop better facilities, and test more. This often results in a faster car. Driver Four mentioned:

In the early days it was really about finding the money, but finding the money, sponsorship, whatever you want to call it, but finding the money, was so that I could get to a better team. Because the team had better equipment, had better engineers, had a better track record, had a better engine deal, had a better this that and the other, Ok. So you didn't necessarily dwell as much about "hey, if we change this, or we change that," because it all centered around finding more money, because if you found more money then you could make those changes.

Often, a driver's ability to excel in public relations, and market oneself better than other drivers, determined if they were to obtain a seat in a Formula One car. The fastest driver is not always given the seat

Goal Setting

Similarly to imagery, all drivers were asked about goal setting. All of the drivers predominately fell into two categories: those with a clearly defined goal to become Formula One World Drivers Champion, and those without that specific goal as a driving force.

For the three drivers who did not set the goal of making it into Formula One, or becoming the World Drivers Champion, their reasoning was mostly due to how fast their career progressed without specific direction. Driver Nine best summed up this sentiment, by stating:

I really didn't have goals as such. Things happened so fast, and there's so many series and opportunities that I just lurched around, if there was something happening here and I could get into it I got into it. I didn't even make phone calls, people called me right from the beginning.

The other drivers echoed that sentiment, and attributed their lack of specific ambition to become a Formula One World to their humble beginnings.

Driver two stated:

When I started racing, I could not tell you that I said I want to be a Formula One driver. Realistically, coming from where I came from, very much blue collar, to think that I could race in Formula One, stars of Formula One seemed so far away, so distant, on a distant platform. I couldn't say to you that I told myself I'm going to be a Formula One driver. I just decided I'm going to give it a go, and see how far I can go, and how far I can get

The other six drivers had clear goals to make it to Formula One, and become World Drivers Champions. Driver Six depicted the consensus of the rest of the drivers, by stating, "Well there's no question, my goal was to be world champion. It's that simple, I don't go into something to be second best."

When drivers were asked to clarify their short-term goals from their long-term goals, they all seemed to resoundingly agree with Driver Seven's remark: "The short term at every race is obviously to win it, and if you can't win it, then at least do as good as you can."

Imagery

Each driver in the study made one or several remarks about imagery, as one of the questions in the semi-structured interview framework was, "Did you use imagery/visualization?" Two of the nine drivers used imagery formally, and discussed how they would sit down and picture the track in their head.

Driver Nine mentioned an anecdote:

I would sit down by myself somewhere, and go through all the shifts and just get the whole lap in my mind. And when I joined the team, the team

manager really liked that, and he had us all sit in a room in the holiday in in Daytona, all of us, and the idea was that we were going to do a lap in our minds of Daytona in the car. So we were all sitting there, concentrating furiously, and when you finished your imaginary lap, you opened your eyes and put your hand up. My one teammate was last, and we started to laugh, because he was slowest on the track too. And he opened his eyes and said, “What are you guys laughing at?” He still hadn’t finished his lap yet.

Both drivers who mentioned they used imagery formally said that they came up with the idea on their own, and were not instructed by a mentor, coach, or other driver.

The other seven drivers in the study clarified that although they would picture what might happen in the upcoming race in a general sense, it was never a skill they formally acknowledged, or tried to improve upon. Drivers also discussed that there are so many unpredictable variables in racing, that it is not always advantageous to have a clearly established plan of action. Driver Three commented:

Working through your mind of what type of track you’re going to drive, what type of racecar you’re going to have, where’s the car have an edge, or has a disadvantage if it will be. You think about those things, you prep yourself in your mind, but you know what you’re going to do... I just say racing is not a book-written script, you do a lot of unexpected things, because unexpected things happen all the time in racing...you can’t have a total commitment to doing it just this way, because it may not work that way for you.

Two of the drivers spoke to the differences between their time in Formula One and the current era, with regards to the prevalence and formality of mental skills training. Sport psychology was not as ubiquitous as it is now, so the few drivers who were exposed to mental skills training saw it later in their career. Driver Five, who actually received guidance from two professors

with expertise in exercise physiology and psychology, stated:

I was actually one of the professor's very first disciples years ago, and it was a lot to do with physical training, and then later on the mental training element became more and more involved, so there wasn't anything that I would say that was terribly regimented or formalized that I would do during my Formula One time to help me with it. Later on in my career I became a little more aware of mental imagery work, and thinking about driving the track, and things that you can do. As a driver you're constantly thinking of how you can improve your driving performance, but actually playing in your mind a tape of yourself doing a lap, and doing everything perfectly, is not something that was really formalized during the time that I was racing.

Mental Preparation

When the drivers were asked if they ever mentally prepared for races, the general consensus was that there were no use of formal mental preparation techniques. Driver Two communicated it best, by acknowledging, "Back then, we didn't understand mental preparation like people do today. 90% of your preparation was physical preparation. Your mental preparations were sort of 'you had what you had and that's it.'"

Drivers elaborated how hours before the race, they might work through what might happen at the start. Driver Six communicated a response in line with all the other drivers' sentiments gathered, by stating:

I've never been one that's hung up on putting my left shoe on before my right, I've never been superstitious, I think in terms of the routine, you develop a way of conducting your life that works for you. Making sure that you get enough sleep, we didn't do much on the party scene, perhaps to be there for PR purposes, make an appearance, but again our entire focus has to be on getting in the car and going as fast as you can and winning the race...Routine, sure, you have a routine, you get up a certain hour, certain number of hours before a race, you have some kind of food, but that's all, nothing that would stand out.

Driver Six also emphasized that although Formula One drivers in his era

did not necessarily use specific mental preparation techniques, the drivers of his era had similar capacity to manage the psychological demand of driving. He clarified:

Today, you have these coaches and these videos you can get, that say how to be superman and all that. We didn't have that in those days; we probably employed many of the same techniques, but we did it instinctively, without somebody coming in and saying, "do this, and do that." I think today's drivers have so much in the way of recourses and the potential support, it's phenomenal, but I think you get to the same point regardless of how you got there.

