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The dynamics of motivation during competition

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Abstract

Previous studies on achievement motivation have not yet come to any clear consensus on how motivation can affect an athlete while performing. Based on achievement goal theory, this study aimed to show how changes in motivation can affect sports performance in a maladaptive way. In the study three experienced top-level Norwegian orienteers wore head-mounted cameras during a real high-pressure competition. After the competition the participants' cognitions were collected by a specially developed method which also identified the situations where the changes in motivation happened. Before the competition, goal-orientation scores were measured with Perception of Success Questionnaire (Roberts, Treasure, & Balague, 1998), also the general self-beliefs was defined. These new findings provide a much deeper insight into the phenomena of changes in motivation during competition. It was suggested that changes in motivation from task-involvement to ego-involvement occur because the context of the performance in some situations attracts an ego-involvement and creates a fixed-point attractor. Change in motivation also showed negative, positive and no consequences for performance, which both lead to support and criticism for the achievement goal theory. Furthermore no clear link was found between goal-orientation scores, general self-beliefs and goal-involvement. During the period of ego-involvement the athletes gave rational and irrational self-evaluations which were mainly based on subjective factors. These findings indicate that athletes have less control of their performance when they are in a state of goal-involvement. To deal with this adaptively a recommendation that athletes need to build ability to deal with periods of ego-involvement is advisable.

Key words: Achievement goal theory, goal-involvement, orienteering.

Content

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1. Introduction

For some decades now, motivation has been a hot topic in the sport domain (Roberts, 2012). From the literature, it is very clear that there are a lot of different theories "on the market": deterministic, mechanistic, organismic and cognitive (Roberts, 2012). With so many approaches it is clear that science has still not come to a consensus on motivation. Whether scientists are confused, misunderstand each other, or are heading the wrong way are all relevant questions. This study does not aim to answer these questions, but nonetheless wishes the reader to understand that science has no clear understanding of or a general definition for motivation, so although this study will narrow down to one basic theory, a critical approach to the general situation is advisable.

Operating in sports, one often hears high-level athletes excuse their poor performance with expressions like "I lost my motivation halfway", "I did not feel motivated enough" or "I did not have the right motivation". Evidently motivation is a problematic issue. Athletes seem to have problems handling their motivation during competition and it may have an effect on the result. Yet research on motivation offers only a vague explanation of how motivation develops during competition and how it might affect performance (Harwood, Spray, & Keegan, 2008; Roberts, 2012). This study aims to address this lack of knowledge and make suggestions for how to fill the gap between science and practice. With a clearer understanding of motivation during competition, it might be possible to help sport participants and their supporters (coaches, parents, etc.) to deal with the possible motivational challenges they meet in competition situations.

This study examines the changes in motivation that an orienteering athlete experiences throughout a competition: how it develops, fluctuates or stabilises over the course of a competition and how it affects performance both adaptively and maladaptively. As mentioned above there are a lot of theories concerning motivation. The achievement goal theory (hereafter AGT), based on the work of John Nicholls in particular (1984, 1989), has been chosen as the theoretical platform for this study. This is because it is a solid and well-documented theory (Roberts, 2012). The practical design of this study, however, should be of interest regardless of the chosen theoretical framework.

The sport studied here, orienteering, is not a well-known sport worldwide. Athletes have to navigate in unknown terrain the fastest way from A to B, using only a map and a compass. On the way from A to B a number of checkpoints (called controls) have to be located in a certain order. Orienteering is a combination sport, which refers to the need to be able to master different important tasks at the same time. The need to be able to run fast but still think clearly and make good decisions is crucial in orienteering (Eccles, Walsh, & Ingledew, 2002). Consequently orienteering holds a high demands for cognitive processes (Macquet, Eccles, & Barraux, 2011).

1.1 Hypothesis

How do changes in motivation appear during an orienteering competition and do they lead to time loss or reduced performance?

2. Theory

As stated above, AGT is the chosen theoretical approach for this study. In this chapter AGT and its possible consequence on behaviour is presented in order to theorise and shed light on the current literature on changes in motivation during competition. AGT has been applied in sport psychology since Glyn Roberts and Joan Duda among others introduced it at the end of the seventies (Harwood et al., 2008). Since then, the theory has been the basis of a lot of interesting studies and now it is one of the most studied cognitive theories in the field of achievement motivation (Roberts, 2012). It is fair to say that the theory has solid support in the field and is embedded in the science of sport psychology (Roberts, 2012). AGT is a social cognitive theory, which means that it builds on the basis that humans are an active part in a dynamical conception, making decisions and planning achievement (Roberts, 2012).

