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The Use of Imagery in Climbing

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ABSTRACT

As the popularity of climbing has grown, so has the interest in researching the psychological aspects of climbers. However, it is only recently that research has examined the use of imagery in climbing (see for example Barton, 1996; Hardy & Callow, 1999; Jones, Mace, Bray, MacRae & Stockbridge, 2002). The purpose of this study was twofold: first to examine the extent to which beginner and advanced climbers used the five functions of imagery (Cognitive Specific, Cognitive General, Motivational Specific, Motivational General-Arousal and Motivational General-Mastery), and second to examine if and how climbers' use of imagery differed from track and field athletes. The Sport Imagery Questionnaire (SIQ; Hall, Mack, Paivio, & Hausenblas, 1998) and the Climbing Imagery Questionnaire (CIQ; modified from Hall et al., 1998), was used to measure how often varsity track and field athletes (n = 38) and climbers (n = 48), used imagery. A Multivariate Analysis of Variance (MANOVA) showed that track and field athletes used the motivational components (MS, MG-A and MG-M) of imagery significantly more than climbers. Advanced and beginner climbers displayed no significant differences in their imagery use patterns. The results of this study give us a greater understanding of how climbers use imagery and increase the body of research of the types of imagery used across various athletic situations.

Introduction

The popularity of risk or adventure sports has increased markedly in the past ten years (McMenamin, 2000). The interest in these sports or activities is presently so great that there are television stations devoted exclusively to broadcasting these sports, as well as several national and international competitions for extreme athletes (e.g., The X-Games and Gravity Games). Ewert (1985) defined risk or adventure sports "as those leisure activities exposing the participant to real or perceived physical danger usually in an outdoor natural setting" (p.241). One of the most popular of these risk sports is climbing (Creasey, Shepherd, Banks, Gresham, & Wood, 1999). This popularity has prompted a number of research studies examining the psychological

and social aspects of climbers (see for example Ewert, 1985; Freischlag & Freischlag, 1993; Maynard, MacDonald, & Warwick, 1997). However, it is only recently that research has examined the use of imagery in climbing (see for example Barton, 1996; Hardy & Callow, 1999; Jones et al., 2002).

Imagery is defined as "using all the senses to recreate or create an experience in the mind." (Vealey & Walter, 1993, p.201). Imagery has been used by athletes in a wide variety of sports and sport settings (Butler, 1996; Hall, Rodgers, & Barr, 1990; Munroe, Giacobbi, Hall, & Weinberg, 2000). For example, Orlick and Partington (1988) found that 99% of Canadian Olympic athletes reported using imagery prior to the 1984 Olympics, and found imagery to be highly effective in facilitating athletic performances. Furthermore, coaches have also reported that imagery was a valuable mental skills technique. Hall and Rodgers (1989) found that experienced skating coaches viewed imagery as a very useful technique and used it often with their skaters. Moreover, imagery is not only beneficial in sport, exercisers have also reported using imagery to enhance appearance, technique and energy (Hausenblas, Hall, Rodgers & Munroe, 1999; Gammage, Hall, & Rodgers, 2000). Most of the recent imagery research has stemmed from Paivio's (1985) analytical framework. He proposed that imagery serves either a cognitive or motivational function and operates at either a specific or general level.

Cognitive specific imagery can be used in the execution and correction of specific skills (Paivio, 1985), and has been shown to improve many sport skills from a golf putt (Orliaguet & Coello, 1998) to a free throw in basketball (Wrisberg & Anshel, 1989). Cognitive specific imagery, in combination with physical practice, has been found to be very effective in producing peak athletic performances (Hall, 2001).

Cognitive general (CG) imagery can be used for strategy development and execution (Munroe et al., 2000). For example, Ille and Cadopi (1999) found that young gymnasts who used CG imagery were able to increase their memory span of gymnastics performances, thus executing their performances more accurately. Cognitive general imagery was also useful in helping both novice and advanced dancers learn and remember complex dance routines (Poon & Rodgers, 2000). Finally, Hall and colleagues (1998) found CG imagery to be a significant predictor of the athletic performance of female varsity track and field athletes.