Physical Fitness

As cars became faster, physical fitness became more of a necessity to handle the demands of driving. Ground effects, aerodynamic components to the bottom surface of the car, were introduced to Formula One in the early 1970's, and added a significant amount of down force to the cars, making the effort required to drive them much greater. Driver Six explained:

Before ground effects chassis came in, drivers didn't have to be super athletes, physical fitness was important, you didn't see many fat drivers in Formula One, you didn't see any, but after the introduction of ground effects, most drivers had personal trainers, nutritionists, the g-forces are so much greater, the physical preparation of training is very much more important.

Although psychological research was not very prevalent, drivers commented how there were always medical researchers examining them. A common theme during the interviews was how grueling their sport was, and how important physical fitness was for the drivers performance. Driver two stated:

Formula One is probably I believe physically and mentally the most challenging sport in the world today. Your heartbeat, I did an interesting physical test, a medical group monitored my heart beat for the course of 2

hours. I averaged 178 beats per minute. For two hours. Now that's blackout for most people.

Several of the other drivers commented on the introduction of physical fitness into Formula One as well. Driver Four stated:

I was one of the first guys a long time ago to start on the physical fitness side of things. And mainly because I looked at myself at a certain state, where I'm nearing 30 years old, and the guys that I'm competing against are all, you know, 19, 20, 21, years old, and physiologically, 30 your body starts going the other way, no matter it could be 31, but around 30 years old, and so how do I make sure that I'm more fit than the other guys, how do I make sure that I'm stronger, and this was just a component, I mean literally people used to laugh at me about doing the physical fitness side of things. And I just thought well if you know races are getting longer, you're required more in the car, there's more physical side that you're required to do

Driver Seven echoed this sentiment, by commenting:

Obviously physical fitness was important, so I used to go jogging and play squash, and I did a lot of testing for other people, so I was in a car quite a bit, so that kept me fit as well. The night before the race, well I didn't drink really much in those days, very little wine, and I would never have sex the night before the race.

Retiring

Only three of the drivers discussed retiring from their sport. Each driver had different reasons for retiring from racing and Formula One. Some continued on with their motorsport career in other series, and some stepped away from the sport completely. Driver Six explained, "when I stopped racing in my last season, I shut the book and walked away. I didn't want to be there and not compete at that level." He went on to say, "when I stopped, I didn't want to do it at a lower level, I didn't want to do it just as a hobby, when I stopped, this competitive thing was suddenly gone from my life, that was a tough adjustment, it was really really hard for me to change myself so

completely.”

Danger played a role in Driver One’s retirement. He stated, “I retired from racing because all my friends are being killed, and I thought I’m next on the list.” Driver Five was fortunate enough to retire from motorsport as a champion of a different series of racing, not Formula One, and said, “Very few of them retire out of choice, even the guys out of Formula One, when they retire, it’s because the team is not renewing their contract.”

Self Talk

Most of the drivers did not use self-talk in any formal capacity. Driver Six summed up the majority of the responses gathered by the researcher, commenting:

I don’t think I had any trigger points, any words that I employed to get me to the right mental state, interesting question though, because that’s not a bad way to do it. I think you can construct your own mantra that could get your game face on, get you ready to race, but for me, it was taking a deep breath, relaxing, filtering out anything that was extraneous to what I was trying to do, and narrowing my focus.

Some drivers mentioned moments in the race when they would have an internal dialogue, such as Driver Seven, who remarked:

I did sometimes talk to myself. I used to talk to myself sometimes during the race. **What kind of things would you say?** One thing, if you’re catching somebody in front, and you say to yourself, “just keep it right here, just go a little bit further into the corner, brake a little later.”

The only driver to communicate the use of any sort of cue word, or deliberate self-talk to improve performance, was Driver One. Driver One used self-talk the night before the race, and clarified his reasoning behind his usage by stating:

Before I went to sleep at night in my early days, I did. One of the most dangerous things that can happen in a racing car is if the throttle jams wide open. Because it always does it when you're flat out, and its wide open, and you come to brake, because you're always braking at the last minute, you know just before the tires actually lock, wheels lock, so to have the throttle jam open in those circumstances is really terrible. I had one in during a race, and I never seen it before, my third lap or so, I came whistling down the straight, at 170, and I came off the throttle to come on the brakes, and the throttle stuck wide open. And I just de-clutched. I just dipped the clutch. The engine went up on the rev limiter, and it was OK, but even if the engine had blown, that's better than a major crash! So the fastest thing you can do is to de-clutch. And so I said that to myself every night before I went to sleep, I'd go to sleep saying "Jammed throttle – de-clutch, jammed throttle – de-clutch."

Young Drivers

Often, the drivers in the study worked with, or continue to work with young, upcoming drivers. Most of the drivers were asked if they had any recommendations for young drivers, and their responses varied from general career advice to specific racing tips. Interestingly, Driver Seven recommended self talk to young racers, by explaining:

One of the other aspects, which I try and say to young drivers, is, sometimes you'll be racing against someone, and they might do something that you consider a little bit dirty, they would chop you or something, as long as you didn't get sucked in and get your front wing chopped off, I just say to myself "don't get mad, just keep calm here" and talk it out.

Other racing tips included not looking in your mirrors too much, and putting a lot of care into the positioning and cushioning of the cockpit.

General career advice given to young drivers emphasized the need for marketability and public relations work, as well as staying focused. Driver Six also discussed the pressures a Formula One driver could face, by explaining:

Outside the race track, of course, every race car driver's a human being, we have distractions that we allow to happen to us, we have distractions

that are created by our own choices, and I was not immune to that, I made some bad choices during that time, and I'll admit that it diminished my performance. If I were coaching a young driver today, I could probably help him avoid a lot of those things, it's easy to get involved in a path that takes you to all of those things.

Discussion

Question #1: What are the psychological skills used by former Formula

One drivers?

