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By

KIMBERLEY A. THOMPSON

B.Sc., University of Ottawa, 2001

THESIS

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ABSTRACT

Indoor group cycling (IGC) is a popular type of aerobic activity performed on a stationary bike, combining both mental and physical aspects of training through the use of imagery (Johnny G. Spinning Instructor Manual, 1999). Thompson, Durand-Bush, & O'Sullivan, (2003) investigated the different types of imagery cues provided by instructors and their effects on the overall IGC experience. However, the purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. The sample included four certified IGC instructors and 15 class participants. The instructors were videotaped while teaching their IGC class, after which class participants completed a questionnaire, took part in a stimulated recall session (Calderhead, 1981), and participated in a semi-structured interview to assess the effectiveness of the imagery cues provided by the instructors. Nine categories and three sub-categories of cues were provided in varying frequencies by the instructors however, the class participants found only certain types to be effective. They preferred simple cues that were given following a logical progression and were synchronized with the music. Several practical implications and suggestions for future research are discussed.

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CHAPTER I

INTRODUCTION

Presentation of the Problem

Studies have shown that regular exercise directly influences the physiological and psychological health of individuals (Berger & Motl, 2001; Leith, 1994; Martin & Dubbert, 1985). This clearly demonstrates the importance of exercising to stay healthy and the urgency of educating people to help them make it a priority. There are many types of exercise classes being encouraged and promoted in fitness centres around the world, such as Yoga, step-aerobics, aqua-fitness, Pilates, and kickboxing. Another type of physical activity that has gained popularity is indoor group cycling (IGC), also commonly known through one popular trademark name: Spinning.

Indoor group cycling (IGC) is a cardiovascular exercise, in which participants pedal their way through a workout on a specially designed stationary bike. It was originally developed to enable competitive cyclists to train year round (Ryan, 1999). Similarly to aerobic classes, IGC classes are led by certified instructors and are performed in a group setting. Workouts are easily personalized because the participants can control their own speed and resistance on the bike. IGC has many benefits for participants of all ages and fitness abilities, which may be one reason why this activity is gaining popularity (Mad Dogg Athletics, 2003).

One of IGC's features is the imagery component. In typical IGC classes, instructors introduce various imagery cues to encourage participants to mentally create a simulated bike ride, where they may encounter steep hills and scenic routes, as well as feel the wind in their hair and hear the birds chirping in the woods. Instructors lead their classes by creating visualized journeys, allowing the participants to simultaneously engage their mind and body. Because

individuals are encouraged to connect their mind and body through the use of imagery, both their physical and psychological effects can be enhanced (Ryan, 1999). The use of imagery in IGC is an integral part of many instructor-training programs (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999).

Imagery is a skill with a cognitive function that allows the mind to create or recreate an experience (Sugarman, 1999). It is a process that involves evoking pieces of information stored in one's memory and shaping them together to form an image (Weinberg & Gould, 1995). Imagery can be compared to a real sensory experience involving all senses, that is, auditory, visual, kinesthetic, tactile, and olfactory information. Many researchers have examined the use of imagery in sport settings (Barr & Hall, 1992; Lerner, Ostrow, Yura, & Etzel, 1996; Martin, Moritz, & Hall, 1999; Munroe, Giacobbi, Hall, & Weinberg, 2000; Rodgers, Hall, & Buckloz, 1991; Salmon, Hall, & Haslam, 1994; Weinberg, Butt, Knight, Burke, & Jackson, 2003). Only recently has exercise imagery been researched in more detail (Gammage, Hall, & Rodgers, 2000; Hall, 1995; Hausenblas, Hall, Rodgers, & Munroe, 1999).

Imagery is an effective mental technique that can be used by individuals in both sport and exercise settings for various reasons, such as rehabilitating injuries (Gould, Udry, Bridges, & Beck, 1997), enhancing motivation and self-confidence (Hall, 1995), and correcting skills (Hall & Rodgers, 1989). Evidence suggests that imagery used in exercise settings can have a positive influence on one's quality of life by enhancing participation and enjoyment, and facilitating achievement of desired goals (Hausenblas et al., 1999). In general, the use of imagery in sport and exercise contexts depends on many factors, including the way it is presented, the specific types of cues used to generate desired images, as well as the main purpose of cues (Hausenblas et al., 1999; Martin et al., 1999; Munroe et al., 2000). In most past studies, people have been shown

to use imagery on their own (Orlick, 1998; Weinberg & Gould, 1995), that is, they did not depend on somebody else to give them cues to elicit images, which is the case in IGC.

Although empirical findings suggest there are many advantages to using imagery in exercise settings, research can still be considered as limited. More research needs to be conducted in different exercise environments, particularly that of IGC, where the research is practically non-existent.

To our knowledge, there has only been one study conducted on the general use of imagery in IGC (Thompson, Durand-Bush, & O'Sullivan, 2003). The purpose of the study was to determine the types of imagery cues given by two different IGC instructors, and the instructors' perceived effectiveness of the cues for enhancing the exercise experience. Each instructor completed a questionnaire, conducted three IGC classes that were recorded on videotape, and participated in an interview. Subsequent analyses of the data revealed that many types of imagery cues were given by the instructors while teaching their IGC classes. More specifically, there were seven categories of cues: (a) effort / intensity, (b) general motivation, (c) environment, (d) body awareness, (e) skill orientation, (f) association / dissociation, and (g) relaxation / recovery. Additional sub-categories of cues within the motivational category related to mastery feelings, optimal performance, and efficacy-building.

There is an important gap in the literature regarding the use of imagery in IGC, yet imagery is being used by many certified instructors (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999). Instructors may be encouraged to use imagery while teaching IGC, however, it is important to determine if class participants are using the imagery cues provided to them and if they find these to be effective during the structured exercise workout.

Purpose of the Study

The purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. Specific types of imagery cues were identified and categorized in a previous study (Thompson et al., 2003). Thus, it was important to re-examine these types of cues in the current study to determine which ones were deemed most effective by class participants. In this study, effectiveness referred to whether the imagery cues provided by the instructors were perceived by the class participants as useful in achieving a desired outcome (Weinberg et al., 2003), for example, increasing effort, relaxing muscles, or ensuring proper cycling technique.

Significance of the Study

IGC is a type of exercise that has been introduced in many fitness centres around the world (Mad Dogg Athletics, 2003). However, there has only been one study conducted that examined the mental aspects for which this activity is known (Thompson et al., 2003). Even though imagery is believed to be a significant component of IGC classes, it is important to determine whether or not it is actually effective.

The current study is significant because it will fill a gap in the literature. From a methodological standpoint, this study provides evidence about the usefulness of the stimulated recall technique to analyze the data with participants. This method was not used in Thompson and colleagues' (2003) initial study with instructors, but it proved to be extremely valuable to examine the perceptions of the participants immediately after their workout. From a practical standpoint, this study may help certified instructors who are seeking to improve their use of imagery in IGC classes. It provides an increased understanding of which cues should be used and

how instructors can use them to best meet the needs of their participants. Findings of this study can also be used to enhance certification training programs.

The next section will provide an overview of previous research that has been conducted on the use of imagery in sport and exercise settings, which can be linked to IGC.

CHAPTER II

LITERATURE REVIEW

The purpose of this chapter is to provide an overview of the research that has been conducted on the two key topics of this study, that is, imagery and exercise, including IGC. These topics will be critically analyzed and discussed. The content on imagery will be presented based on the types of imagery that exist and the effects that imagery has on performance. This chapter also presents theoretical and methodological gaps that have led to the design of the current study.

Imagery

Imagery has been studied for many years and it has been demonstrated that it can play an important role in sport settings (Hall, 2001). Its purposes can differ from one athlete to another, and from one type of sport to another. Although imagery is recognized as an effective tool in sport, it is only in recent years that it has been studied in exercise settings. Hall (1995) was one of the first to suggest that imagery could be a powerful tool for exercisers, just as it is for athletes in different sport contexts. However, little research has been conducted on the use of imagery in specific exercise settings.

Researchers have examined the different characteristics of imagery in sport: its types, functions, and benefits (Hausenblas et al., 1999). As a result, imagery has been defined various ways. In a general context, Richardson (1969) defined mental imagery as "those quasi-sensory and quasi-perceptual experiences of which we are self-consciously aware and which exist for us in absence of those stimulus conditions, that are known to produce their genuine sensory or perceptual counterparts" (pp. 2-3). From a similar perspective, White and Hardy (1998) defined imagery as "an experience that mimics real experience. We can be aware of 'seeing' an image,

feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing" (p. 389). In other words, imagery represents the methods that an individual will use to create or recreate an experience, in absence of any recognizable stimulus, in order to produce a sensory response (Murphy & Jowdy, 1992). Huang and Lynch (1992) suggested that the primary objective of imagery is to experience a mental image while using all five senses. This allows individuals to be centered on an activity with total control, while oriented towards specific, reachable goals.

Types of Imagery

Paivio (1985) reported that imagery can be categorized based on its functions; it can have either a motivational or cognitive purpose. Motivational imagery refers to behavioural situations, goal-oriented attitudes, and emotion-arousal levels. Contrarily, cognitive imagery refers primarily to the motor tasks as well as the strategical and tactical dimensions of a particular physical movement. Consequently, athletes use imagery for different reasons such as preparing themselves for peak performances or learning or correcting specific motor tasks (Hall, Mack, Paivio, & Hausenblas, 1998). Furthermore, previous research has shown that the use of imagery differs depending on the type of sport (i.e., closed versus open, team versus individual) and the time when it is utilized: before, during, or after competitions (Munroe, Hall, Simms, & Weinberg, 1998).

Over the years, imagery has also been classified as internal or external (Hardy & Callow, 1999). Internal imagery, also referred to as kinesthetic imagery, occurs when individuals act out a physical movement in their mind (Ito, 1999; Salmon et al., 1994). They feel the same sensations they would if they would be doing the actual movement, perhaps at a lower intensity. They integrate and associate the perceived image with all the feelings and emotions affiliated

with the movement (Orlick, 2000). Conversely, external imagery consists of individuals viewing themselves from the perspective of an outside observer. In other words, they play the role of a spectator by watching the reproduction of a movement, while considering all of their surroundings, including people. There is a general concept that can help to differentiate both types of imagery. Internal imagery occurs when individuals imagine themselves executing a movement, thus they are imaging in the first person. External imagery is experienced when individuals experience the whole picture in the third person (Weinberg & Gould, 1995).

Effects of Imagery

Imagery has become a highly recommended component of an athlete's overall sport preparation. Coaches are aware of its significant role and are encouraged to promote its importance and use in athletic events (Hall & Rodgers, 1989; Salmon et al., 1994). According to some researchers (Hall, 1995; Hausenblas et al., 1999), imagery is also a useful intervention tool that can be used to enhance exercise behaviour by improving self-efficacy and outcome expectancy. However, imagery does not only have a psychological dimension. It can provide the energy, strength, and attitude (i.e., motivation, commitment, discipline) required for a specific event, by allowing individuals to replay the steps and feelings involved in a specific task (Sugarman, 1999). It is a way of programming a link between an individual's mind and body in order to perform, succeed, or achieve a goal (Hall, 1995; Orlick, 2000).

Whether in sport or exercise settings, imagery is considered to be a cognitive skill that can bring many benefits to one's performance (Durand-Bush, 2000; Suinn, 1993). From a general standpoint, imagery can be used to enhance various aspects of daily living (Orlick, 1998). As a result, it can bring numerous useful advantages to one's daily life tasks. Examples of both physical and psychological effects of imagery include improved: (a) concentration, (b)

consistency, (c) self-efficacy, (d) pain or injury feelings, (e) physical reaction time, (f) coordination, (g) learning, and (h) motivation (Gould et al., 1997; Hall, 1995; Hall & Rodgers, 1989; Orlick, 2000). According to Murphy and Jowdy (1992), imagery can be used to facilitate skill acquisition and maintenance, increase self-awareness and confidence, and regulate arousal, emotions, and pain.

Hall (1995) proposed that the relationship between imagery and exercise is influenced by variables that play a crucial role in developing and maintaining active participation in physical activity. Some of these variables relevant to the current investigation include: (a) motivation, (b) self-efficacy, (c) peak performance, (d) mastery sensations, (e) skill correction, (f) activation and relaxation, (g) concentration, and (h) associative and dissociative strategies.

Motivation is a component that has often been linked to imagery. Sage (1977) defined motivation as the direction (i.e., if an individual is searching for, engaged in, or attracted to a situation) and the intensity (i.e., importance associated with the situation) of effort. Results from previous research in both sport and exercise settings show that imagery can be a valuable motivational tool (cf. Roberts, 1992). Thus it would be interesting to see if the same results apply to the context of IGC. So far, it was found that IGC instructors use motivational types of imagery cues and perceive them to be effective for the workouts of their participants as well as their own personal workouts (Thompson et al., 2003). However, it is still unknown if the participants themselves find these cues to be effective.

Another variable that can be improved through imagery, and can ultimately enhance the exercise experience, is self-efficacy (Rodgers & Gauvin, 1998). Self-efficacy can be described as the extent to which an individual believes he or she has the capabilities to execute actions, which

in turn, lead to a certain outcome (Bandura, 1986). Self-efficacy has been found to improve considerably with imagery (Feltz & Weiss, 1982; Hall, 1995).

Other imagery functions associated with motivation include peak performances and mastery feelings (Ames, 1992; Ames & Archer, 1988). Peak performances refer to ego-involving situations and goal achievement, such as circumstances where interpersonal competition, normative feedback, public evaluation, and social comparison are emphasized in order to facilitate the involvement of an individual's ego. An example of a peak performance imagery cue is when exercisers are encouraged to imagine themselves competing in a race. At the beginning of the race, they are riding in second place. But by the end of the race, they have managed to gain ground and pass the number one rider, thus finishing the race in first place (Thompson et al., 2003).

Alternatively, mastery feelings generally relate to tasks, in which effort, learning, and the mastery of skills are encouraged (Kavussanu & Roberts, 1996). Studies have demonstrated that environments that encourage personal development and ongoing learning should be created (Bandura, 1986; Kavussanu & Roberts, 1996). Thompson and colleagues (2003) found that IGC instructors do in fact use imagery cues intended to elicit mastery feelings, however, more research needs to be conducted to determine the effectiveness of these cues.

Imagery is also used by competitive athletes for skill correction purposes (Orlick, 2000). Orlick suggested that reliving in one's mind the feelings, sensations, and emotions associated with a movement until it can be reproduced naturally and perfectly, can help an individual speed up the learning process and modify any skill-related errors. According to Rushall and Lippman (1998), imagery can also be used for skill acquisition by acting as a template in an individual's mind and allowing him or her to properly develop the sequences involved in a specific

movement. Imagery also plays an important role in allowing individuals to activate the body, reduce energy levels in order to attain a normal heartbeat or relaxation after exercising, and maintain specific levels of concentration (Orlick, 2000; Weinberg & Gould, 1995; White & Hardy, 1998).

Some studies have shown that performance can be positively influenced by the use of specific coping strategies (L. Scott, D, Scott, Bedic, & Dowd, 1999; Tammen, 1996). For example, Orlick (2000) stated that in certain situations, shifting your focus away from fatigue and pain is essential, and this can effectively be done through the use of imagery. As a result, dissociative strategies are used to escape the reality involved in any specific movement where pain, fatigue, tension, and/or heat are overlooked. Dissociative strategies can be categorized as either internal or external (Couture, Jerome, & Tihanyi, 1999). Examples of internal strategies include resolving math problems, repeating poetry, and singing to oneself. External strategies involve focusing on something in the environment, for example, light posts, scenery, and spectators. It is believed that novice athletes have a tendency to use dissociative strategies because they are most likely concerned with their initial goal of participating rather than trying to improve their performance (L. Scott et al., 1999).