Paivio (1985) found imagery to have a motivational function as well. He divided the motivational aspect of imagery into two components that function at either a specific or general level. More recent research by Hall et al. (1998) found that the motivational general function of imagery should be divided into two components, motivational general-mastery (MG-M) and motivational general-arousal (MG-A) imagery. Motivational general-mastery imagery refers to being mentally tough, confident and in control (Hall et al., 1998). For example, a soccer player may image himself working successfully through a tough situation, such as a sore ankle, or imagine himself remaining in control when the referee makes a poor call. Research has found that the MG-M function of imagery was the best source to increase an athlete's self-confidence (Feltz & Riessinger, 1990; Munroe et al., 2000). Motivational general-mastery imagery can also be effective in increasing an athlete's sense of self-efficacy (Feltz & Riessinger, 1990) and state of flow (Munroe et al., 2000). Jackson (1996) conducted an in-depth investigation examining elite level athletes' perceptions of flow. Although many of her findings seemed to support

Csikszentmihalyi's nine flow characteristics, one miscellaneous theme that emerged could be construed as imagery. Several of the elite athletes alluded to "feeling out of body" or as if "watching oneself", which are both characteristic of imagery. This finding would suggest that there is a relationship between imagery and achieving a flow state. More recent studies have extended this line of research. It was found that a hypnosis intervention, preceded by relaxation and imagery, could improve three-point basketball shooting performance (Pates, Cummings, & Maynard, 2002) and golf chipping performance (Pates & Maynard, 2000) and increase feelings of cognitions that are associated with flow.

Motivational general-arousal (MG-A) imagery has been used by athletes in various sports to control anxiety and arousal in preparation for an event or competition (Munroe et. al., 2000; White & Hardy, 1998; Wrisberg & Anshel, 1989). Motivational general-arousal imagery can also be used to help athletes "psych-up" for an event or competition (White & Hardy, 1998).

Motivational specific (MS) imagery has been used for outcome goal-orientated responses (e.g., winning a championship). Paivio (1985) found that athletes who used MS imagery were better able to maintain goal related activities (i.e., training); even when actual rewards or incentives were not present. For example, Martin and Hall (1995) found that beginner golfers who used MS imagery adhered better to their training programs in comparison with a group of golfers who did not use imagery.

Research has found that imagery use varies from activity to activity (Hall, 2001). In a comprehensive examination of 10 varsity team athletes' imagery use, Munroe and colleagues (1999) found imagery use differs considerably from sport to sport. Gender however, does not seem to be a factor affecting imagery use. In most studies (Munroe et al., 1998; Salmon, Hall, & Haslam, 1994), gender differences in imagery use are so minimal that this variable has often been omitted from any further analysis.

It is not only the athletic situation, which can affect an individual's imagery use. Individual differences, such as experience, must also be accounted for when examining an athlete's use of imagery (Hall, 1985). More experienced athletes have better quality imagery sessions and therefore have been found to improve their sport performance faster (Butler, 1996; Vealey & Walter, 1993). In addition it has been found that more experienced athletes use imagery more often (Hall et al., 1998). Novice athletes still benefit from imagery sessions but may be constrained due to a lack of experience either in using imagery or with the sport itself (Hall, 2001). For example, Salmon et al. (1994) found that even though both novice and elite soccer players benefited from imagery use, elite soccer players reported using more imagery, regardless of function, than novice soccer players. Therefore, there seems to be a positive linear relationship between the experience level of the athlete and the frequency of imagery use.

Researchers have recently examined the differences between the imagery use by athletes in team and individual sports. Hall et al. (1998) found that ice hockey players used the MS and MG-M functions of imagery more often than athletes in the individual sports of track and field. However, Munroe et al. (1998) found that the issue of individual versus team sports was further complicated by whether or not the sport was open or closed in nature. Therefore no conclusive results could be determined on the different imagery use patterns of individual and team sport

athletes.