2.1 AGT

AGT first saw the light of day thanks to researchers such as John Nicholls, who studied infant development in terms of differentiating ability from effort, task difficulty and luck (Harwood et al., 2008; Roberts, 2012). Nicholls defined motivation as follows: in a situation in which it is possible to show competence, a person will strive to demonstrate competence or avoid demonstrating incompetence (Nicholls, 1984, 1989). To succeed in the defined situation, a person will create rational achievement motives. Nicholls found that a person's concept of ability plays a leading role when they create achievement goals. He outlined two different concepts of ability, one that is differentiated from effort, task difficulty and luck, and another that is undifferentiated (Nicholls, 1984, 1989). The two different concepts of ability lead to different constructions of achievement goals for involvement in a task, described as the central division in AGT. A person will therefore define success or failure on the basis of their cognitive beliefs about the concept of ability in the achievement situation. In other words, the reason people give for their effort makes the distinction between the two concepts (Nicholls, 1984, 1989). When Nicholls constructed AGT he built it on the nature of interactions between different antecedents which form goal-involvement (Harwood et al., 2008). Most studies on AGT tend to start by describing a predisposition for certain goal-orientations, but with both the origin of the AGT and the

salience of goal-involvement in this study in mind, this study will start by defining goal-involvement.

Nicholls named the undifferentiated concept of ability task-involvement. It is characterised by the intention to develop mastery, improvement or learning (Nicholls, 1989). With no differentiation between ability and effort, effort becomes the only moderator for competence, so the reason people give for success is built on the belief that the effort was high. On the other hand, if failure is experienced, the effort was not perceived as good enough or the task was experienced as too difficult. For that reason a focus on putting effort into the task at hand is the salient focus of a person who is task-involved. Consequently task-involvement becomes an intrinsic strategy, because a person perceives him/herself as the only one in control of the level of effort put into the task (Nicholls, 1984, 1989). The task-involved person, apart from showing high effort, also become more likely to persist, select challenging tasks and be interested in the task. A moderately difficult task will be preferred, because it will produce the greatest challenge. AGT describes this as an adaptive strategy, because of the presence of high effort and the choices of tasks (Roberts, 2012).

Nicholls named the differentiated concept of ability ego-involvement. It is characterised by the intention to demonstrate superior ability to others or to show the same ability with less effort (Nicholls, 1989). Ability is perceived as a fixed capacity, and as the limitation of what effort alone can accomplish (Nicholls, 1989). With this concept the differentiated approach becomes a challenging equation, because with a fixed mindset regarding capacity it is possible to demonstrate both competence and incompetence with both low effort and high effort. For example, if one puts high effort into a task, one would only feel competent if one demonstrated superior ability, because a demonstration of lower or the same ability would mean incompetence. This phenomenon will also occur with low effort, with the reverse approach. Therefore effort alone does not explain competence, which makes a person's perceived ability compared with others the salient focus or the factor of success where ego-involvement is concerned. If a person believes in their norminative ability (high self-belief), there is no reason to fear incompetence and effort will be high in most cases. Only if a person feels that he or she can show the same ability with less effort can less effort be demonstrated (Nicholls, 1984, 1989). The ego-involved person with high self-beliefs is more likely to

persist and demonstrate competence to pertinent others. The choice of task will be moderately close to the perceived level of ability, because it will lead to success (Roberts, 2012). AGT perceives this as an adaptive strategy. Concerning the behaviour and the choice of task, it can be hard to differentiate this state from task-involvement (Nicholls, 1989). On the other hand if a person does not believe in their norminative ability (low self-beliefs) he or she will try to avoid showing incompetence. This will lead to little effort, because of the fear of showing low ability with high effort. The choice of task can vary from one that is easy to accomplish to one that is so hard that there is little chance of accomplishing it. When one is afraid of showing incompetence, an easy task will give some assurance that one is competent or at least not failing, whereas choosing an excessively difficult task is built on the assumption that everyone would fail this task, so failing is not demonstrating incompetence. Behaviour in terms of not attending at all or giving up is seen in low self-beliefs of ego-involvement (Roberts, 2012). This should be perceived as a maladaptive strategy, because of the consequences such behaviour will have. From the norminative perspective, ego-involvement is seen as an extrinsic strategy (Nicholls, 1984, 1989).