On the other hand, people can use associative approaches during exercise to internalize their focus and attend to their bodily needs and feedback signals (Couture et al., 1999). Associative strategies allow exercisers to sustain an overall awareness (L. Scott et al., 1999). Thompson and colleagues (2003) found that imagery cues were given by IGC instructors to encourage the use associative and dissociative strategies, however, the effect of these cues on the workouts of exercisers remains unclear.

In summary, imagery can have a positive impact on the performance of individuals in both sport and exercise settings (Gammage et al., 2000; Hall, 2001). It can enhance their interest and quality of participation. Imagery can also affect many sport and exercise components (i.e., performance, effort, strategies) and individual attributes (i.e., motivation, personal goals, achievements). As well, it can play different roles depending on the setting.

Unfortunately, most of the studies that have investigated the use of imagery within exercise settings have primarily been limited to aerobics (Hausenblas et al., 1999). Furthermore, most of these studies have employed the Exercise Imagery Questionnaire (EIQ; Hausenblas et al., 1999), which is a tool that measures exercise imagery based on a 9-point scale. The nine items rated in the questionnaire refer to using imagery either prior to or after the actual exercise, as opposed to during the physical workout. For example, two of the items on the EIQ are "To keep me going during the day, I imagine exercising," and "To take my mind off work, I imagine exercising." Consequently, one can see that the EIQ evaluates the use of imagery outside of the actual physical workout setting. Thompson and colleagues (2003) found, however, that imagery is emphasized while participants are exercising during IGC classes.

As reported by Weinberg and colleagues (2003), many studies have been conducted on the types and use of imagery in various sport settings, but there is little information relating to its effectiveness. This is also true for exercise settings. Moreover, it must be noted that many of the studies that have examined the use of imagery, in both contexts of sport and exercise, have focused on individuals or teams using imagery on their own. In other words, they guided their own imagery and controlled its purpose and duration as well as the environment in which it occurred. Interestingly, in the present study, imagery is guided for the most part by IGC instructors. The following section provides a more in-depth description of IGC.

Indoor Group Cycling

Originating in Los Angeles, IGC is an indoor, non-impact, cardio-workout performed on a specially designed bike within a group setting. The stationary bike is equipped with fixed gear-racing handlebars, an adjustable seat, and a 17-kilogram flywheel. The participants can adjust the resistance of the wheel to modify their speed of pedalling depending on their personal abilities and strength. There are two general objectives in IGC classes: (a) target both the body and the mind in a unique exercise program, and (b) teach individuals how to incorporate the mind/body relation in order to reach complete health and fitness (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999).

IGC combines music, motivation, and both physical and mental training techniques, creating an ultimate workout and leaving participants with a feeling of accomplishment and exhilaration (Mad Dogg Athletics, 2003). During a session, instructors encourage the use of imagery by employing different imaging cues, soliciting all five senses. The class participants are able to make adjustments on their cycles, which correspond to the difficulty of the perceived and imagined ride. Proponents of IGC advocate that it is an excellent physical and mental workout (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999). Psychological benefits of IGC may include an increased ability to focus, stress reduction, mental calmness, pain control, and an ability to function better as a whole (Mad Dogg Athletics, 2003; Ryan, 1999).

The use of imagery in IGC was first empirically studied by Thompson et al. (2003). The primary purpose of the study was to examine the general use of imagery in IGC classes. Thus, the types of imagery cues used by instructors were investigated. Another objective was to examine the instructors' perceptions of the effects of imagery on the general quality of their IGC

experience and that of the class participants. The sample included two certified IGC instructors from whom the data were collected in three phases. The instructors were first asked to complete a questionnaire to obtain demographic information and general responses pertaining to the use of imagery in IGC classes. The second phase involved videotaping three IGC classes taught by each of the instructors. The content of these videotapes were inductively analyzed to examine the imagery cues provided during IGC classes. In the third phase, each of the instructors participated in a semi-structured, open-ended interview of which the purpose was to gather more in-depth data. A set of questions was pre-determined based on (a) the information provided by the instructors on their initial questionnaire, and (b) the analysis of their videotapes, and more specifically, the types of cues provided during IGC classes.

Thompson and colleagues (2003) reported that the types of imagery cues provided by the instructors during their IGC classes related to effort / intensity, general motivation, environment, body awareness, skill orientation, association / dissociation, and relaxation / recovery. Mastery feelings, optimal performance, and efficacy-building were sub-categories of motivational cues. The types of cues that were used most frequently by both instructors were motivation, effort / intensity, body awareness, and environment. Within the sub-categories of motivation, efficacy-building was a predominant one.

The findings also showed that it is not the quantity of cues that contributes to the participants' workouts but the quality of each cue. This suggests that the imagery cues instructors provide must be of quality and not redundant. In other words, the imagery cues should be carefully thought out and appropriately timed. More research is warranted to verify this finding.

According to the instructors in the study by Thompson and colleagues (2003), the use of imagery in IGC benefits not only the participants but also the instructors, depending on their

personal goals. The instructors stated that using imagery contributed to their own performance by providing a mean for them to stay focused on their participants' needs and goals. By using imagery, they could remain connected with themselves as well as with their participants.

A limitation of the previous study, however, was that the participants' perceptions were not assessed. Also, the study investigated the different types of cues provided by only two instructors and the general rather than specific effects of these cues on the IGC experience. It is therefore essential that a study be conducted to examine the effectiveness of imagery cues in this setting. It is these gaps that have led to this study. More specifically, the main purpose of the current study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. The next chapter provides an overview of the procedures and instruments that were used in this study.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to provide detailed information regarding the methodology that was used to carry out this study. The research paradigm, participants, instruments, and data collection and analysis procedures will be described.

Research Paradigm

This research can be classified under the post-positivist paradigm. This particular paradigm was selected based on two components: (a) the research questions described in the previous section, and (b) the methods utilized to answer these questions. First, this paradigm allows data to be collected in a more natural setting. It also supports the use of both qualitative and quantitative methods for a comprehensive analysis. A deductive / inductive design was used for the qualitative data analysis. It was considered deductive because specific categories of imagery cues were already established in a previous study and part of the analysis was done using these categories. However, it was inductive in the sense that if other categories emerged, they were added. The results of this study were discussed in light of pre-existing research, a basic tenet of the post-positivist paradigm. Finally, steps were followed to guard against violations of validity and reliability.

Participants

The sample for this study consisted of 19 individuals involved in IGC. The first group was comprised of four certified IGC instructors, one man and three women, who taught in the Ottawa-Carleton region. The instructors' demographical information is presented in the following table.

Table 1

Demographical Information of IGC Instructors

Personal Information	Instructors			
	I1	I2	I3	I4
Age	42	37	n/a	47
Gender	F	F	M	F
Fitness Teacher (# of years)	20	14	n/a	18
IGC Teacher (# of years)	5	4	n/a	5
# of Classes per Week	3	4	n/a	5
# of Hours per Week	4	4	n/a	5

Note. I = Instructor; No data was available for Instructor 3 (I3).

The second group consisted of 15 participants, five men and ten women, who attended IGC classes. The age of the class participants ranged from 25 to 70 years, with a mean of 44. The class participants' experience in IGC varied from beginner to advanced level cycling. On average, they had nearly two years of experience (1.9) in IGC. Also, they attended, on average, one to two classes per week (1.72). The demographical information of the class participants is presented in the following table.

Table 2

Demographical Information of Class Participants

Code	Age	Gender		Years of experience in IGC	IGC classes per week
		F	M		
I1-P1	61	X		4	3
I1-P2	48		X	3	2
I1-P3	36	X		1	1
I1-P4	55	X		5	2
I1-P5	39	X		1	2
I2-P1	37		X	2	1
I2-P2	41	X		0.5	3
I2-P3	52	X		1	1
I2-P4	53	X		1	3.5
I3-P1	70	X		2.5	3
I3-P2	41		X	1.5	2
I3-P3	25		X	0.5	1
I4-P1	47		X	2	2
I4-P2	26	X		0.5	1
I4-P3	26	X		0.25	1

Note. Code represents the number given to each participant to ensure anonymity. I = Instructor; P = Participant.

An attempt was made to recruit approximately three participants per class (i.e., per instructor), which was deemed a reasonable number for which to aim, as it allowed the researcher to conduct all of the stimulated recall sessions, that is, one with each selected class participant within a 48-hour time frame. In addition, the study was conducted in both French and English. Although all of the IGC classes were taught in English, some of the participants were French or bilingual, and were more comfortable expressing themselves in French or in both languages.

Data Collection

The present study combined both qualitative and quantitative methods for collecting and analyzing the data. The data was collected in four phases in which different instruments and methods were used. Following is a description of these instruments and methods.

Instruments

Phase 1 - Questionnaire

The first phase involved the administration of a questionnaire to class participants to obtain demographical data (i.e., age, years of participation) and general perceptions regarding imagery (see Appendices B and C). This questionnaire was a modified version of that used by Thompson et al. (2003).

Phase 2 – Videotaping

The second phase involved videotaping one IGC class of each of the four instructors who agreed to participate in the study, and this for videotaping purposes only. A camera, videotape, and tripod were used and set up at the back of each class. The camera was positioned so that only the instructors were filmed.

Phase 3 – Stimulated Recall Session

Once recruited for the study and after their respective class was videotaped, the class participants attended an individual stimulated recall session (SRS) that was conducted by the researcher. Stimulated recall is "an introspective method, in which participants are prompted (via visual or oral stimulus such as video or audio taped events) to recall thoughts they entertained while carrying out certain tasks or participating in certain events" (Gass & Mackey, 2000, p. 9). An advantage of this technique, compared to the post hoc interview method, is that participants need not rely solely on memory to recall any or all thoughts (Gass & Mackey, 2000). It is a technique that allows individuals to relive original experiences with vividness and accuracy, by presenting many cues or stimulus of the original situation (Bloom, 1953; Calderhead, 1981).

It is during the SRSs that the participants and the main researcher viewed the videotape of their IGC class and identified and discussed the effectiveness of the cues provided. To identify the cues, the participants were advised to ask to stop the videotape any time they noticed something that elicited images. If the participants did not ask to stop the videotape and an imagery cue was presented, as pre-determined by the researcher, then the videotape was paused. Thus, when an imagery cue was provided, the videotape was paused either at the request of the class participant or by the researcher. The researcher had viewed and analyzed the videotape before the SRS to identify all of the cues based on the categories found in the previous study (Thompson et al., 2003). When the videotape was paused, the class participants were asked what they thought the purpose of the cue was, if and how they used the cue, and whether or not the imagery cue had an effect on them. Note that each participant had the opportunity to comment and discuss each of the cues that were presented by their respective instructor.

The SRSs were audio-recorded and transcribed verbatim for further data analysis. They lasted approximately two hours, depending on the comments and elaboration of the class participant. Note that the SRSs were each held within 48 hours of the videotaped classes, a guideline that was used by Gilbert, Trudel, and Haughian (1999). They were also held before the participants attended another IGC class because this could have impacted their ability to relive the original experience. In total, there were 15 SRSs conducted with class participants (i.e., one per participant), resulting from four videotaped sessions of instructors (i.e., one class per instructor).

Phase 4 – Interview

Once the SRSs were completed, each participant took part in a semi-structured interview containing open-ended questions (see Appendices D and E). The interviews lasted approximately 15 to 30 minutes. The purpose of the interview was to gather more in-depth data regarding the class participants' perceptions of the effectiveness of imagery in IGC. As such, they were asked to explain their general perceptions of imagery. An example of a question that was asked is: "Do you think that the instructor used good imagery cues throughout the IGC session?"

Procedures

The data were collected in specific steps. First, there was the recruitment phase, followed by the on-site phase in which data were obtained from class participants using the aforementioned instruments. Detailed information is provided next for each of the data collection procedures.

Pilot Study

It is imperative that specific measures be taken in order to ensure trustworthiness when conducting research from a post-positivist perspective (Huberman & Miles, 1994). In order to

increase the credibility of this study, a pilot study was conducted with two individuals, one instructor and one class participant. It is important to note that the individuals involved in the pilot study did not subsequently participate in the study. An important purpose for conducting the pilot study was to test and practice the SRS.

The pilot study was an important part of the study for many reasons. It allowed the researcher to familiarize herself with the instruments, and more specifically, the steps involved in the SRS. This ensured structure and flow during the data collection with the class participants. For example, it was important to determine who should be in control of the remote control while viewing the videotape; the participants or the researcher. After the pilot study, it was concluded that the researcher would have control as this allowed for better continuity in the session and saved valuable time. The interview questions were also examined during the pilot study to determine if they were clear and well posed to the participants. Once the pilot study was completed, the next step included recruiting participants for the study.

Methods of Recruitment

The first phase of recruitment focused on the instructors. Through contacts in the Ottawa-Carleton region, email messages were sent to coordinators at several facilities where IGC classes were offered. Following an initial email contact, further details of the study were provided in person at the respective facilities. The instructors were given a letter of information (see Appendices F and G), and upon agreement, they signed a consent form that conformed to the established University of Ottawa ethical guidelines (see Appendices H and I). Arrangements were made with them to videotape one of their IGC sessions.

The class participants were recruited via the instructors who identified in advance class participants who would possibly be willing to participate in the SRSs. The class participants

were recruited on-site in advance of the targeted class that was videotaped. Once the study was explained, they were given a letter of information (see Appendices J and K) and questions were answered as necessary. Those who were interested in participating signed a consent form (see Appendices L and M), and a meeting was scheduled for them to complete the questionnaire and participate in the SRS within 48-hours after the videotaped class.

On-Site Data Collection Procedures

After identifying the instructors and class participants, scheduling a time to videotape the IGC class, and obtaining their consent forms, the researcher attended the 50-minute class in order to videotape it. These videotapes were required for the SRSs that were conducted with class participants. It is important to note that only the instructors were videotaped and that this was the only manner in which the instructors participated in the study. Data were not directly collected from the instructors. The researcher viewed the videotape immediately after each IGC class and before conducting the SRSs with participants in order to identify the different imagery cues provided by the instructors based on Thompson et al.'s (2003) previous study, and the timing of each cue.

At the onset of the individual meetings with class participants, they were asked to complete a questionnaire (see Appendices B and C). Then, detailed instructions were given prior to viewing the videotape. The tape-recorder was turned on to record the SRS for transcription purposes and future analyses. Throughout the SRSs, the class participants and the researcher identified the imagery cues provided by the instructor, at which points the videotape was paused. The participants were advised that if they did not recall or did not use and perceive the imagery cues as being effective, to be honest. The class participants were asked (a) what they thought the purpose of the cues were, (b) if and how they used the cues, and (c) whether or not the cues had

an effect on them. The researcher assigned a coding number and tag that represented the type of cue as each cue was identified. These steps were repeated until the entire videotaped class session was viewed. Throughout the SRS, the participants were encouraged to ask questions and share any type of comment or perception.

Once the SRSs were completed, the participants took part in a short semi-structured interview (see Appendices D and E). Probe questions were used in order to clarify or gather more in-depth information. At the end, the participants were thanked for their cooperation and contribution.

Data Analysis

As previously mentioned, both qualitative and quantitative data were collected in this study, therefore different methods were used to analyze them. The next section describes the method used to analyze the qualitative data.

Qualitative Analysis

The qualitative data gathered from the questionnaires and SRSs were analyzed using a deductive and inductive process of reasoning (Côté, Salmela, Baria, & Russell, 1993), with an emphasis on a deductive process based on the results of the study by Thompson et al. (2003). For example, cues on the videotape were coded and analyzed by the researcher and participants during the SRSs based on the categories of cues identified by Thompson and colleagues. However, if for any reason, a new type of cue emerged, it was noted and rated as such. This part of the analysis was inductive.