As the popularity of climbing has increased, so has interest in researching the psychological and social aspects of individuals who participate in the sport and the related disciplines of mountaineering and ice climbing. Magni, Rupolo, Simini, De Leo and Rampazzo (1985) found climbers to have a weak super ego and to be more detached then the general population. Thus it was hypothesized that climbers were better able to cope with leaving family and friends for long periods of time, therefore, they did not suffer symptoms of withdrawal and loneliness to the same extent as the general population. It has also been found that climbers are less trait anxious (acquired behavioral disposition) and have a lower stress level then the general population (Freischlag & Freischlag, 1993; Magni et al., 1985; Robinson, 1985). The reversal theory (Kerr, 1985) could be one explanation as to why climbers exhibit lower anxiety levels. The concept of psychological reversal stems from the individual's shift in interpreting one's feelings from pleasant to unpleasant or vice versa. Rock climbers, who are more paratelic dominant, may initially have heightened anxiety, however when the skill is mastered this anxiety may reverse and become excitement. This low level of anxiety, or shift in anxiety, could allow climbers to cope better with the sometimes psychologically demanding situations that are associated with the disciplines of climbing, such as placing appropriate protection or making decisions regarding the safety of other climbers. The ability to come up with effective coping strategies could be further facilitated by the fact that climbers have been found to be highly imaginative and creative people (Mitchell, 1982).

Climbing can also have many positive psychological effects on the individual climber. Freischlag and Freischlag (1993) found that individuals who participated in climbing often reported a sense of flow and positive mood changes (e.g., reduced anxiety) while they were climbing. Motl, Berger and Leuschen (2000) recently conducted a study with rock climbers in which enjoyment of the activity was found to mediate the exercise-mood relationship. This finding suggests that rock climbing is associated with acute mood alterations, specifically decreased tension and depression and increased vigor. Mitchell (1982) also found that the risk involved in climbing provided individuals with a sense of fulfillment and exhilaration. However upon further investigation, it was found that this sense of fulfillment and exhilaration was most applicable to experienced climbers who were intrinsically motivated to participate. Less experienced climbers tended to be extrinsically motivated, climbing for such reasons as recognition and social activity (Ewert, 1985; McIntyre, 1992; Robinson, 1985).

Although many studies have examined the psychological characteristics and effects of climbing, fewer studies have examined how imagery use can affect climbing performance. Barton (1996) examined the use of an imagery script by beginner climbers. One group of volunteer college students who had never climbed before received ten minutes of imagery training per day, over a period of ten days, in addition to the regular physical practice of climbing skills. The control group, who were also beginner climbers, was limited to physical practice of climbing skills over the same time period. It was found that the beginner climbers who received the ten-day imagery program in addition to regular physical practice did not perform any better than the control group. Jones and colleagues (2002) conducted a similar study in which novice climbers' levels of perceived stress, self-efficacy and climbing performance were assessed. Climbers who were randomly assigned to the motivational imagery intervention group reported significantly

lower levels of perceived stress and higher levels of self-efficacy in their ability to execute the climb than the control group. No differences were found between the groups in overall climbing performance.

Although these studies provide some preliminary findings into the relationship between imagery and rock climbing performance, they provide little information in terms of the frequency of imagery functions. This becomes increasingly problematic when attempting to develop imagery interventions. The frequency with which athletes are imaging and the context of their images become ever so important. As suggested by Martin, Moritz and Hall (1999), it is imperative to match the imagery function with the desired outcome. Therefore, if a climber wants to map out a route in his head, the appropriate function would be cognitive general imagery not motivational general-arousal imagery.

Hardy and Callow (1999) took different perspective than the aforementioned studies and examined the kinesthetic and visual imagery used by expert climbers from both an internal and an external perspective. The climbers were divided into four groups. Each group completed a series of bouldering ("a form of rock climbing in which climbers attempt to link together a sequence of extremely difficult moves quite close to the ground" Hardy & Callow, 1999, p.105) problems using the combinations of internal or external visual imagery with or without the use of kinesthetic imagery. It was found that the use of external visual imagery combined with kinesthetic imagery was most effective for climbers. This supported earlier research that external imagery can be highly beneficial for tasks such as climbing, where form is important (White & Hardy, 1995).