2.2 Antecedents of goal-involvement

Given the AGT definition of motivation with its two different conceptions of ability and consequences which are both adaptive and maladaptive, and the role of self-beliefs, we need to step back and define the antecedents of goal-involvement. We also need to understand how achievement goals develop. Nicholls suggested that the antecedent of goal-involvement, either ego or task, is formed by a combination of the individual's dispositional goal-orientation and situational cues specific to the context (Nicholls, 1989; Harwood et al., 2008; Roberts, 2012). In other words, a combination of two factors will decide if we choose a differentiated or undifferentiated concept of ability. Goal-orientation refers to an intrinsic individual predisposition for creating achievement goals (Nicholls, 1989). It is still debated by scientists how people develop such predispositions, but the general belief is that they are learned through exposure to a task-involved or ego-involved context over time (Roberts, 2012). This notion also suggests that goal-orientation is dynamic in nature, and over time it can be changed, although theorists perceive it to have some kind of stability (Nicholls, 1989). Two particular questionnaires have been used to measure goal-orientation in sport: The Task and Ego Orientation in Sport Questionnaire, after this TEOSQ and Perception of

Success Questionnaire after this POSQ (Duda & Nicholls, 1992; Roberts et al., 1998; Harwood et al., 2008; Roberts, 2012). Both of these questionnaires use questions concerning how people perceive themselves when they are successful. The questions ask if one perceives success through outperforming others or by mastering the task and in that way measure the level of ego- and task-orientation. Studies of goal-orientation suggest that a person can be predisposed on a scale from high to low in both ego-orientation and task-orientation (Duda & Nicholls, 1992; Roberts et al., 1998; Harwood et al., 2008; Roberts, 2012). When it comes to goal-orientation it is important to emphasise that the one does not exclude the other. This means that the concept is orthogonal and that a person can be predisposed to task-involvement or ego-involvement (Harwood et al., 2008; Roberts, 2012). This again makes it possible to be high in both concepts and other combinations are also possible such as high-low, low-high and low-low (Harwood et al., 2008; Roberts, 2012). Situational cues refer to external factors' effect on goal-involvement. Carol Ames's (1992) studies on motivational climate are seminal as regards situational cues in AGT. She found that how people perceive their motivational climate in a classroom setting is mainly affected by the teacher's role, and outside the classroom significant others and important social agents are also salient contributors (Ames, 1992). These findings have been confirmed in sport with both young tennis players and elite skiers (Harwood & Swain, 2001; Pensgaard & Roberts, 2002; Cervello, Rosa, Calvo, Jimenez & Iglesias, 2007). These studies identified the coaches, parents and teammates as the main contributors to athletes' perception of motivational climate. Apart from these findings, Harwood and Swain (2001) suggested two other factors which can affect how athletes perceive motivational climate. They found that the structure and social nature of the match and the context of the match are important contributors to goal-involvement. The structure and social nature of the match refers to how the rules and a general stereotyping in sports affect goal-involvement. This echoes Ames's (1984) early work in which she manipulated the classroom environment in a competitive and non-competitive manner and found that the nature of the task in hand has an effect on the cognitions and performance of children. Harwood and Swain's (2001) other factor, the context of the match, refers to factors like how athletes perceive their ability relative to their opponent's, the social expectations perceived by players, and perceptions of the external consequences of outcome (Harwood & Swain, 2001). It is especially interesting that Ames (1992) found that the motivational climate is more decisive for creation of a goal-

involvement than is goal-orientation. In other words, if one's goal orientation is dominated by ego-orientation, but the climate is perceived as the opposite, the motivational climate's perceived profile will be more decisive in terms of one's goal-involvement. Both Harwood and Swain (2001) and Cervello et al. (2007) confirmed this for sport by showing that goal-orientation scores had little or no effect on involvement in the competition. No matter what the goal-orientation the participant showed a powerful tendency to be ego-involved during competition (Harwood & Swain, 2001).