In terms of the identification of the imagery cues, the main researcher viewed the videotape immediately after each IGC class. A categorization grid containing the different types of cues (Thompson et al., 2003) was used by the main researcher to identify and assess the

frequency of each type of imagery cue used by the instructors. The procedure for coding the imagery cues while viewing the videotape was as follows: each time an imagery cue was identified, the videotape was paused in order to allow the researcher to code it accordingly under the appropriate type. The cue was numbered and also transcribed verbatim on the grid.

The researcher had previous experience coding instructors' imagery cues due to her involvement with the analysis of the data for the previous study (Thompson et al., 2003). It should be noted that cues that were not easily identified were brought forward to the research team for discussion. The cue was debated and coded only once an agreement was reached among the research team. The coding and the analysis of the cues remained flexible to allow additional types of cues to emerge and to be able to modify the names of the categories to best reflect the data.

After the completion of all the SRSs, the researcher engaged in further analysis to code and categorize the responses of the class participants regarding their perceptions of the effectiveness of the cues. To this end, each identified cue was transcribed and inputted in Microsoft Access in order to create a database of cues with an indication of their effectiveness.

The interviews were inductively analyzed following three main steps: (a) preparing the data, (b) creating meaning units, and (c) creating and conceptualizing categories. These steps are described below (Côté et al., 1993).

Preparing the Data

The objective of this step was to get familiar with the gathered information. This involved transcribing the interviews and becoming acquainted with the context of each transcript by reading them over and taking notes. Grammatical and spelling errors were also corrected for

clarification purposes. In sum, preparing the data was an important process that served to facilitate subsequent work.

Creating Meaning Units

The second step of the analysis involved dividing the text from the interviews into "meaning units" (MUs) and giving them a tag, that is, a name that reflected the content of the cue. MUs are pieces of text that contain one idea or piece of information that can be interpreted on their own. For example, if a participant's perception on a particular topic was lengthy and contained more than one idea, the text was divided accordingly. This was done directly on the interview transcripts. Note that the content of the MUs reflected each question. For example, if the question was, "How does imagery influence your overall IGC experience," the MU was tagged as "Influence of imagery." Following is an example of a MU that pertained to the influence of imagery in IGC: "On the days when you're feeling like you don't want to be there, it's a good distraction" (I4-P1).

More inductive analysis of the data occurred at this stage because as the transcripts were scrutinized to create the meaning units, additional categories emerged and were noted.

Creating and Conceptualizing Categories

This step consisted of regrouping the meaning units from the interviews under specific categories based on the content of similar MUs. The categories were discussed and refined until a satisfactory list was reached and a consensus was obtained amongst the research team. Once all the MUs were regrouped under appropriate categories, they were printed out. These printouts were used to write the results and discussion of the study. Significant citations were identified.

Quantitative Analysis

The numerical data obtained from the questionnaires (demographical information and closed questions), as well as the SRSs (i.e., frequency of cues) were analyzed using descriptive statistics because of the limited number of participants and responses. More specifically, the frequency of each type of cue was calculated to provide an indication of which cues were used most and least often.

Trustworthiness

In this study, three different data collection methods (i.e., questionnaire, interview, SRS) were used to obtain in-depth information from the class participants. This was designed to increase the validity of the data through triangulation and maximize the trustworthiness of this study. The limitations of one method could be compensated by the strengths of another.

For the most part, minimal discrepancies between the three sources of data were found, however, a few were encountered and should be acknowledged. For example, a few participants initially answered on the questionnaire that they did not use the imagery cues provided by the instructors. However, when viewing the tape and discussing the numerous cues, it was evident that they used the cues and they did think they were effective. This can perhaps be explained by the fact that many people have never been introduced to the concept of imagery and do not fully understand what it is and how it is used. Another discrepancy is that some participants believed that imagery could only be used from a visual perspective. But again, by viewing the videotape, they realized that they used other senses (i.e., feeling) in their imagery.

A pilot study was conducted before starting the data collection in order to ensure that the research protocol, and more specifically the SRS, was adequate and well structured. The pilot

study enhanced the validity of the study, that is, it helped to verify if the variables were being measured effectively and consistently before starting the data collection.

Trustworthiness was also increased through peer debriefing (Huberman & Miles, 1994), whereby regular meetings were scheduled with a research team. This allowed for continuous feedback, guidance, and suggestions for improving the collection and analysis of the data. Peer debriefing sessions reinforced neutrality as much as possible. Also, the fact that one researcher collected all of the data increased trustworthiness and allowed for more consistency in the findings. Another important procedure to increase the trustworthiness of this study involved member checking. This procedure was significant in that the participants were directly involved in the analysis of the data (i.e., identification of cues and their effectiveness) and thus had an impact on the validity of the results.

Methodological Contribution

Calderhead (1981) suggested that teachers might have specific goals and aims before entering a classroom, however, one cannot assume that these remain the same when they are actually teaching. If teachers are interviewed before a class, or asked to fill out a questionnaire after a class to indicate whether or not they reached their goals, their responses might not be completely accurate. It is best for them to recall the situation, in this case, the class lesson, in order for them to determine their goal achievement. It is therefore perhaps less effective to fully commit to only common methods of data collection (i.e., interviews, questionnaires).

The same concept applies to IGC instructors. Although certified instructors have reported using imagery and believe that it benefits their participants' workouts (Thompson et al., 2003), it cannot be assumed that this is indeed reality. That is why using the SRSs, in addition to the more traditional methods of questionnaires and interviews, with not only instructors (Thompson et al.,

2003) but also class participants to determine whether or not imagery has an impact on the overall IGC experience, is a significant methodological contribution. It allowed the researcher to gather information directly from the individuals as they recalled their IGC class and its imagery components.

CHAPTER IV

RESULTS

The data collected in this study were compiled based on the information provided by 15 IGC class participants, as described in the previous chapter. The information was collected in three different phases: (a) questionnaire, (b) stimulated recall session (SRS), and (c) interview. The first part of the results section contains an article that focuses on the data collected from the SRS; the second part includes the data gathered from the questionnaires and interviews.

The Effectiveness of Imagery in Indoor Group Cycling

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The Effectiveness of Imagery in Indoor Group Cycling

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Abstract

Indoor group cycling (IGC) is a popular type of aerobic activity performed on a stationary bike, combining both mental and physical aspects of training through the use of imagery (Johnny G. Spinning Instructor Manual, 1999). Thompson, Durand-Bush, & O'Sullivan, (2003) investigated the different types of imagery cues provided by instructors and their effects on the overall IGC experience. However, the purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. The sample included four certified IGC instructors and 15 class participants. The instructors were videotaped while teaching their IGC class, after which class participants took part in a stimulated recall session (SRS; Calderhead, 1981) to assess the effectiveness of the imagery cues provided by the instructors. The instructors used 12 types of cues in varying frequencies, however, the class participants found only certain types to be effective. They preferred simple cues that were given following a logical progression. Suggestions for future research are discussed.

Key words: imagery, indoor group cycling, exercise, effectiveness, spinning

The Effectiveness of Imagery in Indoor Group Cycling

Studies have shown that regular exercise directly influences the physiological and psychological health of individuals (Berger & Motl, 2001; Leith, 1994; Martin & Dubbert, 1985). This clearly demonstrates the importance of exercising to stay healthy and the urgency of educating people to help them make it a priority. There are many types of exercise classes being encouraged and promoted in fitness centres around the world, such as Yoga, step-aerobics, aqua-fitness, Pilates, and kickboxing. Another type of physical activity that has gained popularity is indoor group cycling (IGC), also commonly known through one popular trademark name: Spinning.

Indoor group cycling (IGC) is a cardiovascular exercise, in which participants pedal their way through a workout on a specially designed stationary bike. It was originally developed to enable competitive cyclists to train year round (Ryan, 1999). Similarly to aerobic classes, IGC classes are led by certified instructors and are performed in a group setting. Workouts are easily personalized because the participants can control their own speed and resistance on the bike. IGC has many benefits for participants of all ages and fitness abilities, which may be one reason why this activity is gaining popularity (Mad Dogg Athletics, 2003).

One of IGC's features is the imagery component. In typical IGC classes, instructors introduce various imagery cues to encourage participants to mentally create a simulated bike ride, where they may encounter steep hills and scenic routes, as well as feel the wind in their hair and hear the birds chirping in the woods. Instructors lead their classes by creating visualized journeys, allowing the participants to simultaneously engage their mind and body. The use of imagery in IGC is an integral part of many instructor-training programs (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999).

Imagery is a skill with a cognitive function that allows the mind to create or recreate an experience (Sugarman, 1999). It is a process that involves evoking pieces of information stored in one's memory and shaping them together to form an image (Weinberg & Gould, 1995). Imagery can be compared to a real sensory experience involving all senses, that is, auditory, visual, kinesthetic, tactile, and olfactory information. Many researchers have examined the use of imagery in sport settings (Barr & Hall, 1992; Lerner, Ostrow, Yura, & Etzel, 1996; Martin, Moritz, & Hall, 1999; Munroe, Giacobbi, Hall, & Weinberg, 2000; Rodgers, Hall, & Buckloz, 1991; Salmon, Hall, & Haslam, 1994; Weinberg, Butt, Knight, Burke, & Jackson, 2003). Only recently has exercise imagery been researched in more detail (Gammage, Hall, & Rodgers, 2000; Hall, 1995; Hall, 2001; Hausenblas, Hall, Rodgers, & Munroe, 1999).

Evidence suggests that imagery used in exercise settings can have a positive influence on one's quality of life by enhancing participation and enjoyment, and facilitating achievement of desired goals (Hausenblas et al., 1999). In general, the use of imagery in sport and exercise contexts depends on many factors, including the way it is presented, the specific types of cues used to generate desired images, as well as the main purpose of cues (Hausenblas et al., 1999; Martin et al., 1999; Munroe et al., 2000).

To our knowledge, there has only been one study conducted on the general use of imagery in IGC (Thompson, Durand-Bush, & O'Sullivan, 2003). The purpose of the study was to determine the types of imagery cues given by two different IGC instructors, and the instructors' perceived effectiveness of the cues for enhancing the exercise experience. Results revealed that there are seven major categories of cues used by the instructors while conducting their IGC classes: (a) effort / intensity, (b) general motivation, (c) environment, (d) body awareness, (e) skill orientation, (f) association / dissociation, and (g) relaxation / recovery.

Additional sub-categories of cues emerged within the general motivational category and these related to mastery feelings, optimal performance, and efficacy-building.

Although empirical findings suggest there are many advantages to using imagery in exercise settings, research can still be considered as limited. More research needs to be conducted in different exercise environments, particularly that of IGC, where the research is practically non-existent.

Unfortunately, most of the studies that have investigated the use of imagery within exercise settings have primarily been limited to aerobics (Hausenblas et al., 1999). Furthermore, most of these studies have employed the Exercise Imagery Questionnaire (EIQ; Hausenblas et al., 1999), which is a tool that measures exercise imagery based on a 9-point scale. The nine items rated in the questionnaire refer to using imagery either prior to or after the actual exercise, as opposed to during the physical workout. Thompson and colleagues (2003) found, however, that imagery is emphasized while participants are exercising during IGC classes.

As reported by Weinberg and colleagues (2003), many studies have been conducted on the types and use of imagery in various sport settings, but there is little information relating to its effectiveness. This is also true for exercise settings. Moreover, it must be noted that many of the studies that have examined the use of imagery, in both contexts of sport and exercise, have focused on individuals or teams using imagery on their own (Orlick, 1998; Orlick, 2000; Weinberg & Gould, 1995); they did not depend on somebody else to give them cues to elicit images. They guided their own imagery and controlled its purpose and duration as well as the environment in which it occurred. Interestingly, in the present study, imagery is guided for the most part by IGC instructors.

There is an important gap in the literature regarding the use of imagery in IGC, yet imagery is being used by many certified instructors (Cycle Reebok Instructor Manual, 1996; Johnny G. Spinning Instructor Manual, 1999). Instructors may be encouraged to use imagery while teaching IGC, however, it is important to determine if class participants are using the imagery cues provided to them and if they find these to be effective during the structured exercise workout.

The purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. Specific types of imagery cues were identified and categorized in a previous study (Thompson et al., 2003). Thus, it was important to re-examine these types of cues in the current study to determine which ones were deemed most effective by class participants. In this study, effectiveness referred to whether the imagery cues provided by the instructors were perceived by the class participants as useful in achieving a desired outcome (Weinberg et al., 2003), for example, increasing effort, relaxing muscles, or ensuring proper cycling technique.

The current study is significant because it will fill a gap in the literature. From a methodological standpoint, this study provides evidence about the usefulness of the stimulated recall technique to analyze the data with participants. This method was not used in Thompson and colleagues' (2003) initial study with instructors, but it proved to be extremely valuable to examine the perceptions of the participants immediately after their workout. From a practical standpoint, this study may help certified instructors who are seeking to improve their use of imagery in IGC classes. It provides an increased understanding of which cues should be used and how instructors can use them to best meet the needs of their participants. Findings of this study can also be used to enhance certification training programs.

Methodology

Participants

The sample for this study consisted of 19 individuals involved in IGC. The first group was comprised of four certified IGC instructors, one man and three women, who taught in the Ottawa-Carleton region. The second group consisted of 15 participants, five men and ten women, who attended IGC classes. The age of the class participants ranged from 25 to 70 years, with a mean of 44. The class participants' experience in IGC varied from beginner to advanced level cycling. On average, they had nearly two years of experience (1.9) in IGC. Also, they attended, on average, one to two classes per week (1.72).

An attempt was made to recruit approximately three participants per class (i.e., per instructor), which was deemed a reasonable number for which to aim, as it allowed the researcher to conduct all of the stimulated recall sessions, that is, one with each selected class participant within a 48-hour time frame. Also, the study was conducted in both French and English.

Instruments

The first phase involved videotaping one IGC class of each of the four instructors who agreed to participate in the study. A camera, videotape, and tripod were used and set up at the back of each class. The camera was positioned so that only the instructors were filmed.

During the second phase, the class participants attended an individual stimulated recall session (SRS) that was conducted by the researcher. Stimulated recall is "an introspective method, in which participants are prompted (via visual or oral stimulus such as video or audio taped events) to recall thoughts they entertained while carrying out certain tasks or participating in certain events" (Gass & Mackey, 2000, p. 9). An advantage of this technique, compared to the

post hoc interview method, is that participants need not rely solely on memory to recall any or all thoughts (Gass & Mackey, 2000). It is a technique that allows individuals to relive original experiences with vividness and accuracy, by presenting many cues or stimulus of the original situation (Bloom, 1953; Calderhead, 1981).

It is during the SRSs that the participants viewed the videotape of their IGC class and identified and discussed the effectiveness of the cues provided. To identify the cues, the participants were advised to ask to stop the videotape any time they noticed something that elicited images. They were asked what they thought the purpose of the cue was, if and how they used the cue, and whether or not the imagery cue had an effect on them.

The SRSs were audio-recorded and transcribed verbatim for further data analysis. They lasted approximately two hours, depending on the comments and elaboration of the class participant. Note that the SRSs were each held within 48 hours of the videotaped classes, a guideline that was used by Gilbert, Trudel, and Haughian (1999). They were also held before the participants attended another IGC class because this could have impacted their ability to relive the original experience. In total, there were 15 SRSs conducted with class participants (i.e., one per participant), resulting from four videotaped sessions of instructors (i.e., one class per instructor).

Procedures

Pilot Study

It is imperative that specific measures be taken in order to ensure trustworthiness when conducting research from a post-positivist perspective (Huberman & Miles, 1994). In order to increase the credibility of this study, a pilot study was conducted with two individuals, one

instructor and one class participant. It is important to note that the individuals involved in the pilot study did not subsequently participate in the study.