The studies conducted by Barton (1996), Jones et al. (2002) and Hardy and Callow (1999) offer some preliminary insight into the use of imagery in the sport of climbing. However, no research has investigated the frequency of climbers' imagery use. Hall suggested that future research needed to examine the effectiveness of the five functions of imagery in different sport settings (2001) and a better understanding must be had of how imagery varies with the type of sport (1998). In addition, there have been no imagery studies comparing climbers of different skill and experience levels. Barton (1996) recognized this as a limitation in his study and suggested that the frequency and type of imagery use by climbers across a wide span of skill levels should be measured. Therefore the purpose of the present study was to examine the degree to which both beginner and advanced climbers reported using the five functions of imagery as well as to examine how climbers and track and field athletes differ in their imagery use. In order to accomplish this effectively, within-group comparisons were made between beginner and advanced climbers use of imagery, and climber's imagery use as a whole was compared to that of varsity track and field athletes.

Track athletes were chosen as a comparison group for several reasons. Firstly, it could be argued that track and field athletes exhibit similar characteristics to climbers. Cox, Liu, and Qui, (1996) and Hall et al. (1998) found that track and field is classified as an individual sport. However, when varsity track and field athletes participate in competitions they must accumulate points towards a team score. Therefore during competitions, track and field athletes must rely on each other in order to obtain a team win and can thus in some respects be classified as a team. Similarly, when someone is completing a climb, he is doing it on an individual basis. However,

climbers must rely on their partner to belay them and "catch" them safely in the event of a fall. Therefore climbing, like track and field, can exhibit many of the characteristics of both a team and individual sports. Secondly, male and female track and field athletes were readily available at the study's locale thus making it a sample of convenience.

Two general hypotheses were made regarding imagery use by climbers. The first general hypothesis was that climbers would differ from track and field athletes in their use of the five functions of imagery based on an earlier findings by Hall et al.'s (1998) in which varsity track and field athletes made consistent use of all the five functions of imagery. From this, specific predictions were then made regarding three of the imagery subscales. In order to complete a climb successfully, climbers will look at the climbing wall to find the most preferable climbing route. This is referred to as 'route finding'. One could assume that climbers may therefore use imagery (specifically CG imagery; having to do with game plans and strategies) to help with 'route finding'. Hence, it was hypothesized that the frequency in which climbers use cognitive general imagery will be higher than that of track and field athletes. It was also hypothesized that climbers will use motivational general-arousal imagery extensively, in order to control feelings of anxiety (specifically state anxiety which is transitory and fluctuate over time) and fear. Finally, it was hypothesized that because there are very few materialistic (i.e., medals and trophies) associated with climbing, climbers will rate very low in the use of motivational specific imagery, which focuses specifically on outcome goals and extrinsic motivation, when compared to track and field athletes.

The second general hypothesis was that beginner and advanced climbers would differ in their use of the five functions of imagery. This stems from previous imagery research in which more elite athletes have been found to use imagery more frequently than less elite athletes (Hall, 1985; Hall et al., 1998). More specifically, beginner climbers would make greater use of MG-A imagery because they are new to the sport and they might be more susceptible to feelings of anxiety and the fear associated with the height of the climbs. It was also predicted that advanced climbers would use CG imagery more often than the beginner climbers because they are more experienced in the sport and climb more difficult routes.

Method

Participants

A total of 86 athletes were involved in the study. Subjects in the track and field group (n = 38) were randomly selected from one varsity level track and field team. There were 25 male and 13 female participants in the track and field group with a mean age of 21.39 years (SD = 2.15). In the climbing group (n = 48), there were 28 male and 20 female participants who were randomly selected to participate, from one climbing gym in Toronto and one in Windsor. The mean age for the climbing group was 24.19 years (SD = 4.18). Within the climbing group, 18 were classified as beginners while 30 were classified as advanced climbers, while the mean years experience was 3.8.