Drivers used imagery, goal-setting, self-talk, arousal regulation, attentional control, and pre-performance routines. Drivers spoke of other psychological skills as well, such as those emphasized by the Test of Performance Strategies, including emotional control, and automaticity (Thomas, Murphy, & Hardy, 1999).

Although only two drivers worked with sport psychologists, all of the drivers commented on the importance of psychology in the sport. Psychological skills were considered a component of a successful driver, but other factors held their fair share of weight. Drivers spoke of the importance of having a fast car, being a good driver, being physically fit, mentally sound, and being in the right financial position.

A recurring theme during the interviews was that every driver was in constant search of the extra "edge" on his competitors. Whether it was an advantage their car had on the competition, or their ability compared to their teammate competing in the same car, drivers were in constant pursuit of dominating their opponents by any means imaginable. Drivers would psyche out competitors, or withhold strategic information. Drivers would use physical

fitness as a means to achieve better performance, and two drivers used sport psychology consultants to get that edge. Driver Eight mentioned that sport psychology seemed to be more helpful for those who are no longer doing well, and not necessarily encouraged for those who are already at the top of their game. “Individuals who can manage their emotions successfully can use emotions experienced during competition to assist performance,” (Lane, Thelwell, Lowther, & Devenport, 2009, p. 196); therefore, if sport psychology provided a means to assist performance, drivers would use it. Psychological skills were another avenue to maximize themselves, and gain an advantage on their competitors.

Youth development academies for young drivers are relatively new, but offer a means to teach young drivers how to become more successful in their sport. The importance of psychological skills in youth driver development academies has not been researched; however, in order to teach psychological skills effectively, especially to youth athletes, “sport psychologists need to appreciate what young athletes implicitly understand about such skills,” (McCarthy et al., 2010, p. 158). Based on the eloquent way drivers described psychological skills and their use, drivers seemed to fully understand all of the psychological skills discussed.

Question #2: What are the unique psychological demands of Formula One racing?

All of the drivers spoke to the unique difficulty associated with their sport. Drivers discussed the physical difficulty associated with their sport, the

financial burden the sport requires, and the incredibly competitive environment associated with Formula One. Drivers needed to manage all of these components, their personal lives, and their performance, competing in an environment that was very openly dangerous and life-threatening.

In 2009, Klarica described his work as a sport psychologist in Formula One, and emphasized how difficult the sport is for current drivers. He stated:

Motor racing drivers must execute numerous motor and cognitive skills simultaneously. They must remain calm and focused on their vehicle's performance, the track, and their competitors only centimetres away, while travelling at speeds of 150–300 km per hour. They must also manoeuvre gears and foot pedals while steering their vehicle, using highly developed coordination. Each movement must be rapid and precise. During this process, drivers must also have the ability to communicate effectively with their pit manager on their headset radio and ingest fluids through their specially designed hydration systems. Pit crews, including engineers, mechanics, tyre specialists, and managers, must work as a close team, follow the instructions of a leader, and conduct their physically demanding tasks, whether it be loading fuel or changing tyres. In this sport there is no room for error. Any mistake may cost a life, (Klarica, 2009, p. 290).

Current drivers have more access to technological advances in driving, such as electronics and radio communication; however, former drivers had comparable driving demands, without access to such technology. Psychological demands former drivers mentioned, in addition to driving, included driving in cars that were not considered safe, seeing competitors and teammates crash and be injured or killed in front of them, moving from foreign country to foreign country for months on end, and having a constant financial pressure to fund the car.

All of these demands were constantly present, yet drivers emphasized their ability to drop such worries during their actual competition. Several of the

drivers mentioned that in a car, they could only focus on themselves driving in that very moment. As Driver Three stated, “the only thing you focus on during the race is your car, and how it’s performing, and how you’re driving it.” Driver Two clarified that the eventual champions of the sport learn how to focus on driving, race strategy, and season strategy simultaneously. Driver Two said he did not have that mental fortitude to the degree that the multiple World Drivers Champions had.

In Ebben and Gagnon’s study of the relationship between mental skills, experience, and stock car racing performance, they found, “anxiety coping and self-confidence are not only correlated with success, but with each other,” (2012, p. 15). Driver Six reflected on the challenging environment by mentioning:

Now in your personal life, outside the race track, of course, every race car driver’s a human being, we have distractions that we allow to happen to us, we have distractions that are created by our own choices, and I was not immune to that. I made some bad choices during that time, and I’ll admit that it diminished my performance. If I were coaching a young driver today, I could probably help him avoid a lot of those things, its easy to get involved in a path that takes you to all of those things.

Drivers also had demands unique to the sport, such as constant and inescapable media and fan obligations, that at times could affect their performance. Few other sports require drivers to do as much public relations work as close to their competition as Formula One. For some of the drivers, the public relations obligations were a means to finding and financing a better, faster, car, but for others, they served as a distraction, that pulled the focus away from their performance.

Question #3: How do Formula One drivers manage the objective danger inherent in Formula One racing?

All drivers openly discussed the dangerous nature of their sport. Driver Five stated the most succinct remark concerning danger, and how a race car driver deal with it:

The danger element, I don't think it ever really comes in to your mind in my view, I mean you're obviously aware of it as a racing driver you've made your peace that you could be badly hurt or killed in a race car, but you've made that decision long before that these things could happen, so if you were to let the danger element come in at the moment, there's no way that you would be able to perform, you tune that out completely.

Drivers were concerned about safety, and very nervous about competing, but each driver clarified that his pre-race nerves and excitement were not related to being afraid for their lives. It is important to distinguish between not attributing their pre-race nervousness to the danger element, with drivers concern for their overall safety. Former president of the FIA, Max Mosley, said, "once drivers start worrying seriously about safety you know that their fastest days are over" ("1", 2013), and Driver Four agreed, by stating, "I knew it could happen to me, but I just parked it. My desire to do it outweighed the danger, maybe that's a bit naive, but that's how I was."