2.3 Goal-involvement during competition

So far the antecedents and the difference in the two concepts of goal-involvement have been presented. These definitions shape the basis for this study, and also lead to the central issue, goal-involvement during competition. Harwood (2002) defines goal-involvement as a line of successive states of different goal involvements. He introduced the term goal-involvement state. Nicholls (1989) suggested that goal-involvement should not be seen as stable over a period of time but more as a dynamic force that could ebb and flow over time (Nicholls, 1989; Roberts, 2012).

A study addressing goal-involvement during competition was conducted by Smith and Harwood (2002). It was presented at the annual conference of the British Association of Sport and Exercise Sciences (BASES) in Newport, Wales in 2001, but it has never been fully finished or published (pers.comm. with Chris Harwood, see Appendix A). This is a single case study using a retrospective video-recall method to measure the goal-involvement during a tennis match. After every point played the participant was asked how important the following were to his personal feelings of achievement and satisfaction: his standard of skills and personal performance, and winning or losing the point, as a measure of his ability. The results suggested the orthogonal arguments in AGT presented above also apply during performance. Second, the results showed a transiency in goal-involvement during a match, especially in the winning scenario (40-0, 40-15) and at break point (0-40, 15-40), when serving. The results indicated that goal-involvement changes during a competition. With only one participant the findings are not cast in stone, but it cannot be denied that goal-involvement changes over the course of a performance. Another interesting observation is that the cases mentioned above, regardless seemed to attract a certain motivation. The fact that a contextual situation can affect goal-motivation supports the findings of

Harwood and Swain (2001) who found that the match context plays a role when the goal-involvement is decided. One limitation in their study is that it only measures the motivation after each point played. For tennis, a sport with natural breaks, it would seem natural to use the breaks for this kind of measurement. Yet it would be likely that the motivation could change at any time. Even while one is playing a point the motivation could change. For example, the athlete might face a favourable situation in terms of winning the point (scoring a point with a winning stroke); this situation could create an opportunity to change motivation from task-involvement to ego-involvement. This issue was explored by Gernigon, Arripe-Longueville, Delignieres and Ninot (2004). They studied two athletes during a judo combat session. In contrast with Smith and Harwood (2002), Gernigon et al. (2004) tried to describe more precisely how and when the involvement of motivation changed. Using a sport with no breaks, the study aimed to define the motivation during every moment of the combat. The dynamical nature of goal-involvement described by Smith and Harwood (2002), an approach borrowed from social psychology, informed the method, as did work on a dynamical system in social psychology by Vallacher and Nowak (1994) which can be explained as a set of interacting elements whose state undergoes changes in time. Before the five-minute combat started, the coach gave information concerning the task for the training session. The combat was filmed and after it ended the participants had to describe their motivation during the combat. The motivation was determined from the model of Elliot (1999), which is also based on the work of Nicholls (1984) but reinforces and encapsulates the salience of both demonstrating competence and trying to avoid demonstrating incompetence. Clearly dividing these dimensions, the model presents three aspects of motivation; (1) mastery involvement; (2) performance approach; and (3) performance avoidance. Mastery involvement refers to Nicholls's (1984, 1989) dimension task-involvement; Nicholls's (1984, 1989) dimension ego-involvement is split between performance approach and performance avoidance. The two latter dimensions then define demonstration of competence or avoiding demonstration of incompetence. The method also emerged from social science and is called the mouse paradigm (Vallacher, Nowak, Froehlich, & Rockloff, 2002). In Gernigon et al.'s experiment (2004) the two participants, while watching a video of the combat, had to use a computer mouse to indicate how motivated they felt from moment to moment. To cover the three dimensions in Elliot's model (1999), the procedure was repeated three times. For mastery involvement the participants had to consider this statement: "At this