Questionnaire

In order to effectively measure the participants' uses of imagery, the Sport Imagery Questionnaire (SIQ, Hall et al., 1998) and a modified version of the SIQ, the Climbing Imagery Questionnaire (CIQ) were employed. The SIQ is a thirty-item questionnaire designed to measure the frequency of imagery use on the five imagery subscales (cognitive specific, cognitive general, motivational specific, motivational general-mastery and motivational general-arousal). A seven point Likert scale is used to assess how often an athlete engages in the five functions of imagery, with one equaling rarely engaging in a certain type of imagery use and seven equaling very often engaging in a certain type of imagery use. Research has shown that the SIQ has acceptable internal consistency estimates for the subscales with alphas coefficients ranging from .70-.88 (Hall et al., 1998). Because some of the questions on the SIQ are not applicable for climbers, the CIQ (modified from Hall et al., 1998 for the present study) was designed to be specific to climbing situations. In order to achieve this, certain action words such as competing were replaced with the word climb/climbing. For example, one question on the SIQ was changed to read; "I imagine the excitement associated with climbing", instead of, "I imagine the excitement associated with competing." In addition, examples on the SIQ were modified to reflect climbing specific situations. A total of 48 questionnaires were given to rock climbers. All were returned giving a response rate of 100%. A total of 42 questionnaires were distributed to track and field athletes. Thirty-eight were returned giving a response rate of 91%.

Procedure

Subjects in the track and field group completed the SIQ, as a group, just prior to an outdoor practice session. Subjects in the climbing group completed the CIQ independently either during rest periods between climbs or after they had finished their climbing session. Both groups also completed demographic questions. Questionnaires took approximately fifteen minutes to complete. In order to categorize climbers into beginner or advanced, the subjects were asked to indicate the hardest climb they had successfully completed either on top rope or on lead. Top roping refers to climbing when the rope is anchored above you, while leading refers to climbing with the rope and "clipping as you go". Leading is a more difficult form of climbing. Subjects were informed that a climb that they had red pointed (i.e., a climb they had completed but fell during the process) could count as their hardest climb. Climbs were rated on a scale from 5.0 to 5.15. A 5.0 climb is equivalent to climbing a ladder while a 5.15 represents the hardest rock climb attempted in the world. This climbing scale is the most common rating system for rock climbs in North America (Creasey et al., 1999). Climbers who reported their hardest climb as a 5.9 or below on the rating scale were classified as beginners. Whereas climbers rating their hardest climb being above 5.9, were classified as advanced. Subjects in the climbing group also recorded where they climbed, either indoors, outdoors or both, as well as whether or not they perceived climbing to be an individual or team sport.

Results

Preliminary Analyses

A Multivariate Analysis of Variance (MANOVA) showed no significant difference found

between the males and females for the SIQ and CIQ subscales. Therefore, sex was not considered a factor in any of the subsequent analyses.

Thirty-three percent of climbers responded that they primarily climb in an indoor environment, 6% responded that they climb primarily outdoors and 61% answered that they climb both indoors and outdoors. A total of 24 climbers (50%) responded that they perceived climbing to be an individual sport while twenty climbers (42%) answered that climbing was a team sport. Eight percent answered that climbing was both a team and individual sport.

Analysis revealed acceptable internal reliabilities for the CIQ subscales, with Alpha coefficients ranging from .79 to .88. Analysis of the SIQ subscales revealed acceptable Alpha values between .64 to .85 except for the MG-A subscale, which had an Alpha value of .54. This is inconsistent with previous research done by Hall et al. (1998), who reported an Alpha value of .70 for the MG-A subscale on SIQ's completed by track and field athletes and hockey players.

Primary Analyses

In order to test the general hypothesis of this study, significant differences for mean SIQ and CIQ subscales had to be determined between track and field athletes and climbers as a whole. In order to do this, a Multivariate Analysis of Variance (MANOVA) was conducted for climbers and track and field athletes on the CIQ and SIQ subscales. A significant effect was found between climbers and track and field athletes on the MS subscale, F (1, 84)= 29.39, p= .00, with track and field athletes having a higher mean score (M = 4.53, SD= 1.39) than climbers (M = 2.95, SD = 1.31). Significant effects were also found between climbers and track and field athletes on the MG-M subscale, F (1, 84)= 14.59, p= .00. Climbers had a significantly lower mean score (M = 4.63, SD = 1.18) than track and field athletes (M = 5.54, SD = .96). Finally significant differences were found between groups on the MG-A subscale, F (1,84) = 6.74, p = .011. Again track and field athletes had a higher mean score (M = 4.86, SD = .90) than climbers (M = 4.26, SD = 1.18). The descriptive statistics indicated that both climbers and track and field athletes use MGM most frequently (M = 4.63 and 5.54, respectively) and MS least (M = 2.95 and 4.53, respectively). See Table 1 for full results.