These comments mirrored the Peltzman effect, which states that as auto safety improves, drivers will engage in more reckless behavior, offsetting the overall improvement of safety. Potter found, "a change in the conditional probability of driver death has a large impact on driving behavior," and, "from 1963-1973, [Formula One] drivers are found to exhibit complete offsetting behavior during these years; based on these estimates, any safety improvements

left the number of casualties unchanged,” (2011, p. 18)

In 1994, Professor Watkins was appointed by the President of the FIA, Max Mosley, “to chair a commission of experts to examine all aspects of car construction, circuit design, and safety features, with the ultimate goal of zero mortality in Formula One Grand Prix Racing. Much research emanated from this important decision. Research extended into other forms of motor racing and led to the formation of the Institute of Motor Sport Safety in 2004, which encompasses now all Open Cockpit car racing, Closed car racing (Rally, Saloon, Grand Touring) and recently Go- kart racing,” (Watkins, 2006, p. 145).

Question #4: How do Formula One drivers prepare for competition?

The drivers in the study all had vaguely structured pre-performance schedules before the race, but no driver had a set routine that was done before each time he drove. Driver Six would try and eat the same meal a certain amount of time before the race, but none spoke of any ritual or firmly established routine. Drivers would work through the race before, and think about how their competitors would react at the start, how their car would perform, and track conditions; however, all drivers cited that racing is a very dynamic sport, and it is inadvisable to have too strict of a plan. Adaptability is crucial for a race car driver. Driver Eight explained thoroughly just some of the components a Formula One race car driver has to manage at any given moment:

Well, as you're driving many things change. That's a given. Track conditions change, the performance of the tires change, you're burning fuel and your fuel load changes the handling of the car, and you have to be able to adapt to whatever you experience. Many drivers think, 'oh it's only happening to me, the car's handling is going away from me' and they give up. And that's the difference between a potential winner

and a guy that's just going to be there. You have to be able to adapt and maximize everything that's at your disposal. As the car changes, you have to focus on what's changing and how you adapt. Things like how you apply power, if you're really over-tasking the rear tires under acceleration, you have to be very prudent with your throttle, not do a lot of wheel spin. If you do a lot of wheel spin you increase the temperature of the tire, and the compound starts breaking down. All this knowledge comes with experience. But you know the car will never stay the same, conditions will never stay the same, so adaptability is a key word. Many drivers can drive and be fast when everything is pristine, when the tires are fresh, when you have a light fuel load like during qualifying, but not everybody can adapt to what changing conditions are going to be thrown at you. And most of these conditions are not going to be predicted, because the sun makes a difference, wind can be a factor, there might be oil on the track, a lot of things, but the driver that can adapt the best, and maximize the situation that he's dealing with at the time, he's the one who's going to excel. And focus, focus, focus, on that alone. Don't worry about what anybody else might have, whether you're the only one or not, your job is to get 100% of the car that is under you, the car that you're driving in the moment.

Many of the drivers used these innumerable variables as reasons they did not spend a lot of time planning their performance ahead of time. So many things can happen during a race that it would be impossible to prepare for everything.

The night before the race, one driver would use self-talk to remember important steps, such as Driver One's use of the phrase "Jammed throttle-de-clutch." Other drivers would practice imagery, and imagine themselves racing around the track trying to match their in-car lap times. Most drivers spoke about how they would avoid drinking, and one driver would not have sex the night before a race.

Driver Seven also emphasized the importance of remaining calm before racing. He speculated that other drivers had issues with nerves, however he commented:

I could keep pretty calm, and eventually I taught myself that when you go to the grid and you're out of the car and waiting, and lets say you have 10 minutes to go, and people go into real panic. And I could calm myself down more and more until I felt my heart rate go down, and I just took my time, and I could still be getting into the car with 3 minutes to go, strapping in, and just as the mechanic said to leave and get off the grid. So I think I learned to calm myself down probably too much, but that's how I was.

All of the drivers also spoke of the important of physical fitness, and how it factored into their competition. The drivers interviewed all competed in an era that was characterized by significantly faster cars and cornering speed, so the need to be strong and endure through the grueling process of racing a grand prix became incredibly important. To some degree, "conditioning for racing is related to racing success," (Ebbon & Suchomel, 2012, p. 1197).

Question #5: How much value do Formula One drivers place on psychology in their sport?

Being able to self-regulate arousal levels, expectations, confidence, and attentional focus among other factors can be as critical as carrying out the execution of the skills themselves (Singer, 2002). The drivers all agreed that psychology plays an important role in their sport; however, they did not resoundingly agree it was the most important factor.

Formula One success is determined by such miniscule differences in performance that any possible thing that could give a car an edge has incredible value. If sport psychology, or psychological skills helped in the pursuit of speed, then it has a very large degree of value. Psychological skills may improve performance in some areas, but so many other things can as well.

Research has indicated “emotion plays a central role in sport performance,” (Jones, 2003, p. 471). Driver Eight clarified that sport psychology could be a tool for success if it is needed, and exchanged anecdotes of his and other drivers attempts to psyche out the competition. Driver Four and Driver Nine used the aid of sport psychology professionals to assist them in their pursuits. Driver Two stated that he believed that his weakness in mental skills kept him from becoming more successful in the sport. Psychology seems to have an important place in the sport, but many other things do as well. All drivers agreed that the person with the fastest car has the best chance of winning the race.

Not all drivers were particularly interested the psychology of racing. Driver Three was asked if he was interested in the psychology involved in racing, and stated:

No I wouldn't say I was interested. I just did my job, and I enjoyed my work, and I enjoyed competing, and I enjoyed driving, and winning, and that was fine. Why I got there and how I got there, that's just part of the game.

General Discussion

I believe the constant comparative method of interviewing allowed me to develop a much clearer understanding of psychology in Formula One during the time the drivers competed. The constant comparative method, in conjunction with the semi-structured interview format, allowed for a dynamic interview that covered many more topics than I had anticipated. Often, I would ask general questions, such as “did you ever get nervous before competing,” and several various themes would come up, such as self-talk, imagery,

recommendations for young drivers, crashes, and more. Most of the drivers seemed very eager to share their experience with me, and reflect on their time competing in the pinnacle of motorsport.