The pilot study was an important part of the study for many reasons. It allowed the researcher to familiarize herself with the steps involved in the SRS. This ensured structure and flow during the data collection with the class participants. For example, it was important to determine who should be in control of the remote control while viewing the videotape; the participants or the researcher. After the pilot study, it was concluded that the researcher would have control as this allowed for better continuity in the session and saved valuable time. Once the pilot study was completed, the next step included recruiting participants for the study.

Methods of Recruitment

The first phase of recruitment focused on the instructors. Through contacts in the Ottawa-Carleton region, email messages were sent to coordinators at several facilities where IGC classes were offered. Following an initial email contact, further details of the study were provided in person at the respective facilities. The instructors were given a letter of information and upon agreement, they signed a consent form that conformed to the established ethical guidelines. Arrangements were made with them to videotape one of their IGC sessions.

The class participants were recruited via the instructors who identified in advance class participants who would possibly be willing to participate in the SRSs. The class participants were recruited on-site in advance of the targeted class that was videotaped. Once the study was explained, they were given a letter of information and questions were answered as necessary. Those who were interested in participating signed a consent form, and a meeting was scheduled for them to participate in the SRS within 48-hours after the videotaped class.

On-Site Data Collection Procedures

After identifying the instructors and class participants, scheduling a time to videotape the IGC class, and obtaining their consent forms, the researcher attended the 50-minute class in order to videotape it. These videotapes were required for the SRSs that were conducted with class participants. It is important to note that only the instructors were videotaped and that this was the only manner in which the instructors participated in the study. The researcher viewed the videotape immediately after each IGC class in order to be familiar with the different imagery cues provided by the instructors and the timing of each cue, before conducting the SRSs with participants.

At the onset of the individual meetings with class participants, detailed instructions were given prior to viewing the videotape. The tape-recorder was turned on to record the SRS for transcription purposes and future analyses. Together, the class participants and the researcher identified the imagery cues provided by the instructor, at which points the videotape was paused. The participants were advised that if they did not recall or did not use and perceive the imagery cues as being effective, to be honest. The class participants were asked: (a) what they thought the purpose of the cues were, (b) if and how they used the cues, and (c) whether or not the cues had an effect on them. The researcher assigned a coding number and tag that represented the type of cue as each cue was identified. These steps were repeated until the entire videotaped class session was viewed. Throughout the SRS, the participants were encouraged to ask questions and share any type of comment or perception. At the end, the participants were thanked for their cooperation and contribution.

Data Analysis

Qualitative Analysis

The qualitative data gathered from the SRSs were analyzed using a deductive and inductive process of reasoning (Côté, Salmela, Baria, & Russell, 1993), with an emphasis on a deductive process based on the results of the study by Thompson et al. (2003). For example, cues on the videotape were coded and analyzed by the researcher and participants during the SRSs based on the categories of cues identified by Thompson and colleagues. However, if for any reason, a new type of cue emerged, it was noted and rated as such. This part of the analysis was inductive. After the completion of all the SRSs, the researcher engaged in further analysis to code and categorize the responses of the class participants regarding their perceptions of the effectiveness of the cues. To this end, each identified cue was transcribed and inputted in Microsoft Access in order to create a database of cues with an indication of their effectiveness.

Quantitative Analysis

The numerical data obtained from the SRSs (i.e., frequency of cues) were analyzed using descriptive statistics because of the limited number of participants and responses. More specifically, the frequency of each type of cue was calculated to provide an indication of which cues were used most and least often.

Trustworthiness

A pilot study was conducted before starting the data collection in order to ensure that the research protocol, and more specifically the SRS, was adequate and well structured. The pilot study enhanced the validity of the study, that is, it helped to verify if the variables were being measured effectively and consistently before starting the data collection.

Trustworthiness was also increased through peer debriefing (Huberman & Miles, 1994), whereby regular meetings were scheduled with a research team. This allowed for continuous feedback, guidance, and suggestions for improving the collection and analysis of the data. Peer debriefing sessions reinforced neutrality as much as possible. Also, the fact that one researcher collected all of the data increased trustworthiness and allowed for more consistency in the findings. Another important procedure to increase the trustworthiness of this study involved member checking. This procedure was significant in that the participants were directly involved in the analysis of the data (i.e., identification of cues and their effectiveness) and thus had an impact on the validity of the results.

Results

The results of the different types of cues used by the instructors while teaching their IGC class are presented in Table 1.

Table 1

Types of Imagery Cues Used by Instructors

Type of Imagery Cue	I1		I2		I3		I4	
	#	%	#	%	#	%	#	%
Association / Dissociation	0	0	1	3	0	0	0	0
Body Awareness	14	38	5	16	1	4	5	15
Breathing	1	3	4	13	1	4	2	6
Effort / Intensity	5	14	3	9	5	21	4	12
Environment	9	24	2	6	5	21	10	29

Table 1 *(Continued)*

Type of Imagery Cue	I1		I2		I3		I4	
	#	%	#	%	#	%	#	%
General Motivation	2	5	1	3	0	0	1	3
(a) Efficacy-Building	0	0	2	6	0	0	2	6
(b) Mastery Feelings	1	3	1	3	0	0	2	6
(c) Optimal Performance	0	0	3	9	7	29	6	18
General Non-Specific	3	8	1	3	1	4	0	0
Relaxation / Recovery	0	0	4	13	1	4	0	0
Skill Orientation	2	5	5	16	3	13	2	6

Note. # = Number of cues per class; % = Percentage of total cues per class.

The results pertaining to the overall effectiveness of each type of cue for each instructor are presented in Table 2. The overall effectiveness was calculated based on the number of times the cues of one particular type were perceived to be effective by class participants in the same class.

Table 2

Overall Effectiveness of Each Type of Imagery Cue

Type of Imagery Cue	Percentage of Effectiveness			
	I1	I2	I3	I4
Association / Dissociation	-	0	-	-
Body Awareness	47	89	100	67
Breathing	100	75	50	80

Table 2 *(Continued)*

Type of Imagery Cue	Percentage of Effectiveness			
	I1	I2	I3	I4
Effort / Intensity	67	44	70	55
Environment	59	100	40	48
General Motivation	57	0	-	0
(a) Efficacy-Building	-	0	-	100
(b) Mastery Feelings	0	0	-	20
(c) Optimal Performance	-	88	81	81
General Non-Specific	33	0	0	-
Relaxation / Recovery	-	18	67	-
Skill Orientation	33	81	56	75

Note. I1 = Instructor 1; I2 = Instructor 2; I3 = Instructor 3; I4 = Instructor 4.

The frequency and effectiveness of imagery cues will be further described in light of each instructor.

Instructor #1 (I1)

I1 provided a total of 37 imagery cues throughout her class and her cues most often focused on body awareness (38%), environment (24%), and effort / intensity (14%). Although body awareness cues were provided most frequently, the participants did not always find them very effective. Overall, these cues were deemed effective 47% of the time. Out of the 14 body awareness cues, the participants found only four of them to be effective, while five were rated as ineffective. The other five cues were rated by half of the participants as effective while the other half thought they were ineffective. One body awareness cue that was deemed effective pertained

to the body getting warmer and all of the muscle groups changing colors according to their level of warmth. The participants felt this allowed them to feel comfortable and at ease with their working tired muscles. One participant stated:

> I tried to understand and use it in my own terms to benefit from it. There's one point later on where I could see my body start to warm up and I could start seeing or feeling the heat. It made it more comfortable. (I1-P2)

Many participants, however, reported that the body awareness cues were too complex and even too specific. They were difficult to use mainly because the participants were unaware of some of their muscles and bodily functions. One participant explained how picturing the tissue between her ribs expand was too complicated so she simply blocked it out.

> No, this was way out there for me. I had a hard time picturing this: The tissue between my ribs? This was too far-fetched for me. I just can't think of this. I tend to just listen to these cues but don't apply them. (I1-P1)

Environmental cues were also often provided by I1. In general, they were found to be effective by the participants. Overall, a total of 18 environment cues were provided and the participants revealed that these were effective nearly 60% of the time. These types of cues referred to beautiful lookouts, different terrains (i.e., mud, gravel), desert islands, and hills of all sorts.

The effort / intensity cues were also deemed as effective (67%). For example, I1 described cycling through mud, as this is evidently harder than riding on a smooth flat surface. One participant's response to the cue was: "I've done it before on the bike on the road. I was really seeing the mud. I got the sense of the difficulty through that image" (I1-P5). Another participant said: "I slowed down a bit and tried to imagine how tough it would be to bike through

the mud. I was imagining a thick mud, one where my tires would sink in a lot and not just one that splashes" (I1-P2).

Instructor #2 (I2)

This instructor provided all types of imagery cues. In all, I2 provided 32 imagery cues and the ones she used most often were: body awareness (16%), skill orientation (16%), breathing (13%), and relaxation / recovery (13%). Furthermore, I2 was the only instructor to use an association / dissociation cue, however, the class participants found it to be ineffective. She told them to think about their hair rather than their muscles to avoid thinking of their fatigue. One participant reported: "I was in pain, so it didn't help all that much. It made me aware of my pain" (I2-P1).

This instructor used breathing cues four times throughout her class and the participants rated these as effective. These cues got them to see their lungs expand and open their chest. They also helped them to breathe longer and deeper: "I took a deep breath. I started breathing stronger and getting my heart rate down" (I2-P2).

On the other hand, the participants had a hard time relating to effort / intensity cues. They only found them to be effective 44% of the time. These cues are usually provided to make the participants work hard. One reason some of participants found them to be ineffective was because there was a lack of progression. For example, at one point, I2 said that they were at the bottom of a hill and they had to climb it. However, she never mentioned the hill again after this, so the participants could not sustain the image. One participant explained: "It would have been better if it [the imagery] was given throughout the climb. It would have been better had it been more gradual, more progressive. There was nothing in between" (I2-P4).

Another type of cue that proved to be ineffective related to relaxation / recovery, which was perceived to be effective only 18% of the time. Most of these cues were provided during the last section of the workout. For example, I2 asked the participants to feel the softness in their face and to picture the softness around their eyebrows. Unfortunately, she gave this cue immediately after a hard bout of effort so the timing was not ideal. Some of the participants' reactions were quite blunt. "I remember thinking that my head was frying. It's not a soft feeling; it's more like an intense feeling" (I2-P1). Another participant said, "My eyebrows are never soft. It just didn't make any sense to me" (I2-P2). A third participant reported:

> I found that really hard especially when you're doing a physical activity like that. It's not like you're doing yoga. It's not your facial features that you should be relaxing. I just don't know about relaxing my face when I'm riding a bike. (I2-P4)

Finally, I2 gave effective optimal performance cues, which were perceived to be effective 88% of the time. An example of a cue of this type provided by I2 was guiding the participants through a race in which they continually progressed to first place, by seeing, passing, and leading other opponents. The participants responded well to this type of cue.

Instructor #3 (I3)

This instructor used the least number of imagery cues throughout his class, with a total of 24. Most of his cues related to: optimal performance (29%), environment (21%), and effort / intensity (21%). The optimal performance cues were found to be effective 81% of the time. Out of seven cues, there was only one that participants did not positively apply to their workouts. Examples of successful cues were those that allowed participants to reach the top of a hill, peaking at the right moment, and chasing opponents to eventually pass them. One participant

said: "It reminds me of my cycling team. It was interesting. It motivated me to work hard. It pushed me. Most of my images are based on past experiences" (I3-P2).

Another type of cue that was deemed effective was that of effort / intensity. Although the participants believed this type of cue enhanced their workout, they highlighted that there was no progression in I3's introduction of cues. In other words, I3 gave good cues to help them increase or lower their resistance but there was no flow between them:

> The instructor said, "This is the steep part of the hill." But it meant nothing. The last time I heard about it was during the plateau. When did we start climbing again? I was just going at it on my own. There was no imagery in this.... There's no flow. The instructor doesn't tell us where we are. I can't imagine going down a hill if I don't know when I've gone up the hill. (I3-P3)

The participants also revealed that I3's environment cues had no impact on their workout. The following example clearly demonstrates the importance of keeping cues simple yet realistic. At one time during the class, I3 described a setting where they were cycling on a nice flat road and then added that there was no wind. The participants thought that this did not make sense because when they ride, they automatically feel a cool breeze as a result of moving forward. When asked if this cue was effective, one participant responded: "No because you cannot not imagine the wind. Maybe the instructor could have said, there's not a lot of wind. There's just wind from the speed that you are going at" (I3-P3).

Instructor #4 (I4)

I4 used a total of 34 imagery cues of different types during her class. The types of cues she used the most pertained to: environment (28%), optimal performance (17%), and body

awareness (14%). I4 used all types of cues except for association / dissociation, general non-specific, and relaxation / recovery cues.

Overall, the participants perceived I4's cues as effective. For example, body awareness cues were deemed effective 67% of the time. The participants revealed that they enjoyed this type of cue because I4 is descriptive yet brief and simple. An example is during the stretching section of the class, she told the participants to feel their calf muscles lengthen as though they were strings of spaghetti. The participants expressed that this was easy to do because the image was simple and concrete.

Another type of cue that was deemed effective by participants pertained to breathing. They explained how it is often easy to forget to breathe properly, which in the end, has an effect on their physical performance. All three participants found that cues that reminded them to breathe deeply and with control were effective.

Another type of cue that participants found to be effective 81% of the time pertained to optimal performance. Some of these cues related to reaching the top of the hill and leading the pack of a race. One participant stated: "That was neat. I could actually see it [the top of the hill]. I really did picture it. It was a sense of accomplishment. I had attained my destination of being at the top. I did it" (I4-P3).

Environmental cues were used most often by I4, however, these proved to be ineffective half of the time (48%). One cue in particular was disliked by all of the participants. I4 guided them through a scenic adventure where they saw mountains and tall trees, and they felt the breeze. The participants were following this cue up until I4 decided that they were heading back into town. She warned them that it was rush hour, there was traffic, and they could hear all the cars honking their horns. This was the point at which the participants lost interest in the imagery.

A participant's reaction was: "At first I was picturing going downtown Ottawa. But I'm not very comfortable on a bike so it was hard for me to want to be in that situation" (I4-P2). Another participant commented: "For some reason, I pictured San Francisco. I think I started getting stressed. The fact that we were going in rush hour, thinking of all the cars…I thought, 'there's no way I'm going to be able to do this'" (I4-P3). Evidently, a cue like this caused participants to feel anxious and uncomfortable.

In sum, all four instructors used different types of imagery cues throughout their classes, favouring context and body awareness cues. Effort / intensity and optimal performance cues were also frequently provided. In general, the participants perceived these forms of types of cues to be effective. However, as in most relationships (i.e., coach and players, supervisor and employees, teacher and students), it must be assumed that IGC instructors cannot please all of their class participants. Everyone responds differently to different things; in IGC, one cue can provoke different reactions from different participants. For example, I4 asked the participants to picture a color and to breathe that color into their muscles. One participant thought it was an interesting and effective cue: "It was really cool. The stronger I worked, the more [the color] reached the tips of each of my muscles" (I4-P3). On the other hand, another perceived it to uninteresting and useless: "The colors didn't do anything for me. I thought it was boring" (I4-P2).

The participants also described how important it is for cues to be presented in a progressive fashion. If the participants were unaware of where they were supposed to be and what supposed to do, this created confusion and the imagery cue was ignored. One participant said: "There's no progression. You do what you can but you just have no clue, so it's hard" (I3-P2).

An additional finding that was discussed by a few participants was that they do not find it effective when options were presented within the same cue. For example, an instructor said that they were climbing a hill, however, they had a choice between two hills. They could choose a hill with a slight incline or the one next to it that was grueling. This was not effective because the participants did not want to be given the opportunity to take the easy out. One participant revealed: "I found this took away from it. It's giving me an easy way out. Why not give me a hard one and push myself versus taking the easy route" (I4-P3). The participants were there to work hard and expected the imagery to help them do this.