Table 1. Mean Scores for Participants on the CIQ & SIQ Subscales					
Group	Climbers (CIQ)		Track & Field Athletes (SIQ)		
Subscale	*M*	*SD*	*M*	*SD*	*F* (1,84)
CS	4.54	1.28	4.69	1.09	.30
CG	4.68	1.23	4.77	.89	.15
MS	2.95	1.31	4.53	1.39	29.39*
MGM	4.63	1.18	5.54	.96	14.59*
MGA	4.26	1.18	4.86	.90	6.74*
* Difference significant at $p < .05$					

A Multivariate Analysis of Variance (MANOVA) was then conducted using level of climbing (beginner climber and advanced climber) as the independent variables and the CIQ subscale scores as the dependent variables. No significant differences were found between beginner and advanced climbers on the five imagery subscales. See Table 2 for means and standard deviations. During analyses, skewness was calculated for each item and all items were found to be distributed within the tolerance levels for assumption of normality.

Table 2. Mean Scores for Beginner Climbers & Advanced Climbers on the CIQ Subscales								
Group		Beginner Climbers			Advanced Climbers			
Subscale		*M*	*SD*		*M*	*SD*		*F* (1,46)
CS		4.26	1.34		4.71	1.24		.99
CG		4.31	1.38		4.90	1.10		.30
MS		3.22	1.36		2.79	1.27		.45
MGM		4.47	1.31		4.73	1.12		.81
MGA		4.03	1.24		4.40	1.15		.56

Discussion

The purpose of this study was to examine the imagery use by beginner and advanced climbers and compare their imagery use as a group to that of track and field athletes. The first hypothesis stated that climbers and track and field athletes would differ in their use of the five functions of imagery. Specific predictions were then made regarding three of the five functions of imagery, MS, MG-A and CG imagery. Upon analyses of the data, it was revealed that there were significant differences between climbers and track and field athletes on three of the five subscales, motivational specific (MS), motivational general-arousal (MG-A) and motivational general-mastery (MG-M), therefore partially supporting our first hypothesis.

Both beginner and advanced climbers were found to use MS imagery significantly less than track and field athletes; in fact the MS imagery subscale represented the biggest discrepancy between imagery use by climbers and track and field athletes. One reason for climbers scoring low on the MS imagery subscale may be that climbers report participating for reasons that are intrinsically motivated, such as exhilaration and the challenge of the climb (Ewert 1985; McIntyre, 1992; Robinson, 1985). Therefore, the sense of accomplishment comes from completing the climb and not the external rewards associated with the completion of the climb. Another reason could be that climbers may not find it useful to image goals such as a winning a competition or being congratulated on a win (MS imagery) because these images are less realistic. There are very few competitions available for climbers to participate in, when compared

to track and field athletes.

On the MG-M imagery subscale, it was found that track and field athletes used significantly more MG-M imagery than climbers. Hall et al. (1998) found that track and field athletes made extensive use of the MG-M function of imagery (M = 5.32). In addition, Martin and Gill (1991) found that track and field athletes reported high levels of sport confidence and self-efficacy. Moritz, Hall, Martin, and Vadocz (1996) reported that high sport-confident athletes used more MG-M imagery than low sport confidence athletes. Therefore the high mean score (M = 5.54) of track and field athletes in this study is not surprising. However it is surprising that climbers scored relatively low on the MG-M subscale because previous researchers have found climbers to have a high self-confidence level (Mitchell, 1982; Robinson, 1985). One explanation could be the varied experience levels of the climbers. Previous sport imagery research (cf., Hall, 2001) found that more experienced athletes use all functions of imagery more than less experienced athletes. Although some climbers were advanced while other beginners, all varsity track athletes could were considered advanced. Therefore, the differing use of MG-M imagery may not be a function of the sport but rather of function of experience. This is an area that would benefit from further investigation.