Although the youngest driver in the study competed in a different era than the oldest driver, all drivers competed at a time before the use of sport psychology was ubiquitous. Psychological skills to aid in their performance had to either be created on their own, or sought out from a psychologist or professor. A recurring theme in the interviews was that drivers today have access to so many more resources and tools and assistance than the participants in the study. During the interviews, it seemed as though drivers took pride in their ability to succeed in their time without such resources. All the drivers but one willfully acknowledged that sport psychology, and psychological skills training could be useful as a tool for performance. However, there seemed to be a subtext of pride in their ability to perform without any psychological skills training.

A theme that did not fully develop, but was mentioned by two drivers, was the emphasis on engineering in modern day Formula One. Driver Seven indicated it most succinctly by stating:

So what do you think are the key differences between your era of racing and the modern day? Well, massive, I think it's become more of a race of the engineers than the drivers. And you see that very strongly if you look at the grid, the cars are pretty much 2 by 2, like the animals into the arc, 2 Red bulls, 2 Mercedes, 2 of this, 2 of that. The cars were much more scattered back in the 70's, the reliability wasn't there, now they get so many instructions, and so much telemetry, stuff in the radio communications that it seems to be quite ridiculous. You got the guy sitting out on the pit wall, telling the driver when to go fast, and when to go slow, and what to do here, it's like painting by numbers. I guess that's what it takes. We used to go to the races with 2 mechanics, with the car, was really almost nobody back at base, whereas now

they've got the guy on the simulator all weekend, after each practice, so they know so much more about the car and how to adjust it, and they can tell the driver to do this or do that. The driver was much more of a solo guy if you go back in the earlier forms of racing. **So do you put more value on when the driver has more of a determination on the outcome?** Yes, I do actually, it's great for the teams and all the technology, and absolute astronomic money, but it's tending to become a little more race of the engineers, not to say a race of the money, and less of a race of the drivers, because the drivers still high visibility guy, he's in the car, he's out there, and that's what the crowd sees, the crowd doesn't see the 200 people that are all staring at the computer screens and figuring out what to do next.

Although only nine drivers participated in this study, I believe that I reached a logical saturation point for the research questions that I had proposed. Not only did the drivers talk about their personal experience, but they also discussed what their teammates and competitors did as well. To a certain extent, the validity of drivers' claims about their competitors can be questioned; however, it can be reasonably assumed that drivers' remarks about their competitors were true to their knowledge. For example, none of the drivers in the study admitted to throwing up before races, but several drivers stated that their competitors would. It is possible that drivers would shield that information from me, and it is also possible that drivers who threw up before races would not sign up to be a participant in a study examining the psychological skills they used during their time in Formula One.

Drivers discussed the multitude of factors they have to concentrate on while they are driving. Tasks involving very finite movement need to be performed with precision, while driving at incredibly high speeds, with the potential for severe consequences from errors. In addition to the specific task demands involved in driving itself, attentional demands encompass listening

to/processing verbal instructions from the pit crew. These demands make the overall task even more challenging. However, none of the drivers interviewed in this study competed at a time when radio communication technology was used. Pit boards were used, but this was only for a brief moment each lap.

The drivers interviewed for this study did not compete at a time when driving simulators were in use; however, it has been shown that playing video games significantly reduces reaction time, beyond just video games, without sacrificing accuracy (Dye, Green, & Bavelier, 2010). It would be interesting to gauge former Formula One drivers' thoughts on the use of simulators as a viable way to practice driving.

Because of the lack of research in this area, the exploratory nature of this study was valuable. No central theme had to be established, and the drivers and I were free to explore anything substantive during the interview process. Because of the international component of the sport, there are certainly a myriad of cultural factors that were not explored in this study. Although the drivers interviewed came from a total of six different countries, that variety in no way reflects the entirety of Formula One drivers in that era or currently. The current grid for the 2015 Formula One season features drivers from 12 different countries. Since the World Drivers Championship began, drivers have hailed from 37 different countries (StatsF1.com).

Self-Reflection

Writing this thesis has been an incredibly rewarding and exciting experience. I chose this topic because of my interest in the sport, its prestige, intentionality, danger, excitement, and lack of scholarly literature. The interviews have all proven to be unique and fascinating, and I eagerly await all opportunities to continue learning more about psychology and its role in motorsport.

I believe a helpful component to my research was my lack of personal experience in the area I was researching. I knew enough about Formula One to be familiar with the terminology, such as race tracks, famous drivers, and mechanical components, but my lack of personal experience competing in racing seemed to reduce bias.

Before interviewing the drivers, I was incredibly eager to delve into the danger/fear component. Most popular movies about the sport glorify the danger, and I was motivated at the opportunity to research such a unique component of Formula One. I was personally surprised at how candid the drivers were. I was certain that I was not the first, and I will not be the last, person to ask them to discuss the topic, so I was very grateful for their honesty and frankness.

It was very exciting to hear that drivers were interested in my study, and that they had former teammates, competitors, and friends who would also be interested as well. I am excited to share my results with those who were part of

the process, and continue to examine other interesting areas concerning psychology and motorsport as well.

Implications for Researchers

The purpose of this study was to qualitatively examine the psychological skills used by former Formula One drivers. Because no study like it has been done before, the framework for this research was new, and therefore is very open for improvement.

There have been 743 drivers who have raced in a grand prix since the World Drivers Championship began in 1950, and only nine drivers were interviewed for this study (StatsF1.com). Snowball sampling was used to gather participants, which can create bias. Also, only drivers who primarily spoke English were used for this study. Future researchers could uncover much more information by examining more drivers from different countries, and potentially reveal different cultural factors associated with psychological skill use and perception.