Discussion

The purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. Although imagery is a component featured in IGC, no research has been conducted on its effectiveness, which led to the design of the current study. In this study, effectiveness referred to whether the imagery cues provided by the instructors were perceived by the class participants as useful in achieving a desired outcome (Weinberg et al., 2003).

To our knowledge, only one study has been conducted on the general use of imagery in this context (Thompson et al., 2003). With specific purposes in mind, instructors incorporate imagery into their teaching by providing various types of imagery cues to their class participants. These types of cues encompass: (a) effort / intensity, (b) general motivation, (c) environment, (d) body awareness, (e) skill orientation, (f) association / dissociation, and (g) relaxation / recovery. Additional sub-categories of cues emerged within the general motivational category and these related to mastery feelings, optimal performance, and efficacy-building.

Although Thompson and colleagues (2003) identified seven categories and three sub-categories of imagery cues, two new types of cues emerged in the current study: breathing and general non-specific. The purpose of breathing cues is mainly to remind participants to breathe deeply to oxygenate their muscles rather than taking short quick breaths. An example of this type of cue could be to "Imagine your lungs expanding as if someone was blowing into them." Another example would be to "Picture the fresh air filtering through your respiratory system." The cues in the general non-specific category were distinguished because they could be interpreted in different ways. The imagery dimension of these cues was vague and ambiguous. Some examples included: "Allow yourself to daydream," "This is a peak in many ways," and "Your body has got flow; everybody's got flow."

With many types of imagery cues to choose from, IGC instructors use different types of cues while teaching their class. In the present study, there were only two types of cues that exceeded the others with regard to their frequency level. These related to environment and effort / intensity. Although body awareness cues were abundant compared to other types, it was mostly due to the fact that one instructor used them considerably more often than the other instructors.

Although the frequency of a few types of cues was similar to that in the previous study, there were surprising differences regarding the motivation category. Motivational cues were either categorized as general motivation or sub-categorized as optimal performance, efficacy-building, or mastery feelings. Findings demonstrated that motivation-based types of cues were not used as often as they were in the previous study, with the exception of the optimal performance cues. In IGC as in other settings, motivation plays an important role when it comes to exercise adherence (Gammage et al., 2000). Many studies have focused on the use of imagery

and its impact on increasing motivation and thus increasing participation and enjoyment in exercise (Gammage et al., 2000; Hausenblas et al., 1999).

This study also examined not only the types and frequency of cues provided by instructors, but also the effectiveness of these different types of cues. Some studies have shown how athletes tend to use different types of imagery in sport based on what they find effective (Weinberg et al., 2003). As expected, the participants in the current study used different types of cues based on what they deemed most effective for their workout. The type of cue that was deemed most effective by the participants 83% of the time pertained to optimal performance. Two other types of cues that were deemed effective by participants, 76% of the time, related to body awareness and breathing. These latter types of cues were not consistently provided by all four instructors.

On the other hand, the types of cues that were perceived as least effective by the participants pertained to general motivation and mastery feelings, which were seldom provided by instructors. This raises important questions in light of the literature on motivation. Did the participants perceive motivational types of cues as least effective because they were not provided frequently enough by the instructors? Or, was it because the content of the cues or the time at which they were given in the workout were not appropriate? Results of this study suggest that more attention needs to be paid to the delivery and content of the cues. For example, body awareness cues were the type most frequently used by I1, however, these were perceived by the participants to be effective only half of the time. Another interesting finding is that I3 was the instructor who was perceived to have the most effective cues and gave the least number of cues during his class. This demonstrates that quantity is perhaps not as beneficial as quality.

In general, the least effective types of cues varied from one instructor to another, which suggests that the effectiveness of a cue may not be solely dependent on the type or frequency, but rather its presentation, content, or simply the participants' personal preferences. For example, effort / intensity cues were frequently provided by the instructors but the participants did not find them effective when the instructors gave them options to imagine easy or more difficult paths. Imagery has often been used by athletes to motivate themselves to work hard (Martin et al., 1999), and in this study, the content of effort / intensity cues suggesting that participants not work hard did not appeal to them.

Through discussions during the SRSs, the participants revealed additional important information about the effectiveness of imagery cues in IGC. First and foremost, the participants enjoyed having the opportunity to create their own images with the guidance of the instructors. However, they also mentioned that towards the end of a class when they are fatigued, they are not interested in mentally working hard to create images because their concentration abilities are decreased. This illustrates how cognitive abilities can be less than optimal under strenuous conditions (Weinberg & Gould, 1995). This finding suggests that instructors may want to give basic, simple cues toward the end of a class to help participants complete their workout. However, during the first half of the class, it would be beneficial to give the opportunity to participants to create their own imagery, by keeping the cues vague. In sum, the effectiveness of imagery cues appears to be affected by the timing of their delivery.

Another essential factor that instructors should consider is the purpose of cues. If participants are unaware of the objective or the intent of a cue, they may become confused and ignore it. Also, there must be flow between the cues so that participants can easily sustain the image. For example, if participants are told that they are climbing up a hill, they must know what

the hill looks like (i.e., bumps, plateaus), and how long it will take them to reach the top. This allows them to create concrete and realistic images, which in the end, may be more beneficial

Instructors should not simply provide numerous cues for the sake of doing so; each cue should have a clear objective and be introduced in a progressive fashion at an appropriate time. According to the participants, another strategy to ensure progression is to keep cues structured and simple. The instructors sometimes tried to create an amazing image, however, the cues provided to create this image were complex and confusing. It was found in previous studies that individuals are most likely to use images that are simple and realistic (Munroe et al., 2000; Orlick, 1998).

Furthermore, Orlick (2000) reported that an image can be interpreted differently across a number of individuals. For this reason, instructors should use a variety of cues as well as vary the content of one particular type of cue to be able to reach out to a larger number of participants. Weinberg and colleagues (2003) suggested that having variation in the content of images allows individuals to be prepared for all situations that they may encounter. In IGC, this is useful in that participants would be able to use imagery to cope with any situation occurring during their workout, whether psychological (i.e., lack of focus or motivation) or physiological (i.e., fatigue, pain).

Gammage and colleagues (2000) reported that an exercise imagery intervention must be tailored based on the type and frequency of the activity, as well as the gender of the participants. By adapting imagery programs to the participants' needs and goals, it may be possible to increase their motivation to actively participate in and more importantly, adhere to exercise programs. This was also suggested by the participants in the present study. They shared valuable information regarding their understanding and use of imagery. Thus, it would be to the

instructors' advantage to consider the needs and goals of their class participants to make their workout and use of imagery as effective as possible.

Although research in this area is limited, previous studies have demonstrated that imagery can be used effectively in various exercise settings (Gammage et al., 2000; Hall, 1995; Hall, 2001; Hausenblas et al., 1999). In general, imagery appears to have a positive impact on those engaging in IGC. Results of this study suggest that imagery has more than cognitive and motivational functions. There are 12 types of cues that instructors can use in IGC to maximize the workouts of their participants. Although instructors most likely use cues with which they are most comfortable, they should become proficient at delivering all types of cues if they want the imagery to be beneficial to all class participants.

It is important to acknowledge some limitations of this study. First, the sample could be considered small by some individuals. Although there was a total of 15 class participants and four instructors, the number of class participants per instructor was limited (minimum three and maximize five per instructor). In future studies, one may want to examine more participants per instructor (within one same class) since the imagery provided by instructors varies considerably. Also, a greater number of class participants per instructor would allow for a more in-depth investigation.

A limitation of the SRS is that participants may not have been truthful about their use of imagery and its perceived effectiveness. For example, some may not have wanted to disclose that they rarely use or recognize imagery cues, and thus modified their perceptions accordingly. However, again, this was reduced by the fact that a good rapport was established between the participants and the researcher. The participants were also often reminded that it was acceptable for them not to have used every single cue and found them all to be effective. Another limitation

pertains to the videotaping of the IGC classes. The instructors were aware of our presence in the class, and thus could have modified their teaching style or use of imagery accordingly (i.e., provide more imagery cues than usual). This was minimized, however, by the fact that only the perceptions of class participants were examined.

To our knowledge, there has only been one study conducted on the general use of imagery in IGC prior to this study. Evidently, more research is needed to establish a good knowledge base in this area to fill the gaps in the literature that exist today. In terms of future research, it would be important to examine other factors that could contribute to the effectiveness of imagery, such as the age, gender, fitness and cycling ability level of participants as well as the type of class being conducted (i.e., interval, endurance). A comparison between imagery ability and perceived effectiveness between novice and experienced IGC class participants and instructors would allow for a greater understanding of the use and effectiveness of imagery in IGC. In this study, only the class participants' perceptions were examined, thus it would be interesting to investigate what instructors perceive as effective, using the same SRS method to determine if there are discrepancies between the perceptions of participants and instructors.

Finally, future research should be conducted to evaluate the use and effectiveness of imagery based on different IGC instructor training programs. As such, it would be interesting to compare the use of imagery required for getting certified through different instructor-training programs. In sum, more research on the use and effectiveness of imagery in exercise settings is warranted.

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Results from Questionnaires and Interviews

In this study, the data were collected in three different phases: (a) questionnaire, (b) stimulated recall session (SRS), and (c) interview. The following section focuses on the data gathered from both, the questionnaires and interviews.

Questionnaires

The questionnaire was developed to investigate the class participants' perceptions and general thoughts on the effectiveness of imagery in IGC. It was comprised of both open-ended and closed questions. The following results were obtained from the analysis of the questionnaires.

One of the questions asked the participants why they participate in IGC. In general, almost all of the participants stated that the main reason was to maintain and/or increase their fitness level. Specific results of this question are presented in Table 2.

Table 3

Reasons for Participation in IGC

Code	Age	Gender		Reasons for Participation
		F	M	
I1-P1	61	X		It is the best aerobic exercise
I1-P2	48		X	Maintain cycling fitness/ training; Social benefits
I1-P3	36	X		Meditation and relaxation; Fitness
I1-P4	55	X		Low impact; No injury exercise; High intensity in short time
I1-P5	39	X		Improve cardiovascular strength; Relieve stress; Weight loss
I2-P1	37		X	Good preparation for mountain biking
I2-P2	41	X		Part of fitness program

Table 3 *(Continued)*

Code	Age	Gender		Reasons for Participation
		F	M	
I2-P3	52	X		Fitness; Weight loss
I2-P4	53	X		Enjoy cycling; Maintain fitness level throughout the off-season
I3-P1	70	X		Keep in good condition for outdoors
I3-P2	41		X	Great cardio workout; Improve outdoor cycling skills and strength
I3-P3	25		X	Feel good and in shape
I4-P1	47		X	Focused workout; Cross-training for running
I4-P2	26	X		Curious to try it; Fitness
I4-P3	26	X		Fitness; Good cardio

Note. Code represents the number given to each participant to ensure anonymity. I = Instructor; P = Participant.

The other questions from the questionnaire asked the participants if and why they use imagery in their IGC workout. Interestingly, 93% of the participants expressed that they do use imagery during IGC classes. When asked why they use imagery, various reasons were expressed. The most common ones were: motivation, focusing, and enjoyment. A few of the participants also said that imagery allows them to keep their mind off the pain and minimize the difficulty of the workout. One participant noted that imagery helped him concentrate on using proper cycling techniques.

In sum, results from the questionnaires revealed that imagery is an integral component of IGC. The majority of class participants use imagery to accomplish physical and mental tasks during their workout.

Interviews

The interviews were conducted with each class participant after completing the questionnaire and participating in the SRS. Once again, the purpose of this semi-structured interview was to clarify and/or further expand on information that was previously shared to provide more depth and validity to the study.

The data from the interview transcripts are presented under six categories: (a) Influence of imagery, (b) Preferred types of imagery cues, (c) Use of reminder imagery cues, (d) Role of music with imagery, (e) Use of imagery in other settings, and (f) General use and effectiveness of imagery cues. Citations are provided to further illustrate the results.

Influence of Imagery

All of the participants, except for one, stated that they believe imagery influences their overall IGC experience. They suggested that imagery is an effective tool for many reasons: "It helps in a sense that it gives you more than just the picture of the classroom. It takes you out of the actual room. It gives you goals that you set" (I4-P3); "It makes me feel at peace and even interested. The imagery keeps it interesting for me" (I1-P3); "What I love about it is the fact that I go away. Rarely do thoughts pop into mind about my daily routine when I'm cycling. It's everything. I feel like the stress has been entirely released" (I1-P5); "On a scale of one to ten, in terms of general effectiveness; I would probably rate imagery as a seven or an eight" (I3-P1). In general, many participants believed that incorporating imagery into their IGC workout is effective in that it helps them to remain motivated and maintain intensity, and it makes the class

interesting and enjoyable. One participant explained that since she has now become more comfortable on the bike, the imagery provided by instructors has helped her to develop body awareness and use proper cycling techniques. Another participant said that imagery is a great distraction as it helps her focus on other things rather than fatigue and pain.

The participants were asked if they would enjoy IGC classes if the instructors did not incorporate imagery. Five of the participants would still enjoy IGC classes if there were no imagery cues provided by instructors: "I would find my own cues anyways, based on the technical instructions of the instructor" (I3-P2); "I find IGC classes are too busy. They're not calm in my mind, all the ups and downs. I prefer instructions more than imagery" (I1-P4); and "I would just go by myself and do my own thing" (I2-P2). Conversely, the other 10 participants revealed that they would not enjoy IGC as much if the classes were limited to instructions without the imagery component: "Each of them on their own [workout, imagery, and music] is good, but the combination is very powerful, for me anyways" (I4-P1); "No because I don't think it would be IGC. It would be just like getting on a stationary bike" (I2-P4).

Preferred Types of Imagery Cues

The participants were asked to choose one or two of their preferred types of cues. Note that a percentage is used to represent the results, as some participants stated up to three preferred types. One participant stated: "It depends on the structure and the setting. It depends on the mood, the environment, and the instructor. With some instructors, it could be different" (I1-P2). For the most part, however, 39% of the participants felt that motivational cues were the ones they preferred because it keeps them working hard and helps them to push their limits: "Having set a goal, attaining it, achieving it. I'm from a competitive background in different sports so I

probably associate with those cues more in that it just helps me to push myself that much further" (I4-P3).

On the other hand, 28% of the participants favoured effort / intensity cues. Most participants wished the instructors would use more imagery to help them increase their intensity level. Instead of simply telling them to add more tension on their bike, they would prefer that it be incorporated into an effort / intensity type of cue:

> Instead of saying, "We'll increase the tension," the instructor could have said, "We're going up higher in the hill." That would make me increase the tension. I can't just increase the tension without visualizing it or knowing what I'm doing mentally. (I3-P3)

Body awareness (17%) and skill orientation (11%) were also mentioned as favorites for some of the participants. These individuals felt that it was often easy to disregard internal body sensations and neglect proper posture and body positioning when working hard. Consequently, it is beneficial when instructors ensure that these elements are not forgotten: "[I prefer] the ones [cues] that focus on technique. I can motivate myself, so I don't really need someone else to do it for me" (I2-P4). Essentially, all cues have an important role as not all participants prefer the same type.

Use of Reminder Imagery Cues

An additional question was whether or not participants were able to sustain an image for a long period of time. Ten of the participants reported that they can sustain an image for a certain period of time, however, they believe that reminder cues are always useful. Reminder cues are simple key words or phrases that allow individuals to return to an initial image or to expand on it to remain engaged in the imagery. For example, an initial cue could be to imagine riding in a

race on a hot summer day. As the image of the race progresses, the instructor may add particular elements, such as a change in temperature, passing an opponent, or leading the pack.