After analysis of the MG-A subscale, it was found that there was a significant difference between climbers' and track and field athletes' use of imagery, with the latter using MG-A imagery more often than climbers. This result was contrary to the hypothesis, which predicted that climbers would use MG-A imagery more often. One reason for this could have been that varsity track and field athletes often participate in competitions where a lot of emphasis is attributed to the outcome of the competition (e.g., winning, accumulating points for the team). Moreover, the nature of the SIQ asks the participants about images pertaining to events/competitions. It could be that the track and field athletes used their most recent inter-squad competition (in which athletes are attempting to make team standards) as a frame of reference to answer the questions. Lewthwaite (1990) found that when there was high-perceived importance placed on the outcome of an event, the state anxiety levels of competitors increased. Therefore, the varsity track and field athletes might have experienced feelings of increased state anxiety during competition and employed measures, such as MG-A imagery, to control anxiety levels. In contrast, because there are very few external rewards associated with climbing, participants may display lower anxiety levels. Another consideration was that it has been found that climbers have lower trait anxiety than the general population (Magni et al., 1985; Robinson, 1985). Hence, climbers may not be as susceptible to fluctuations in state anxiety prior to a climb and therefore would not have to employ tactics such as MG-M imagery in order to control their anxiety levels.

It was predicted that climbers would use CG imagery more often than track and field athletes, however, this hypothesis was not supported. One possible reason could be that the climbers participating in the study were climbing indoors when they completed the survey. Climbs on an indoor wall tend to be well-marked and easy to follow. In contrast, outdoor climbs require more "route finding" and planning. Therefore, climbers may be more inclined to use CG imagery in an outdoor setting. A second explanation could be that beginner climbers might not recognize the importance of planning their route in order to successfully complete a climb, and therefore not employ CG imagery.

There were no significant differences found between beginner and advanced climbers on the five imagery subscales. It was predicted that beginner climbers would use MG-A imagery more often, in order to control the potential anxiety associated with the fear of falling. However, both beginner and advanced climbers reported using MG-A imagery to approximately the same extent. It could be that advanced climbers climb routes that are higher and more difficult, therefore their perceived danger of the climb is greater and anxiety levels may thus increase. Another explanation could be that because advanced climbers often lead climb, they increase the chance that they will take a substantial fall thus increasing their risk of injury. This could also increase their anxiety levels and the need to use MG-A imagery.

Beginner and advanced climbers also reported using CG imagery to approximately the same degree. It was predicted that advanced climbers would use CG imagery more often, however this hypothesis was not supported. Advanced climbers are participating indoors and they might not have to plan their routes to the same degree as if they were climbing outside. Therefore the use of CG imagery is not required.

One limitation of the present study was the small sample size used. There were 48 participants in the climbing group and 38 participants in the track and field group. This could have been a factor when the climbing group was divided into beginner and advanced level, thus making sample sizes relatively small compared to other studies that have examined imagery use by athletes. Future studies should consider using a larger sample size. Another consideration was the fact that the Alpha value on the MG-A subscale of the SIQ, for track and field athletes was outside of acceptable limits. Due to this results for the MG-A subscale must be interpreted with some caution. A final limitation was that track and field athletes were not asked to classify their sport as individual or team, whereas climbers were asked. Having track and field athletes classify their sport would have allowed for greater consistency across groups.

As the interest in climbing and other adventure sports increases, more and more individuals will be seeking to participate in these sports. Theses individuals will most likely desire an enjoyable experience and a sense of accomplishment in their endeavors. Imagery can be a useful psychological skill in order to facilitate these goals for the participants. The present study found that climbers did make use of all five functions of imagery but used the motivational function of imagery significantly less than track and field athletes. Future studies need to examine why climbers scored lower on the motivational subscales of the CIQ and what measure can be undertaken to increase climber’s use of the motivational component of imagery. For example, having climbers use MG-A imagery so they can focus on the climb and not their fear of falling. In addition, the examination of imagery use by participants in the various disciplines of climbing, such as mountaineering and ice climbing should be examined. Benefits from this type of research include the design of better coping strategies for climbers experiencing stressful situations, such as extended periods of isolation and physical exertion. Finally, the imagery use by athletes in other risk sports should be examined to distinguish various imagery use patterns. With a more substantial body of research available, we may gain a greater understanding of athlete's imagery use across various athletic situations, which is crucial in broadening our understanding of imagery use.

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