The main method for interviewing the drivers was Skype. Skype was effective, and allowed the researcher access to the drivers without the inconvenience of travel, but it is possible that more in-person interviews could prove valuable. Drivers were also unfamiliar with qualitative research, and when the transcriptions were sent to them for their approval, some were concerned that their answers made it seem like they were rambling. I also included in the first transcriptions phrases like “gotta,” and “you know.” Drivers were also concerned about the lack of formality. Future researchers

should explain thoroughly to participants how the transcriptions would be analyzed, so participants will not be concerned about how their responses will be interpreted.

Because the interviews were primarily done online, it was important to have a trustworthy internet connection and means for recording. It is advised to avoid “Wi-Fi,” and to be plugged into the internet with an ethernet connection. It is also advisable to have a dictaphone with extra batteries recording as well, in the event other recording devices do not function properly.

I believe I have a satisfactory understanding of racing to perform this research; however, it may be more valuable for the interviewer to have an even greater understanding of the sport. It may establish a greater deal of confidence from the participants, as well as uncover themes I may have missed. It could also be valuable for a researcher with absolutely no knowledge of the sport of Formula One to research the participants, which could reduce bias, and allow for examination of the data in a different way than I would interpret the data.

Implications for Practitioners

All the drivers in this study seemed to have a great deal of confidence in their psychological skill-set. Two participants in the study worked with psychological professionals in order to maximize their performance; however, there were fewer available sport psychology resources for the drivers at that time. Currently, most Formula One teams have access to sport psychology services for their drivers, (Jutley, 2003). Because there is a limited amount of research concerning the psychology involved in Formula One racing, hopefully

this study can aid sport psychology professionals in their understanding of motorsport athletes.

Some of the drivers perpetuated the stigma that working with a sport psychologist was a sign of weakness. It would be beneficial for a sport psychology professional to approach a driver offering means to improve performance, and frame it as a way to, “go from good to great,” as opposed to helping an athlete who appears to be struggling. Driver Eight stated quite succinctly, “you can look at it as a weakness or you can look at it as utilizing another tool to enhance your performance.”

Drivers all seemed to have a sense of psychological skills such as goal setting, arousal regulation, attentional control, imagery, and self-talk, but not a great deal of formal training and experience with them. Drivers seem to also be very aware of how useful those skills could be, so it would be advisable to approach drivers with specific ways those psychological skills could be helpful in their competition, such as imagining a perfect lap around a track, or developing a refocusing cue-word.

An interesting ethical issue arose from the discussion of danger management for Formula One drivers. All drivers seemed to believe that a driver who was fearful became a danger to himself or herself, and others. Drivers believed that most of those who were afraid of driving had left the sport before reaching Formula One, although many noted they saw other drivers struggle with fear. Driver Eight stated clearly:

Quite honestly, if your nervousness becomes fear, you don't belong there. You find another job. Because if you have an actual fear of

being out there and think I don't want to get hurt, then you're going to be very tentative on the track. And when you're tentative, you are not confident, and when you are not confident, you are dangerous to yourself and everyone else.

The ethical issue an applied sport psychologist might face is whether or not to assist a driver who seeks psychological skills consulting to manage the fear and danger associated with the sport. If the driver has any fear about competing in such a dangerous environment, it could be incredibly dangerous for that driver to continue. Would it be ethical for a sport psychologist to help manage those fears, and aid the athlete in the participation of the sport, or would it be more advisable to recommend that the driver not participate if those fears are present? Driver Seven adamantly stated, "I thought if you got nervous, or you were frightened, then you shouldn't be doing it." It is important for practitioners to be aware if they are placing their client in harm's way.

This ethical dilemma could be especially important for youth driver developmental academies. Drivers, even those who competed in Formula One, were fearful of the danger in the sport, and younger drivers may struggle with the danger even more. Young drivers can either determine a way to overcome that fear, or leave the sport. Would it be ethical for a practitioner to help a young driver struggling with fear? If fear makes a driver dangerous to himself or herself, and others, at what point should a fearful driver stop participating? This is an important set of questions that remain to be answered.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

Summary

The purpose of this study was to qualitatively examine the psychological skills used by former Formula One drivers. The subject matter studied included the psychological skills drivers used, how drivers mentally prepared for races, how drivers managed the inherent danger associated with their sport, and the importance of psychology in Formula One racing. Nine former Formula One race car drivers were interviewed using a semi-structured interview framework, which allowed the interview to cover the main research questions, along with various other topics unique to each driver. Eight of the drivers were interviewed on Skype, and one was interviewed in person. All drivers competed in at least one Formula One grand prix during their career.

The interviews were transcribed, edited, corrected, and approved by the drivers, reviewed several times, and the data were coded by the researcher. The raw data were coded and organized to themes and sub-themes by utilizing constant comparative methods as described in Charmaz (2006). Twelve themes and 30 sub-themes evolved from the data.

Drivers used a variety of psychological skills identified by psychological skills measures such as the Test of Performance Strategies (Thomas, Murphy, & Hardy, 1999), including goal-setting, arousal regulation, attentional control, self-talk, and imagery. Drivers also used vaguely defined pre-race routines, and planning the night before to aid in their performance. Drivers noted that

psychological skills were not emphasized in their time, because they were unaware of its importance, and most preparation focused on the physical side.

Drivers discussed the unique psychological demands of their sport, including the travel, the danger, the financial burden, the need for public relations prowess, and deaths of their teammates and competitors. Drivers discussed how many things they have to manage while they are driving, and the risks involved in mistakes while driving.

The drivers interviewed seemed to have no problem managing the danger inherent with their completion; however, they noted that some of their competitors did. The drivers resoundingly agreed that if a driver was fearful, that driver should quit the sport. Drivers did experience nervousness before competition, and at times that nervousness became physically incapacitating, but the nervousness was attributed to a pressure to succeed, and not a fear of perceived safety.