Most participants reported liking reminder cues. One participant stated, "It helps that instructors remind you. There are always going to be external cues from the environment and they might take you away from it. So it helps to bring you back" (I4-P3). Another said, "If I'm on a good path, I can sustain that on my own. But reminder cues in terms of increasing intensity through a ride and setting higher goals is good reinforcement. It denotes progress" (I4-P1).

Role of Music with Imagery

All of the participants agreed that music has an impact on not only their workout but also the effectiveness of the imagery. As one participant stated, "It [the imagery] totally depends on the music and if it fits. Then you can really connect (I2-P1). The music can either positively or negatively influence the imagery cues provided by instructors. From a positive perspective, the music can enhance the imagery because of the link participants are able to make between the music and the cue. One individual expressed, "I pick up speed because the music is motivational. Because I like the music, somehow, that just gives me more energy and fits right in with my image" (I1-P3).

Conversely, the opposite is also true. A poor choice of music can decrease the effectiveness of the imagery. One participant said: "If the music is opposite to the imagery, obviously something is going to seem strange" (I3-P1). The participants agreed that the music instructors choose should be directly related to the type of imagery they will use in class. For example, if an instructor asks participants to imagine climbing up a steep hill, the music cannot be too fast and upbeat. In reality, when struggling on a hill, the pace is likely to be slow. One participant explained, "The beat or the tempo has an effect on your rhythm. It has an impact on

my mental images. Like if the music is fast and I'm supposed to be climbing a hill, then something doesn't add up" (I3-P2).

Many participants enjoy listening to the music and creating their own images. If an instructor tries too hard to fill silent moments, it distracts them from their workout. As stated by one participant, "I just want to be in my own zone, with the music. When the instructor starts talking, it takes away from the music and my image" (I1-P5). This same participant explained that watching how the instructor reacts to the music also has an effect on her imagery use:

> Hearing the music in the background and seeing the instructor working hard doesn't fit. It probably wasn't as painful for me because of the music. If the music was going hard, with a harder driving rhythm with this particular image, then I would have liked it. It would have been harder for me. (I1-P5)

Use of Imagery in Other Settings

The participants were also asked if they had ever used imagery in settings other than IGC. Examples of such settings included workplace, school, and other sport or exercise settings (i.e., aqua-fitness, aerobics). Three out of the 15 participants said that they had never used imagery prior to joining IGC classes. However, the rest of the participants revealed using imagery for various reasons in numerous settings: when they read, relax and/or meditate, practice other sports (i.e., dancing, running, soccer), and work.

General Use and Effectiveness of Imagery Cues

Towards the end of the interview, the participants were asked about their general perceptions of the use and effectiveness of imagery. The purpose of this final question was to allow participants to openly discuss any other thought. Surprisingly, most participants said they were unaware of the mental component involved when they first joined IGC classes.

The participants also discussed certain factors about instructors and their way of integrating imagery into the workout. Some participants felt that the instructors did not provide enough imagery cues: "I found the instructor talked too much when it wasn't imagery. Imagery wise, I think she could have added more. There were a few places where additional cues would have been helpful" (I4-P3). Another participant said:

> If the instructor doesn't talk much, then I try to continue to visualize. So I'll see myself somewhere. I'll try to think of other visions that I have.... I wish he would use more imagery. It would be more fun and I would think less. (I3-P2)

On the other hand, some of the participants felt the instructors tried too hard and consequently talked too much: "I felt like I had to be distracted now. I really wanted the instructor to shut up. She was talking just way too much. I just closed my eyes and listened to the music" (I2-P2). One participant described it from both extremes:

> There are some [instructors] who will talk all the time and some of them don't talk at all. And both can be equally ineffective if they are not creating any type of motivation for you, either through the music or themselves. (I4-P1)

Another finding is that imagery does not need to be complex, detailed, and extravagant for it to be effective. The participants expressed that the simpler it is, the easier it is to use. One participant explained how she prefers simple images that are easy to create and that do not require much effort to implement: "It was something really easy to picture. So even if you were tired, you could still see it. And you felt like all that work was worthwhile" (I4-P2). Others revealed that they prefer when instructors keep the cues structured. As a result, it is easier to apply them to their workout. When the instructors guide the desired image, it allows the

participants to continue to focus primarily on their physical movements. If imagery cues are not structured, they may require too much effort to use.

> I think I would have liked a little more guidance than me trying to do it on my own. It's enough that I'm trying to push my body physically. It just takes so much energy to try to do both. (I4-P3)

Some participants mentioned that some cues are inappropriate and have a negative impact on their workout. For example, in one class, the instructor wanted the participants to pretend they were cycling in mud patches. The objective of such a cue is to increase the intensity of the workout because it is much harder to cycle in mud than on a smooth paved path. However, the instructor changed the terrain to have them bike on gravel. As a result, one participant revealed that this was not an image he enjoyed for the simple fact that he became conscious of the dangers of cycling on rocks. From a realistic perspective, riding on such a terrain makes it hard to maneuver the bike and remain in control.

> On gravel, I'm usually very careful and conscious, so it threw me off. I may have lost my concentration. This is a different terrain and I wasn't sure how to look at this. My body was saying, I don't like this part. I let myself be tricked by it. (I1-P2)

Another example is when the instructor described the image of the participants cycling into town. The instructor added that it was rush hour traffic, there were no bike lanes, many cars surrounded them, and you could hear all the honking from a distance. Although this made for an interesting image, some participants felt uneasy and anxious. They did not feel confident and their pace slowed down as they cycled with more caution: "I'm just not confident enough. So it was more stressing than anything else" (I4-P2).

Another important element that the participants mentioned during the interviews as well as in the SRSs was the lack of progression. They often felt that the instructors tried to create the perfect mental picture, however, there was no progression, leaving the participants more confused than interested. In terms of effectiveness, this can definitely have a negative impact on not only the workout but the imagery as well.

> It [the imagery] was off because the instructor hadn't talked in a long period of time. He says we're going up a hill at the beginning and then leaves us hanging. It's like, "Where's the hill?"… You sort of forget about it and you're just cycling again. After a long while, you forget what you're doing. (I3-P3)

In sum, imagery was perceived to play an important role and to be an effective technique in IGC. The participants expressed their preference for specific types of cues, more specifically motivation and effort / intensity cues. They also revealed that they enjoyed it when instructors provided them with reminder cues as this allowed them to sustain an image for a greater length of time. The participants found it more effective when the music, particularly the rhythm and tempo, matched the image encouraged by instructors. Finally, imagery cues were perceived to be best when they were structured, kept simple, and introduced in a progressive fashion throughout the workout. Timing also appeared to be of essence because if the instructors could not synchronize the cues and they talked too much or not enough between them, the imagery of the participants was not as effective.

CHAPTER V

DISCUSSION

The result section included an article focusing on the data collected from the SRSs, and a second section presenting the data gathered from the questionnaires and interviews. Although a brief discussion was included in the article, this chapter will include a discussion of the overall findings of the study. The latter will be linked to previous research on imagery in both sport and exercise settings.

The purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. Although imagery is a component featured in IGC, no research has been conducted on its effectiveness, which led to the design of the current study. In this study, effectiveness referred to whether the imagery cues provided by the instructors were perceived by the class participants as useful in achieving a desired outcome (Weinberg et al., 2003), for example, increased effort, reduced energy level, or proper cycling technique.

To our knowledge, only one study has been conducted on the general use of imagery in this context (Thompson et al., 2003). This study revealed that instructors incorporate imagery into their teaching by providing various types of imagery cues to their class participants.

Although Thompson and colleagues (2003) identified seven categories and three sub-categories of imagery cues, two new types of cues emerged in the current study: breathing and general non-specific. The purpose of breathing cues is mainly to remind participants to breathe deeply to oxygenate their muscles rather than taking short quick breaths. An example of this type of cue could be to "Imagine your lungs expanding as if someone was blowing into them." Another example would be to "Picture the fresh air filtering through your respiratory system."

The cues in the general non-specific category were distinguished because they could be interpreted in different ways. The imagery dimension of these cues was vague and ambiguous. Some examples included: "Allow yourself to daydream," "This is a peak in many ways," and "Your body has got flow; everybody's got flow."

With many types of imagery cues to choose from, IGC instructors use different types of cues while teaching their class. The frequency of imagery cues was examined in this study in attempt to compare it to that found in Thompson et al.'s (2003) study. In accordance with Thompson and colleagues' previous study, results confirmed that there are certain types of cues that are used more frequently than others. In the previous study, the types of cues that were used most often pertained to motivation, effort / intensity, body awareness, and environment. In the present study, however, there were only two types of cues that exceeded the others with regard to their frequency level. These related to environment and effort / intensity. Although body awareness cues were abundant compared to other types, it was mostly due to the fact that one instructor used them considerably more often than the other instructors.

In general, the four instructors used some types of cues frequently, however, differences were also apparent. More specifically, the types of cues that varied in frequency from one instructor to another were skill orientation, breathing, and optimal performance. It would be interesting to further investigate why this occurs. Are the instructors' cues based on the needs of their participants or do instructors simply use cues with which they feel more comfortable? Thompson and colleagues (2003) found that both aforementioned reasons influenced the cues of the two instructors in the study. However, results of the current study indicate that instructors should base their imagery cues according to their participants' workout needs and goals in order for them to be effective.

There are also some types of cues that were seldom used by any of the instructors. Similar to Thompson and colleagues' (2003) previous study, the types of cues used less often by instructors were: efficacy-building, general motivation, mastery feelings, and relaxation / recovery. General non-specific cues identified in the current study were also minimally used. Although the frequency of a few types of cues was similar to that in the previous study, there were surprising differences regarding the motivation category. Motivational cues were either categorized as general motivation or sub-categorized as optimal performance, efficacy-building, or mastery feelings. Findings demonstrated that motivation-based types of cues were not used as often as they were in the previous study, with the exception of the optimal performance cues.

In IGC as in other settings, motivation plays an important role when it comes to exercise adherence (Gammage et al., 2000). In his framework, Paivio (1985) suggested that imagery has an essential motivational function. Many studies have focused on the use of imagery and its impact on increasing motivation and thus increasing participation and enjoyment in exercise (Gammage et al., 2000; Hausenblas et al., 1999). In Thompson et al.'s (2003) study, efficacy-building was the most frequently used type of motivation cue. In the present study, however, only four efficacy-building cues were given, twice by two separate instructors. It is difficult to provide an explanation for this as the instructors' perceptions were not examined in the current study.

Nevertheless, results from previous studies have demonstrated that self-efficacy is directly linked to motivation and exercise adherence and can be improved through the use of imagery (Feltz & Weiss, 1982; Hall, 1995; Rodgers & Gauvin, 1998). Based on the literature, it can be assumed that if instructors provide appropriate motivational types of cues and participants use these accordingly, there is a greater chance that the participants will feel good about

themselves and enjoy the activity, which in turn, may increase their motivation to maintain exercising in IGC or other exercise settings. Consequently, it would be important for instructors to emphasize motivational cues, including efficacy-building cues, to enhance motivation and enjoyment.

This study also examined not only the types and frequency of cues provided by instructors, but also the effectiveness of these different types of cues. Some studies have shown how athletes tend to use different types of imagery in sport based on what they find effective (Weinberg et al., 2003). As expected, the participants in the current study used different types of cues based on what they deemed most effective for their workout. The type of cue that was deemed most effective by the participants 83% of the time pertained to optimal performance. Note that optimal performance cues were not frequently provided by the instructors, but had they known that the participants enjoyed these types of cues, they could have given them more often. Two other types of cues that were deemed effective by participants, 76% of the time, related to body awareness and breathing. These latter types of cues were not consistently provided by all four instructors.

On the other hand, the types of cues that were perceived as least effective by the participants pertained to general motivation and mastery feelings, which were seldom provided by instructors. This raises important questions in light of the literature on motivation. Did the participants perceive motivational types of cues as least effective because they were not provided frequently enough by the instructors? Or, was it because the content of the cues or the time at which they were given in the workout were not appropriate? Results of this study suggest that more attention needs to be paid to the delivery and content of the cues. For example, body awareness cues were the type most frequently used by I1, however, these were perceived by the

participants to be effective only half of the time. Another interesting finding is that I3 was the instructor who was perceived to have the most effective cues and gave the least number of cues during his class. This demonstrates that quantity is perhaps not as beneficial as quality.

In general, the least effective types of cues varied from one instructor to another, which suggests that the effectiveness of a cue may not be solely dependent on the type or frequency, but rather its presentation, content, or simply the participants' personal preferences. For example, effort / intensity cues were frequently provided by the instructors but the participants did not find them effective when the instructors gave them options to imagine easy or more difficult paths. Imagery has often been used by athletes to motivate themselves to work hard (Martin et al., 1999; Rushall & Lippman, 1998), and in this study, the content of effort / intensity cues suggesting that participants not work hard did not appeal to them.

The participants revealed additional important information about the effectiveness of imagery cues in IGC. In this exercise context, the imagery is guided by the instructors and rarely, if ever, are participants encouraged to initiate their own imagery. So how do instructors know what types of cues to incorporate into their teaching? It was important to examine the preferences of the participants.

From the participants' perspective, environment and body awareness cues were the most favoured and appreciated. These types of cues were, in general, frequently provided by the instructors, yet they were not always perceived to be effective. The participants liked imagery cues that enabled them to embark on scenic adventures. Weinberg and Gould (1995) reported that by creating vivid images, individuals can experience actual events in their mind but to do so, close attention must be paid to the environment. In IGC, instructors can add various details to imagery cues, like incorporate all senses (Orlick, 1998), in order to help participants create or

recreate appropriate contexts or environments. The participants also associated with cues that helped them control body sensations, such as body temperature and muscle stretches.

Other favorites were skill orientation, effort / intensity, and optimal performance cues. The participants typically enjoyed cues that required them to push themselves to their limits and allowed them to achieve success. Rushall and Lippman (1998) reported that imagery is often used in sport settings to achieve optimal levels of intensity and set goals for attaining success. Results of this study suggest that imagery can be used in exercise settings for similar purposes.

The participants also discussed important factors regarding the use of imagery in their workout. First and foremost, the participants enjoyed having the opportunity to create their own images with the guidance of the instructors. However, they also mentioned that towards the end of a class when they are fatigued, they are not interested in mentally working hard to create images because their concentration abilities are decreased. This illustrates how cognitive abilities can be less than optimal under strenuous conditions (Weinberg & Gould, 1995). This finding suggests that instructors may want to give basic, simple cues toward the end of a class to help participants complete their workout. However, during the first half of the class, it would be beneficial to give the opportunity to participants to create their own imagery, by keeping the cues vague. In sum, the effectiveness of imagery cues appears to be affected by the timing of their delivery.

Another essential factor that instructors should consider is the purpose of cues. If participants are unaware of the objective or the intent of a cue, they may become confused and ignore it. Instructors should also ensure that a progression exists between cues. In other words, there must be flow between the cues so that participants can easily sustain the image. For example, if participants are told that they are climbing up a hill, they must know what the hill

looks like (i.e., bumps, plateaus), and how long it will take them to reach the top. This allows them to create concrete and realistic images, which in the end, may be more beneficial.

Instructors should not simply provide numerous cues for the sake of doing so; each cue should have a clear objective and be introduced in a progressive fashion at an appropriate time. According to the participants, another strategy to ensure progression is to keep cues structured and simple. The instructors sometimes tried to create an amazing image, however, the cues provided to create this image were complex and confusing. It was found in previous studies that individuals are most likely to use images that are simple and realistic (Munroe et al., 2000; Murphy & Jowdy, 1992; Orlick, 1998).