point, I desired to completely master my technique". For the performance approach they had to consider the statement "At this point, I am motivated by outperforming my partner". For performance avoidance, they had to consider the statement "At this point, I just want to avoid performing badly in front of my partner". By placing the mouse high up on the screen, they defined the statement at a certain point as "very true" and lowering the mouse they defined it as "not at all true". After this the participants went through a self-confronting interview where they were told to describe their thoughts at each moment. In the interview, the video of the combat was also used to better recall their thoughts. Gernigon et al. (2004) found that the motivation changed fast and so confirmed Smith and Harwood's (2002) findings. On the basis of their results, especially those from the qualitative part, these scientists formed a much clearer picture of the suggested dynamics and the ebb and flow of motivation during competition. The results showed three dimensions which affected the level of motivation. The first dimension, goal-involvement flow, was split into; (1) variation in goal-involvement and (2) stationarity of goal-involvement. These two sub-dimensions showed how the situations that occurred during the combat could differently affect goal-involvement, resulting in a sudden change on the one hand, and on the other stability. Results for the second dimension, relationships between goal-involvement states, showed how the different involvement states could make opposition, develop at the same time or complement each other. The third dimension was situational conditions of emergence of goal-involvement states, which were split into: (1) initial contextual conditions and (2) course of action. Results from this part showed how situational conditions could affect the emergence of goal-involvement. Both instruction by the coach and the training programme were contextual conditions that affected goal-involvement. The history of the actions, imaginary scorekeeping, attacking opportunities, control of the situation, and feelings and emotions were found to be factors affecting goal-involvement over the course of the action. In general these findings describe a complexity in goal-involvement, with many factors that need to be assessed. Similarly to the studies that I have presented above, Gernigon and colleagues (2004) study supports the argument that the motivational climate concerning the role of the coach (Pensgaard & Roberts, 2002) and the context of the task (Harwood & Swain, 2001) has an effect on goal-involvement. Still, it has to be mentioned that during a five-minute combat in judo only a small percentage of the cognitions, feelings and behaviours can give support, so how strong this effect is hard to determine.

To explain the complexity a theory from social science was added to the model of Elliot (1999) and so Gernigon and colleagues introduced a new angle. This new approach prompts the question whether the antecedents affecting goal-involvement could be defined as fixed-point attractors.[1] An attractor is a stable mode of behaviour or equilibrium point, with which the fluctuations of the variable capturing the dynamics of a complex system asymptotically converge (Gernigon et al., 2004). Although this approach attracted some scepticism because of the lack of clear convergence with a fixed point, Gernigon et al. (2004) considered if a contradiction in attractors, as shown in the study byVallacher and Nowak (1994), could verify the use of the term attractor. If factors changing goal-involvement are seen as attractors it is interesting how these attractors affect goal-involvement and each other. As Nicholls (1989) suggested, goal-involvement is a combination of dispositional and situational factors, and it might be that these factors should be seen as attractors that are able to change goal-involvement and possibly even exclude each other. Gernigon et al. (2004) also discussed the study limitation, i.e. the use of a retro perspective method. The challenges of using such a method will be presented later in this study. Apart from this limitation one must also question the use of a training session. This matter seemed in some degree to affect the participants, who did not put a lot of effort in. Though the results from this study are really interesting it would have made the reliability better if a real combat situation had been used. Especially if the goal is to look at performance digression, high-stake situations might give more reliable results. Another element that should be questioned is the degree of motivation, because of the reliability of the measurement. It is easy to determine no motivation or high motivation in a situation, but all scores in between are problematic. The data in such situations should for this reason be handled with care. A last point to consider is the finding that the athletes could be motivated by different motivational beliefs at the same time. This is in contrast with the theory of Nicholls (1984, 1989) which concludes that it is only possible to be either ego-involved or task-involved at a given moment (Treasure et al., 2001; Roberts, 2012). This question was also discussed by Harwood and colleagues (Harwood, Hardy, & Swain, 2000; Harwood & Hardy, 2001), which confirms that science has no clear answer concerning the possibility of being both task- and ego-involved at the same time. It is hard to make a

[1] The fixed-point attractor in a dynamic system is addressed in studies of social science, where the attractor is described as an ongoing, destructive pattern of conflicts between elements (Coleman, Vallacher, Nowak, & Bui-Wrzosinska, 2007).

definitive judgment so adopting Nicholls's (1989, pp.88-89) stance is perhaps appropriate: *it might be noted that drawing distinctions between task involvement, ego involvement, and other forms of extrinsic involvement does not mean that such states exist in isolation. We can fluctuate between states and experience combinations of different level of them.*