Drivers agreed that psychology plays an important role in their sport. Drivers would use a sport psychologist if it helped them perform better, and two of the drivers did use professional psychological services; however, the rest of the drivers interviewed said they needed no such services. Drivers did not have sport psychology services as readily available as young drivers do today, and they believe that it can be a good tool to aid an upcoming driver.

All other drivers seemed to be fiercely competitive, and had a very practical view of themselves, their career, and their ability as a driver. The drivers noted that the best driver does not always win the race, and most often

the driver with the best car wins the race. Drivers factor in the ability to position themselves to be on the best team, with the fastest car, as a skill that could be worked on and improved.

Conclusions

The following conclusions were drawn based on the nine interviews conducted with former Formula One race car drivers:

1. Psychological skills were used by drivers predominately in an informal way. The skills were not practiced or refined in an effort to specifically improve them.
2. Drivers mostly developed their psychological skills on their own, and did not have a sport psychologist teach them. The psychological skills drivers learned from professional psychologists or sport psychology professors were how to manage pre-race nervousness.
3. Mental preparation was not heavily emphasized by the drivers, because they were unaware of its benefit. Drivers in that era were unaware of the effect mental preparation had on their performance.
4. Drivers were most nervous right before the race started, followed by during qualifying, then practice and test sessions. As soon as the race began, drivers' nervousness subsided.
5. Drivers believe that being fearful while driving can be fatal. None of the drivers were ever afraid of the danger; however, they did notice that competitors had issues managing the danger at times.

6. Drivers believe that psychology plays an important role in Formula One driving performance, however it is not the most important role. Drivers emphasized the abundant number of factors that could determine Formula One success and failure.

7. Drivers believe that the development of psychological skills will aid in the improvement of performance as a race car driver.

Recommendations for Future Research

1. Very few drivers competed at times where radio communications were used during their performance; however, one driver mentioned it could be a distraction. It would be interesting to talk with drivers who constantly use such devices and learn more about the conversations during the course of a race.

2. Drivers had incredible stories about their crashes and recovery process from those crashes. Future researchers should examine the process involved in recovering from a crash at such incredible speeds to race again.

3. Due to the small sample size of the study, results may not be generalizable to the entire population of former Formula One drivers. The study should be repeated using a larger sample size.

4. Cultural components may affect psychological skills, and the value placed on psychology in the sport. Future studies should include more drivers from different countries.

5. Some drivers talked about their work with young drivers, and what is important for a young driver coming up in the sport. Future studies should examine this concept more in-depth.

6. Future studies should examine current drivers, and other former drivers who have competed more recently, in an effort to examine what psychological skills they value, and how they improve on such skills in an environment where sport psychology is much more ubiquitous.

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APPENDIX A

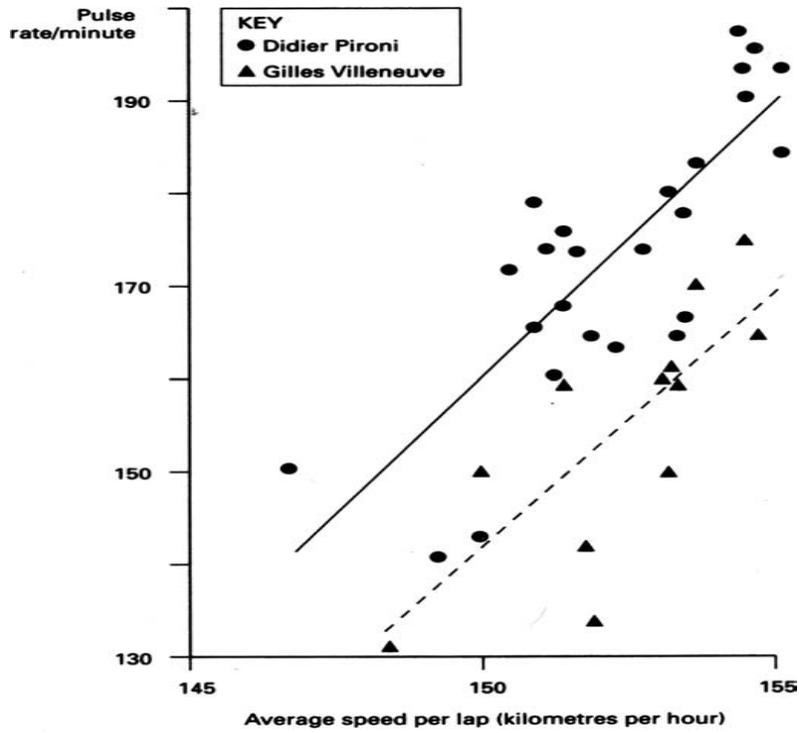
SEMI-STRUCTURED DRIVER QUESTIONNAIRE

- How did you get involved with racing?
- What did you love about racing?
- What were your goals as a driver?
- Did you ever get nervous competing? Was there a difference between events?
- Did you ever talk to yourself?
- Did you use imagery/visualization? If so, who taught you to use this skill?
- Talk to me about focus as a driver. What do you focus on while you are driving? Are there times you have lost focus? What factors affect your focus?
- How did you mentally prepare for driving? Did you have different routines or preparations depending on the event?
- Did you have a psychological coach or mentor? Would you have liked one? It has been said that most modern Formula One drivers and teams have their own sport psychologist. Do you support this? What percentage of drivers do you think are working with Sport Psychologists?
- What was your greatest moment in racing?