Furthermore, Orlick (2000) reported that an image can be interpreted differently across a number of individuals. For this reason, instructors should use a variety of cues as well as vary the content of one particular type of cue to be able to reach out to a larger number of participants. Weinberg and colleagues (2003) suggested that having variation in the content of images allows individuals to be prepared for all situations that they may encounter. In IGC, this is useful in that participants would be able to use imagery to cope with any situation occurring during their workout, whether psychological (i.e., lack of focus or motivation) or physiological (i.e., fatigue, pain).

Orlick (2000) also suggested that imagery is a skill that can be refined through practice. It is therefore important that instructors consider the imagery abilities of their participants and remember that the more complex a cue is, the greater the chance the participants will not use it. By keeping the cues simple and using familiar images and experiences, the participants may be more inclined to use them effectively and actually improve their imagery skills. Individuals who

are comfortable using imagery can allow themselves to be more creative with their images on their own or by using the initial cues provided by instructors.

Finally, it has been demonstrated that music can be a popular motivational tool within exercise settings (Weinberg & Gould, 1995). The participants in the current study expressed that music does indeed play an important role in the effectiveness of imagery and their workout. If the image suggested is one involving descending a hill at a high speed, then the music should be of high tempo. Alternatively, if the image is one of pedaling through mud, which is a difficult task, then the music should not be fast and uplifting because it contradicts the desired image. Ultimately, instructors need to ensure that the music matches the images they want participants to create.

In sum, although research in this area is limited, previous studies have demonstrated that imagery can be used effectively in various exercise settings (Gammage et al., 2000; Hall, 1995; Hall, 2001; Hausenblas et al., 1999). Imagery can have a positive impact on one's exercise experience by enhancing participation and enjoyment (Hausenblas et al., 1999), improving motivation and confidence (Hall, 1995), correcting skills (Hall & Rodgers, 1989), and helping to set and reach personal goals (Hall, 1995). Similar results were found in the current study. In general, imagery appears to have a positive impact on those engaging in IGC. The imagery encouraged by instructors in this setting appears to increase the enjoyment and motivation of class participants. As Hall and Rodgers found, it also helps participants to correct skills and attain performance goals.

Imagery was perceived by instructors (Thompson et al., 2003) and participants in the current study to be an effective component of IGC, in which various types of cues are used to elicit various images for different purposes. Hall and colleagues (1998) as well as White and

Hardy (1998) reported that there are more types of imagery that can be used by athletes than those initially proposed by Paivio (1985). Results of this study suggest that imagery has more than cognitive and motivational functions. There are 12 types of cues that instructors can use in IGC to maximize the workouts of their participants. Although instructors most likely use cues with which they are most comfortable, they should become proficient at delivering all types of cues if they want the imagery to be beneficial to all class participants.

Gammage and colleagues (2000) reported that an exercise imagery intervention must be tailored based on the type and frequency of the activity, as well as the gender of the participants. By adapting imagery programs to the participants' needs and goals, it may be possible to increase their motivation to actively participate in and more importantly, adhere to exercise programs. This was also suggested by the participants in the present study. They shared valuable information regarding their understanding and use of imagery. Thus, it would be to the instructors' advantage to consider the needs and goals of their class participants to make their workout and use of imagery as effective as possible.

Limitations

It is important to acknowledge some limitations of this study. First, the sample could be considered small by some individuals. Although there was a total of 15 class participants and four instructors, the number of class participants per instructor was limited (minimum three and maximize five per instructor). In future studies, one may want to examine more participants per instructor since the imagery provided by instructors varies considerably. Also, a greater number of class participants per instructor would allow for a more in-depth investigation.

The use of questionnaires is another limitation as it is possible that the participants did not respond truthfully. One way of reducing this potential bias was by administering the

questionnaires in person, answering the participants' questions, and establishing a good rapport with them. In addition, responses were limited to the participants' written answers. However, this was compensated for by having the participants engage in the SRS and a subsequent interview.

Similar to the previous limitation of the questionnaire, a limitation of the SRS is that participants may not have been truthful about their use of imagery and its perceived effectiveness. For example, some may not have wanted to disclose that they rarely use or recognize imagery cues, and thus modified their perceptions accordingly. However, again, this was reduced by the fact that a good rapport was established between the participants and the researcher. The participants were also often reminded that it was acceptable for them not to have used every single cue and found them all to be effective. To further reduce this effect, a semi-structured interview was conducted to clarify and elaborate any confusing or misunderstood information gathered from the questionnaire and SRS.

Another limitation pertains to the videotaping of the IGC classes. The instructors were aware of our presence in the class, and thus could have modified their teaching style or use of imagery accordingly. This was minimized, however, by the fact that only the perceptions of class participants were examined.

Practical Applications

IGC appears to have become a popular trend in fitness centers. However, because there has been limited research conducted on the use of imagery in IGC, the literature on which to base its instructor training programs is practically non-existent. Many IGC programs exist and each of these programs has their own certification requirements.

The findings of the current study will allow instructors and administrators to become aware of the perceptions of participants regarding the effectiveness of imagery in IGC classes.

As a result, administrators in charge of instructor training programs can have a better understanding of the use and effectiveness of imagery and directly apply relevant information to the context of IGC. They can also incorporate it in their curriculum. This could allow individual certified IGC instructors to acquire more information on imagery and the possible benefits it may have on their participants. It could also enable instructors to improve their teaching style with regard to the way they provide imagery cues to their class participants. Finally, the findings of this study can be applied to other exercise settings in which imagery is an integral component.

Recommendations for Future Research

To our knowledge, there has only been one study conducted on the general use of imagery in IGC prior to this study. Evidently, more research is needed to establish a good knowledge base in this area to fill the gaps in the literature that exist today.

In terms of future research, it would be important to examine other factors that could contribute to the effectiveness of imagery, such as the age, gender, fitness and cycling ability level of participants as well as the type of class being conducted (i.e., interval, endurance). In addition, it would be pertinent to investigate whether the imagery skill of either the participants or the instructors play a role in the use of imagery and its effectiveness. A comparison between imagery ability and perceived effectiveness between novice and experienced IGC class participants and instructors would allow for a greater understanding of the use and effectiveness of imagery in IGC. In the same manner, research has demonstrated that imagery use is distinguishable between frequent and less frequent exercisers (Hall, 1995; Hausenblas et al., 1999), therefore it would be interesting to determine if this also applies to IGC class participants.

In this study, only the class participants' perceptions were examined, thus it would be interesting to investigate what instructors perceive as effective, using the same SRS method to determine if there are discrepancies between the perceptions of participants and instructors.

It is recommended that more research be conducted in this specific context using similar methodologies that were used in the current study because the combination of the three methods was effective. These methodologies could also be used for studying imagery use during other types of exercise, rather than just before of after. Finally, future research should be conducted to evaluate the use and effectiveness of imagery based on different IGC instructor training programs. As such, it would be interesting to compare the use of imagery required for getting certified through different instructor-training programs (i.e., Reebok, Schwinn, Keiser). In sum, more research on the use and effectiveness of imagery in exercise settings is warranted.

CHAPTER VI

CONCLUSION

In summary, this study provided empirical information on the effectiveness of imagery in IGC. As previously mentioned, the purpose of this study was to examine the effectiveness of imagery cues provided by IGC instructors, as perceived by class participants. Two new types of imagery cues emerged in addition to the ones already identified by Thompson and colleagues (2003). In all, there are nine types of cues that instructors used and these relate to: (a) effort / intensity, (b) general motivation, (c) environment, (d) body awareness, (e) skill orientation, (f) association / dissociation, (g) relaxation / recovery, (h) breathing, and (i) general non-specific. Additional sub-categories of cues within the motivational category pertain to: mastery feelings, optimal performance, and efficacy-building.

The types of cues that were most frequently used by instructors pertained to environmental and effort / intensity cues. Conversely, the types of cues that instructors did not use often were efficacy-building, general non-specific, general motivation, mastery feelings, and relaxation / recovery cues.

Although various types of cues were frequently provided by the instructors, they were not always deemed effective by class participants. The type of cue that was perceived as effective most often related to optimal performance, however, it was not one frequently used by instructors. Other types of cues that the participants found to be effective were body awareness and breathing cues. On the other hand, two types of cues that the instructors did not often provide and were perceived as ineffective by class participants were mastery feelings and general motivation cues.

Overall, however, imagery was perceived as an effective strategy by class participants for many reasons. The participants used the imagery cues provided to them to (a) increase their motivation, (b) maintain their focus, (c) push themselves to their personal limits, and (d) concentrate on proper cycling techniques. However, it appears that the manner in which cues are presented (i.e., variety, simplicity, progression, and synchronicity with music) influences the effectiveness of imagery more so than the type of cue itself.

Evidently, more research on the use of imagery in various exercise settings, including that of IGC, is needed in order to expand the knowledge base in this area and maximize its use in various practical settings.

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APPENDIX A

Certificate of Ethical Approval

Université d'Ottawa · University of Ottawa

Cabinet du vice-recteur à la recherche
Office of the Vice-Rector, Research

HEALTH SCIENCES AND SCIENCE RESEARCH ETHICS BOARD

CERTIFICATE OF ETHICAL APPROVAL

This is to certify that the University of Ottawa Health Sciences and Science Research Ethics Board has examined the application for ethical approval for the research project **The Effectiveness of Imagery in Indoor Group Cycling (File H04-02-01)** submitted by Kimberley Anne Thompson and supervised by Pierre Trudel and Natalie Durand-Bush. The Board found that this research project met appropriate ethical standards as outlined in the Tri-Council Policy Statement and in the Procedures of the University of Ottawa Research Ethics Boards, and accordingly gave it a Category 1a (approval). This certification is valid for one year from the date indicated below.

October 7, 2002
Date

Catherine Paquet
Protocol Officer for Ethics in Research,
For the Chairperson of the Health Sciences and Science REB
Daniel Lagarec

APPENDICES B & C

Questionnaires

PARTICIPANT QUESTIONNAIRE

1. Experience

Age: _____ Gender: _____

Number of years or months you have been involved in indoor group cycling (IGC)?

Months: _____ or Years: _____

How many IGC classes do you attend per week? _____

Why do you participate in IGC classes? _____

_____

_____

2. What components do you think are involved in IGC? (Please circle only one)

a) Physical b) Mental c) Physical & Mental

3. Do you use imagery during your workouts?

a) Yes b) No

If so, why do you do this? _____

_____

_____

If so, how do you do this? _____

_____

_____

QUESTIONNAIRE POUR LES PARTICIPANTS

1. Expérience générale

Age: _____ Sexe: _____

Le nombre d'années d'expérience dans l'IGC?

Mois: _____ ou Années: _____

Combine de classes d'IGC est-ce que vous pratiquez par semaine? _____

Pourquoi pratiquez-vous du IGC? _____

_____

_____

2. D'après vous, quelles dimensions font parties de la pratique d'IGC? (SVP encerclez seulement une réponse)

a) Physique b) Psychologique c) Physique & psychologique

3. Utilisez-vous de l'imagerie pendant tes entraînements d'IGC?

a) Oui b) Non

Si oui, pourquoi l'utilisez-vous?_____

_____

_____

Si oui, comment l'incorporez-vous?_____

_____

_____

APPENDICES D & E

Interview Guides

INTERVIEW GUIDE

Questions:

1. Does imagery influence your overall exercise experience? If so, how?
2. Do you think you would enjoy IGC if instructors did not incorporate imagery into the workout? Why?
3. Which type of imagery cues (choose one or two) do you prefer? And why?
4. Are you able to sustain an image for a long period of time?
    a. Do reminder cues help you sustain an image for a longer period of time? If so, how?
    b. If there are too many, do you block them off?
5. Do you think the music plays a role in your use of imagery?
    a. Does it have an impact on the effectiveness of your imagery? If so, how?
6. Do you think that the instructor used good imagery cues throughout today's IGC session?
7. Have you ever used imagery for any other purpose than in IGC? If so, for what?
8. Do you have anything else to add with regard to the use and effectiveness in imagery in IGC?

GUIDE D'ENTREVUE

Questions:

1. De façon générale, croyez-vous que l'imagerie influence vos séances d'exercice (IGC)? Si oui, comment?
2. Pensez-vous que vous aimeriez cet exercice (IGC) si les instructeurs n'utilisaient pas d'imagerie? Pourquoi?
3. Quels types d'imagerie préférez-vous et pourquoi?
4. Pouvez-vous maintenir une même image pour une longue période de temps?
    a. Est-ce que cela vous aide à maintenir une image lorsque les instructeurs vous donnent des «cues» de rappel? Si oui, comment?
    b. S'il y en a trop, est-ce que vous les ignorez?
5. Pensez-vous que la musique joue un rôle dans votre imagerie?
    a. Pensez-vous qu'elle affecte l'efficacité de votre imagerie? Si oui, comment?
6. Croyez-vous que l'instructeur a utilisé des bons «cues» d'imagerie aujourd'hui?
7. Avez-vous déjà utilisé l'imagerie dans un contexte autre que l'IGC? Si oui, lequel?
8. Avez-vous autres choses à partager par rapport à l'utilisation et/ou l'efficacité de l'imagerie dans l'IGC?

APPENDICES F & G

Letters of Information (Instructors)

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

INSTRUCTOR LETTER OF INFORMATION

Dear Indoor Group Cycling Instructors,

We are conducting a master's research project in order to examine the effectiveness of imagery in indoor group cycling (IGC) classes. The types of imagery cues used by instructors and their effects on the overall IGC experience have been previously investigated (Thompson, Durand-Bush, & O'Sullivan, 2002). However, it is important to determine whether or not the imagery being provided is effective for class participants.

In order to gather the required data, we would like to conduct stimulated recall sessions (SRS) with class participants. To do so, we require a videotape of the instructor s teaching their class. Thus, we would need to attend the instructor's IGC class, videotape them, and then meet with one or two of the class participants. This information will enable us to meet our research objectives.

In accordance with the Faculty of Health Sciences ethical procedures, all of the information gathered will remain confidential. The data will be stored in locked files in my supervisor's office at the University of Ottawa. It is only my supervisor and I that will have access to them and they will be conserved for five years. The participants will be identified by a number so that their name does not appear anywhere and their anonymity is fully ensured. The final report will be written in such a way as to conceal the identity of all participants.

Should you wish to participate, you will be asked to sign a consent form. We will then proceed to videotaping one of your 50-minute IGC classes. There is no risk, harm, or discomfort involved in the process.

Imagery has been shown to improve wellness and performance in various settings, including that of sports. IGC is a relatively new popular type of aerobic exercise that is supposed to promote the use of imagery, yet no research has been conducted to examine the effectiveness of imagery use during IGC classes. This study will provide empirical data in an area of research that is practically non-existent. Although the participants will have little direct benefit, except the summary report that will be available to them after the completion of the project, the findings of this study will be significant in that they could help instructors and class participants to enhance the quality of their workouts and overall performance. The findings could also be useful to administrators and educators in charge of developing training programs for instructors who aspire to teach IGC classes.

Your participation in this study is voluntary, but your responses would be extremely helpful and greatly appreciated. Please note that all documents are available in French and may be provided upon request. You could help us reach a better understanding of the use of mental imagery during IGC.

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

LETTRE D'INFORMATION POUR LES INSTRUCTEURS

Chers Instructeurs,

Nous sommes en train de poursuivre un projet de recherche au niveau de la maîtrise dans le but d'examiner l'efficacité de l'imagerie dans les sessions de «Indoor Group Cycling» (IGC). Les différents types d'imagerie utilisés par les instructeurs ainsi que leurs effets sur l'expérience générale ont déjà été examinés dans une étude antérieure (Thompson, Durand-Bush, & O'Sullivan, 2002). Cependant, il est maintenant important de déterminer si l'imagerie a un effet sur l'entraînement des participant(e)s d'une session.