2.4 Goal-involvement and performance

Though the studies above describe goal-involvement during competition they give no clear indication of how it might affect performance. As shown earlier, AGT defines adaptive and maladaptive behaviours from the different perspectives of goal-involvement. The study by Cervello et al. (2007) of 167 young tennis players tried to assess this issue. The aim of the study was to examine how goal-orientation and situational factors affected task-involvement and correlated with performance. The situational factors were clearly divided between contextual motivational climate and coach-initiated motivational climate in competition. One week before the competition the participants answered questionnaires on goal-orientation using POSQ (Roberts et al., 1998) and perception of contextual motivational climate using the Perceived Motivational Climate in Sport Questionnaire-2 (Newton, Duda, & Yin, 2000). After the competition a questionnaire of own design measuring the perception of coach-initiated motivational climate was completed, and task-involvement was measured by the FLOW STATE Scale-2 (Jackson & Eklund, 2002). Finally the performance was measured by both the participants and the coach, who assessed performance on a 10-point Likert scale from zero (played much worse than usual) to 10 (played much better than usual). The results showed that the perception of a performance climate had a positive effect on the level of performance. This finding is really interesting, because it opposes most findings in AGT which suggest that a mastery climate should be preferred over a performance climate (Ames, 1992). If we also look at factors during competition, Cervello et al. (2007) used only the measure of task-involvement on the premise that it is more likely that task-involvement will develop an adaptive pattern in a competition situation and that distinguishes it from ego-involvement (Cervello et al., 2007). Studies on goal-orientation and performance also support this idea and have found that athletes with a high task-orientation find it easier to get into a flow state (Jackson & Roberts, 1992). Athletes with a high ego-orientation appear to have more concentration disruption (White & Zellner, 1996), and cognitive interference, that might lead to an

escape during competition (Hatzigeorgiardis & Biddle, 1999). As mentioned, the FLOW STATE Scale-2 (FSS-2) was used to measure task-involvement. This is a questionnaire concerning three dimensions of task-involvement: concentration, autotelic experience and loss of self-consciousness. The findings could not actually support a correlation between flow-state and performance, and found that only autotelic experience significantly contributed to variance in performance. It was not the aim of the study by Cervello et al. (2007), but the lack of correlation between task-involvement and the level of performance raises an essential question. What is the optimal goal-involvement for a good performance? Assessing the literature on mastery climate (Ames, 1992) and goal-orientation and performance (Jackson & Roberts, 1992; White & Zellner, 1996; Hatzigeorgiardis & Biddle, 1999), one could easily suggest that task-involvement should be preferred over ego-involvement. Yet one must bear in mind that most of these studies approach achievement motivation in a global way (Harwood et al., 2000). Another point is that studies which use goal-orientation have some limitations. The point of the interaction between goal-orientation and motivational climate was described earlier, but Swain and Harwood (1996), Hall and Kerr (1997) and Harwood and Swain (1998) show that the orientation differs depending on when the questionnaire is done and if it is general or specific in terms of the competition. To get more reliable results, POSQ and TEOSQ should be done just before the competition and concern only this competition (Harwood & Swain, 1998; Harwood, 2002). Using Nicholls's (1984, 1989) original theory it is not possible to say that either task-involvement or ego-involvement reduces performance, because ego-involvement can become adaptive or maladaptive. As described earlier, both a task-involved person and an ego-involved person with high self-beliefs would produce an adaptive pattern, whereas an ego-involved person with low self-beliefs would produce a maladaptive pattern.

2.5 Summary

It is hard to tell how far science has come in answering the question of goal-involvement. The public discussion between leading scientists on AGT at the start of this millennium and the latest textbook material confirm that. It was Chris Harwood, Lew Hardy and Austin Swain (2000) who started the discussion, asking how far we have come in actually predicting motivational states of involvement and if we even measure this in the right way. This question was answered by Darren Treasure, Joan Duda, Howard Hall, Glyn Roberts, Carol Ames and Martin Maehr who tried to clarify

the misunderstandings and express some agreements (2001) Finally, Chris Harwood and Lew Hardy (2001) made a response to Treasure et al., offering a new model of goal-involvement. Interestingly enough it seemed like the only thing they really could come to a consensus on was that there should be more research on the phenomenon of goal-involvement. Assessing the latest textbooks in AGT we find a lot of questions unanswered. Harwood et al. (2008) present the lack of development in AGT as a 20-year watershed. They criticise the limited research on goal-involvement and stress the need for more studies. Roberts (2012) supports them. These scientists are some of the most prominent in the field of AGT. Highlighting their cry for more research on goal-involvement is salient.