APPENDIX B

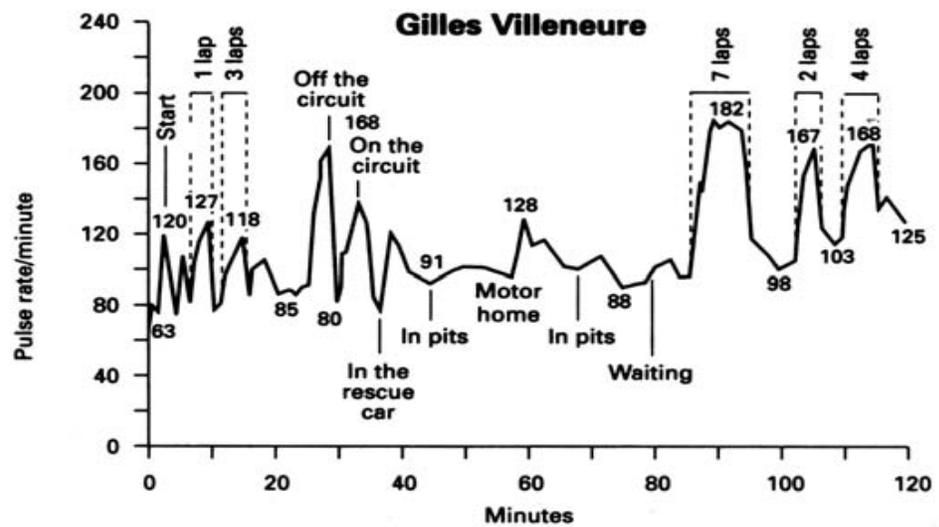
GRAPHS

Figure 1:



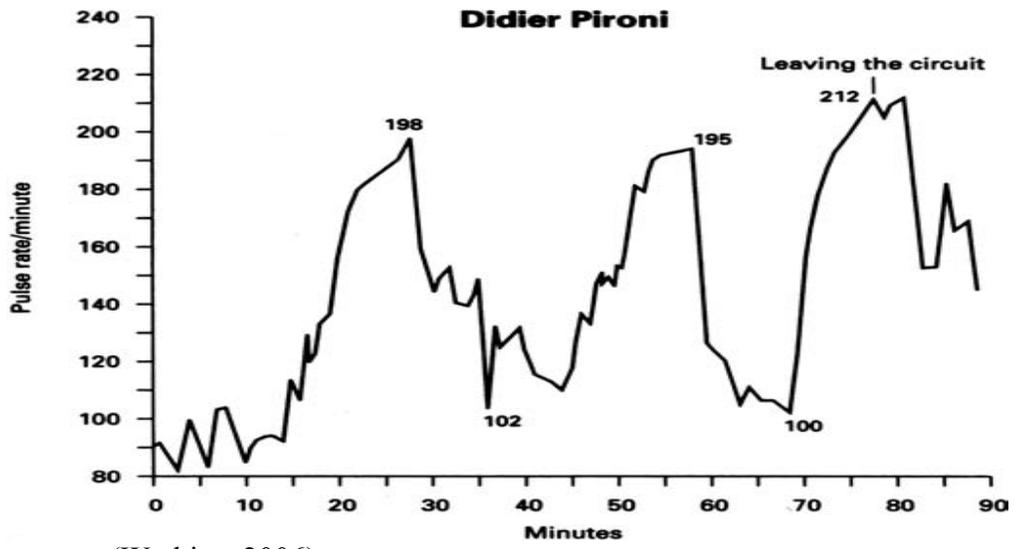
(Watkins, 2006)

Figure 2



(Watkins, 2006)

Figure 3



(Watkins, 2006)

APPENDIX C

INFORMED CONSENT

Title of research: “Behind the Visor” A Qualitative Exploration of the Psychological Skills of Formula One Race Car Drivers

Investigator and Department: Michael Sachs and Brett Gordon, Kinesiology Department, Temple University

Why am I being invited to take part in this research?

We are inviting you to take part in this research study because you are a former Formula One Race Car driver

What should I know about this research?

- Someone will explain this research to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to about this research?

If you have questions, concerns, or complaints, or think the research has hurt you, contact the research team at +1 (410) 218-2806, 1800 N Broad St, Pearson 244, Philadelphia, PA 19122, or email at: BrettGordon@temple.edu

This research has been reviewed and approved by an Institutional Review Board. You may talk to them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Why is this research being done?

This study examines the psychological skills, strategies, and demands involved in Formula One race car driving. This study is intended to shed light on an aspect of Formula One and motorsport that is rarely researched. Findings from the study may serve as a reference point for future research, and as a guideline to the type of services and support drivers need when competing in their sport.

How long will I be in this research?

We expect that you will be in this research study for 1 hour (the approximate length of the interview).

How many people will be studied?

We expect about 7 people will take part in the research.

What happens if I agree to be in this research?

The researcher will contact you to arrange an interview either in person, or using Skype. The researcher will instruct you on how to install Skype if you need help. If you and the researcher are able to meet face to face, the researcher will meet you in an agreed upon location and time, that is most comfortable and convenient for you. The researcher will ask you about your personal experience driving, and the psychological demands of your sport, for roughly an hour. The researcher will record your responses with a voice-recorder. The researcher will then transcribe the interview, and send you a copy of the transcription before data analysis for your approval. The researcher will then take the transcriptions of all the interviews, and look for common themes and subthemes found in all of the interviews.

What other choices do I have besides taking part in this research?

Instead of being in this research, your choices may include not participating at all or aiding the researcher in establishing contact with other former Formula One drivers.

Is there any way being in this research could be bad for me?

It is possible that this research may involve recounting difficult/stressful memories. If at any point you feel uncomfortable talking with the researcher about such topics, alert the researcher and he will change the subject. It is also possible that the topics we discuss, such as fear and coping strategies, may be embarrassing to disclose. Once again, if at any point you do not want to continue discussing a topic, alert the researcher, and he will change the subject or end the interview. If you experience any psychological distress, you will be encouraged to utilize your locally available psychological resources. The researcher will redact all identifying information of the participants, and the interviews will be transcribed and submitted to you for your approval before data analysis begins.

What happens to the information collected for this research?

To the extent allowed by law, we limit the viewing of your personal information to people who have to review it. We cannot promise complete secrecy. The IRB, Temple University, Temple University Health System, Inc. and its affiliates, and other representatives of these organizations may inspect and copy your information.

Signature Block for Adult Subject Capable of Consent

Your signature documents your permission to take part in this research.

Signature of subject

Date

Printed name of subject

Signature of person obtaining consent

Date

Printed name of person obtaining consent