Afin de pouvoir recueillir les informations nécessaires, nous voulons mener des sessions de rappel stimulé (SRS) avec les participant(e)s d'une session. Pour ce faire, nous devons enregistrer sur vidéocassette les instructeurs lorsqu'ils ou elles enseignent leur session de IGC. Ainsi, nous devons assister à une de leurs sessions, les enregistrer, et par la suite, rencontrer une ou deux personnes qui ont participé activement à la session. L'information acquise durant ces rencontres nous permettra d'atteindre nos objectifs de recherche.

Selon les procédures d'éthique de la Faculté des sciences de la santé, toute information obtenue demeurera strictement confidentielle. Les données recueillies seront sauvegardées dans des filières à clés dans le bureau de mon superviseur à l'Université d'Ottawa. De plus, ce n'est que les deux chercheurs-mêmes qui auront accès à ces documents, et ceci pour une période de cinq ans. Les participants seront identifiés par un numéro, de façon à ce que leurs noms n'apparaissent à aucun moment pour assurer l'anonymat. Le rapport final sera écrit de telle sorte que l'identité de tout(e)s les participant(e)s soit protégée.

Si vous désirez participer à cette étude, vous aurez à signer un formulaire de consentement. Par la suite, nous procéderons à enregistrer sur vidéo-cassette une de vos sessions de IGC, qui dure environ 50 minutes. Il n'y a aucun risque possible, d'inconfort émotionnel, physique, ou autres impliqués dans cette étude.

L'imagerie est reconnu comme un outil efficace qui améliore le bien être personnel et la performance et ceci dans une variété de situations, y inclus le sport et l'exercice. L'IGC est un nouveau type d'exercice aérobique qui encourage l'utilisation de l'imagerie. Néanmoins, aucune recherche a été effectuée pour déterminer son efficacité pendant les sessions d'IGC. Notre étude nous permettra d'obtenir des données empiriques dans un domaine de recherche qui est pratiquement non-existant. Même s'il n'y a aucun bénéfice direct pour les participant(e)s, à part du rapport final qui leur sera disponible lorsque le projet de recherche sera complété, les résultats seront importants à aider les instructeurs et participant(e)s à améliorer la qualité de leur

entraînement et leur rendement en général. De plus, les résultats obtenus pourront être utiles aux administrateurs et éducateurs responsables de développer les programmes d'entraînement pour les instructeurs qui désirent enseigner des sessions d'IGC.

Votre participation dans cette étude est volontaire et vos réponses seraient bien appréciées. Vous pouvez nous aider à mieux comprendre l'utilisation de l'imagerie dans les sessions d'IGC.

APPENDICES H & I

Consent Forms (Instructors)

Université d'Ottawa • University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

INSTRUCTOR CONSENT FORM

After being informed of the goal of the research project on the "Effectiveness of imagery in indoor group cycling (IGC)", directed by Kim Thompson and Natalie Durand-Bush,

I consent to participate in this research project and I can withdraw from the study at any time without prejudice. I am aware that all documents are available in French, upon my request.

I know that for the purpose of this study, one of my IGC classes will be videotaped. The session will last for the duration of the 50-minute IGC class held at a designated facility agreed upon by both the researcher and myself. Furthermore, I am aware and give my consent to the researchers to use my videotaped class as a mean for them to conduct the stimulated recall session with class participants that attended my class.

I understand that there are no risks and no direct benefit to me from participating in this study, however, I can get a summary report after the completion of the study. Also, I understand that the results will be kept strictly confidential and that my name will not appear in any publications. The data will be stored in locked files in my supervisor's office at the University of Ottawa. It is only my supervisor and I that will have access to them and they will be conserved for five years.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Science Research Ethics Board of the University of Ottawa, or by contacting Catherine Paquet, Protocol Officer for Ethics in Research, at

There are two copies of the consent form, one of which I may keep.

Signature of the participant: _____

Signature of the researcher: _____

Date: _____

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

FORMULAIRE DE CONSENTEMENT POUR INSTRUCTEURS

J'ai été clairement informé(e) de l'objectif du projet de recherche sur "L'efficacité de l'imagerie dans le IGC", mené par Kim Thompson et Natalie Durand-Bush.

J'accepte volontairement de participer à cette étude. Je suis libre de me retirer d'étude en tout temps, avant ou pendant une entrevue, refuser d'y participer, ou refuser de répondre à certaines questions.

Je reconnais que ma participation implique un enregistrement sur vidéo-cassette d'une des sessions ICG que j'enseignerai à un groupe de participant(e)s. Cet enregistrement aura une durée approximative de 50 minutes. Le moment et l'endroit de l'enregistrement seront déterminés de concert entre le(s) chercheur(s) et moi-même. De plus, je consens à l'utilisation de cet enregistrement pour les sessions de rappel stimulé ultérieures qui auront lieu avec les participant(e)s de la session.

Je comprends qu'il n'y a aucun risque et aucun bénéfice direct pour ma participation à cette étude. Par contre, je comprends que je peux recevoir une copie du rapport final de l'étude une fois la recherche terminée. Je comprends aussi que l'information que je partagerai avec le(s) chercheur(s) demeure strictement confidentielle et que mon nom apparaîtra dans aucun document de publication. Les données recueillies seront sauvegardées dans des filières à clés dans le bureau de mon superviseur à l'Université d'Ottawa. De plus, ce n'est que les deux chercheurs-mêmes qui auront accès à ces documents, et ceci pour une période de cinq ans.

Pour tout renseignement sur mes droits comme participant à cette étude, je peux m'adresser à Catherine Paquet, responsable de la déontologie en recherche ou à

Il y a deux copies du formulaire de consentement, dont une que je peux garder.

Signature du chercheur: _____

Signature du sujet de recherche: _____

APPENDICES J & K

Letters of Information (Participants)

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

CLASS PARTICIPANT LETTER OF INFORMATION

Dear Indoor Group Cycling Participants,

We are conducting a master's research project in order to examine the effectiveness of imagery in indoor group cycling (IGC) classes. The types of imagery cues used by instructors and their effects on the overall IGC experience have been previously investigated (Thompson, Durand-Bush, & O'Sullivan, 2002). However, it is important to determine whether or not the imagery being provided is effective for class participants.

In order to gather the required data, we would like to conduct stimulated recall sessions (SRS) with class participants. To do so, we will videotape instructors while they are teaching their 50-minute IGC class. Following this, a SRS will be conducted with class participants. Stimulated recall is a technique that allows individuals to relive original experiences with vividness and accuracy, by presenting many cues or stimulus of the original situation (Bloom, 1953; Calderhead, 1981). Questions will be asked throughout the SRS in order for us to assess the effectiveness of the imagery cues provided during the IGC class. This information will enable us to meet our research objectives. The SRS will be audio-recorded for verbatim transcriptions and further data analysis purposes. The SRS will last between approximately 90 minutes and three hours.

In accordance with the Faculty of Health Sciences ethical procedures, all of the information gathered will remain confidential. The data will be stored in locked files in my supervisor's office at the University of Ottawa. It is only my supervisor and I that will have access to them and they will be conserved for five years. The participants will be identified by a number so that their name does not appear anywhere and their anonymity is fully ensured. The final report will be written in such a way as to conceal the identity of all participants.

Should you wish to participate, you will be asked to sign a consent form. It is at this point that you will fill out a questionnaire, which will allow us to obtain demographical information and your general perceptions on the use of imagery. You will then participate in a SRS. There is no risk, harm, or discomfort involved in the process.

Imagery has been shown to improve wellness and performance in various settings, including that of sports. IGC is a relatively new popular type of aerobic exercise that is supposed to promote the use of imagery, yet no research has been conducted to examine the effectiveness of imagery use during IGC classes. This study will provide empirical data in an area of research that is practically non-existent. Although the participants will have little direct benefit, except the summary report that will be available to them after the completion of the project, the findings of

this study will be significant in that they could help instructors and class participants to enhance the quality of their workouts and overall performance. The findings could also be useful to administrators and educators in charge of developing training programs for instructors who aspire to teach IGC classes.

Your participation in this study is voluntary, but your responses would be extremely helpful and greatly appreciated. Please note that all documents are available in French and may be provided upon request. You could help us reach a better understanding of the use of mental imagery during IGC.

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

LETTRE D'INFORMATION POUR LES PARTICIPANTS

Chers Participants,

Nous sommes en train de poursuivre un projet de recherche au niveau de la maîtrise dans le but d'examiner l'efficacité de l'imagerie dans les sessions de «Indoor Group Cycling» (IGC). Les différents types d'imagerie utilisés par les instructeurs ainsi que leurs effets sur l'expérience générale ont déjà été examinés dans une étude antérieure (Thompson, Durand-Bush, & O'Sullivan, 2002). Cependant, il est maintenant important de déterminer si l'imagerie a un effet sur l'entraînement des participant(e)s d'une session.

Pour atteindre le but de l'étude et recueillir les informations nécessaires, nous voulons mener des sessions de rappel stimulé (SRS) avec les participant(e)s de classe. Pour le faire, les instructeurs seront enregistré(e)s sur vidéo-cassette pendant une session d'ICG de 50 minutes. Il est entendu que la caméra sera positionnée pour enregistrer l'instructeur et aucun(e) participant(e). Par la suite, une SRS se déroulera individuellement avec les participant(e)s. La SRS est un technique qui permet aux individus de revivre des expériences avec précision et vigueur, en leur présentant plusieurs stimuli venant de la situation originale (Bloom, 1953; Calderhead, 1981). Pendant la SRS, nous allons visionner l'enregistrement et le participant(e) aura à répondre à des questions au sujet de mes perceptions sur l'efficacité de l'utilisation de l'imagerie pendant la classe enregistrée. Un court questionnaire devra être complété au début de la session. Je comprends que la SRS sera enregistrée sur audio-cassette pour fin de transcriptions et analyse de données. La SRS durera approximativement deux à trois heures.

Selon les procédures d'éthique de la Faculté des sciences de la santé, toute information obtenue demeurera strictement confidentielle. Les données recueillies seront sauvegardées dans des filières à clés dans le bureau de mon superviseur à l'Université d'Ottawa. De plus, ce n'est que les deux chercheurs-mêmes qui auront accès à ces documents, et ceci pour une période de cinq ans. Les participants seront identifiés par un numéro, de façon à ce que leurs noms n'apparaissent à aucun moment pour assurer l'anonymat. Le rapport final sera écrit de telle sorte que l'identité de tout(e)s les participant(e)s soit protégée.

Si vous désirez participer à cette étude, vous aurez à signer un formulaire de consentement. Par la suite, nous procéderons à enregistrer sur vidéo-cassette une de vos sessions de IGC, qui dure environ 50 minutes. Il n'y a aucun risque possible, d'inconfort émotionnel, physique, ou autres impliqués dans cette étude.

L'imagerie est reconnu comme un outil efficace qui améliore le bien être personnel et la performance et ceci dans une variété de situations, y inclus le sport et l'exercice. L'IGC est un nouveau type d'exercice aérobique qui encourage l'utilisation de l'imagerie. Néanmoins, aucune recherche a été effectuée pour déterminer son efficacité pendant les sessions d'IGC. Notre étude nous permettra d'obtenir des données empiriques dans un domaine de recherche qui est pratiquement non-existant. Même s'il n'y a aucun bénéfice direct pour les participant(e)s, à part du rapport final qui leur sera disponible lorsque le projet de recherche sera complété, les résultats seront importants à aider les instructeurs et participant(e)s à améliorer la qualité de leur entraînement et leur rendement en général. De plus, les résultats obtenus pourront être utiles aux administrateurs et éducateurs responsables de développer les programmes d'entraînement pour les instructeurs qui désirent enseigner des sessions d'IGC.

Votre participation dans cette étude est volontaire et vos réponses seraient bien appréciées. Vous pouvez nous aider à mieux comprendre l'utilisation de l'imagerie dans les sessions d'IGC.

APPENDICES L & M

Consent Forms (Class Participants)

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

CLASS PARTICIPANT CONSENT FORM

After being informed of the goal of the research project on the "Effectiveness of imagery in indoor group cycling (IGC)", directed by Kim Thompson and Natalie Durand-Bush,

I consent to participate in this research project and I can withdraw from the study at any time without prejudice. I am aware that all documents are available in French, upon my request.

I know that for the purpose of this study, the instructor of my IGC class will be videotaped. However, I will not appear on the videotape. A time will be scheduled with the researcher in order for me to participate in a stimulated recall session (SRS), which will be held at the same facility where I attended the class. The stimulated recall session will consist of watching the IGC class on videotape with the researcher. Prior to the start of the SRS, I will fill out a short questionnaire. Throughout the SRS, I will answer questions in regards to my perceptions of effectiveness of the imagery cues. The SRS will be audio-recorded for verbatim transcriptions and further data analysis purposes. The SRS will last between approximately two and three hours.

I understand that there are no risks and no direct benefit to me from participating in this study, however, I can get a summary report after the completion of the study. Also, I understand that the results will be kept strictly confidential and that my name will not appear in any publications. The data will be stored in locked files in my supervisor's office at the University of Ottawa. It is only my supervisor and I that will have access to them and they will be conserved for five years.

If some of my responses are appropriate to illustrate the data collected in this study, I give my consent to the researchers to use them under the condition that they will safeguard confidentiality and anonymity.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Science Research Ethics Board of the University of Ottawa, or by contacting Catherine Paquet, Protocol Officer for Ethics in Research.

There are two copies of the consent form, one of which I may keep.

Signature of the participant: _____

Signature of the researcher: _____

Université d'Ottawa • University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

FORMULAIRE DE CONSENTEMENT POUR PARTICIPANTS

J'ai été clairement informé(e) de l'objectif du projet de recherche sur "L'efficacité de l'imagerie dans le IGC", mené par Kim Thompson et Natalie Durand-Bush.

J'accepte volontairement de participer à cette étude. Je suis libre de me retirer d'étude en tout temps, avant ou pendant une entrevue, refuser d'y participer, ou refuser de répondre à certaines questions.

Je reconnais que, pour atteindre le but de l'étude, mon instructeur sera enregistré(e) sur vidéo-cassette pendant une session d'ICG de 50 minutes. Il est entendu que la caméra sera positionnée pour enregistrer l'instructeur et aucun(e) participant(e). À la suite, je reconnais que je serai invité(e) à un moment propice par le(s) chercheur(s) à participer à une session de rappel stimulé (SRS) au même endroit où a lieu la session d'IGC. À ce moment, j'aurai à compléter un questionnaire au début de la session, à visionner l'enregistrement avec le(s) chercheur(s), et à répondre à des questions au sujet de mes perceptions sur l'efficacité de l'utilisation de l'imagerie pendant la classe enregistrée. Je comprends que la SRS sera enregistrée sur audio-cassette pour fin de transcriptions et analyse de données. La SRS durera approximativement deux à trois heures.

Je comprends qu'il n'y a aucun risque et aucun bénéfice direct pour ma participation à cette étude. Par contre, je comprends que je peux recevoir une copie du rapport final de l'étude une fois la recherche terminée. Je comprends aussi que l'information que je partagerai avec le(s) chercheur(s) demeure strictement confidentielle et que mon nom apparaîtra dans aucun document de publication. Les données recueillies seront sauvegardées dans des filières à clés dans le bureau de mon superviseur à l'Université d'Ottawa. De plus, ce n'est que les deux chercheurs-mêmes qui auront accès à ces documents, et ceci pour une période de cinq ans.

Si certaines de mes réponses peuvent illustrer les données de l'étude ou servir d'appui aux résultats de l'étude, j'accepte que le(s) chercheurs s'en servent, en autant que la confidentialité et l'anonymat soient de rigueur.

Pour tout renseignement sur mes droits comme participant à cette étude, je peux m'adresser à Catherine Paquet, responsable de la déontologie en recherche,

Il y a deux copies du formulaire de consentement, dont une que je peux garder.

Signature du chercheur: _____

Signature du sujet de recherche: _____ Date: _____