Smith and Harwood (2002) and Gernigon et al. (2004) have provided support for the concept of abrupt change in motivation during competition. These studies and others show that the reason for such change could be affected by both the person's goal-orientation and the situational cues. As examples of the latter, perceived motivational climate and match context are suggested. Gernigon et al. (2004) suggested without any clear evidence that these could be seen as attractors that affect goal-involvement. Apart from these indications it is hard to clarify how goal-involvement affects performance or what the optimal motivation is during competition. Given the complexity and contrasting strategies of the adaptive and maladaptive outcomes in AGT, it is interesting to study the effect that changes in motivation have on the athlete. The theory of change from task-involvement to ego-involvement is an interesting one. If one considers the challenges the athlete confronts in competition when task-involved, only concerned about the task at hand, suddenly experiencing or perceiving an ego-attractor that prompts the athletes to change to ego-involvement, comparison with other athletes is salient. How does this change affect the athlete and does it interfere with performance? This study aims to examine the dynamics of goal-involvement during competition and how they might affect performance. With both internal and external factors affecting goal-involvement in a dynamic system, this is a challenging task. As Gernigon et al. (2004) highlight, goal-involvement could be seen as a labyrinth where the walls change after every step.

2.5.1 Methodological challenges

To be able to answer these questions a solid methodological framework is needed. Given the limitations in the studies presented so far, the use of elite athletes in high motivational situations could provide better findings. If and how goal-orientation and goal-involvement interact should also be assessed. Furthermore, because of the suggested salient role of self-beliefs, the general self-belief the athlete perceives concerning their own ability and their ability compared with others should be measured, to see if and how general self-belief interferes with goal-involvement.

Measuring the motivation during competition, Smith and Harwood (2002) and Gernigon et al. (2004) used retro perspective video-recall to define goal-involvement. This was measured quantitatively with simplified questions that defined the motivation, either during breaks or at each moment, with a mouse paradigm, as described earlier. In the study by Gernigon et al. (2004) the authors argue that it is possible consciously to declare the conception of achievement and the intention of the moment will define the motivation. As regards the latter, the mouse paradigm would seem useful for this study as well. In orienteering the athlete is mostly moving all the time, so if the athlete were to define their motivation at each place in the competition it would avoid the need for a mouse paradigm and instead create an own method. For these reasons, it should be possible to involve the participants in defining their motivation throughout the competition and in that way define the places where changes happen. Even though the participants define the change in motivation on their own, some control of the change should be exercised. To define the goal-involvement and the changes appearing in competition, AGT suggests a clear differentiation. Nicholls (1989) suggested that the cognitive self-evaluation a person performs will define their goal-involvement. If a person is task-involved one would describe a focus on the task at hand or if evaluating the performance, one would see the achievement in the light of one owns abilities (Nicholls, 1984, 1989). Evaluation during performance would therefore be constructed by a self-referred evaluation of effort and consequent intrinsic focus. In a state of task-involvement a person would ask “Is my effort good enough?” and “Did I perform as well as I have done previously?” or just have a focus on the task at hand. If on the other hand one is ego-involved, one would look at the task at hand in conjunction with the final result to make a self-evaluation (Nicholls, 1984, 1989). One would be concerned with the ability one demonstrates compared with others and an extrinsic focus would be

dominant. In the state of ego- involvement a person would be concerned with issues like "How am I doing compared with my competitors?" or "Is my effort good enough to show my ability compared with others?"

Task-involvement and ego-involvement are differentiated by cognitive processes. The best way to examine cognitions would be to record them while competing. Science has not so far created a possibility for that. In earlier studies where cognitions have been a central issue two main approaches have been used: the "talk out loud" method or a retrospective recall method (Eccles, 2011). In sports there is good support for the retrospective recall method, especially if used with a video of performance (Omodei, Mclennan, & Whitford, 1998). One reason for not using the "talk out loud" approach during a performance is that one would already be aware of one's cognitions and greater awareness could change one's natural thought patterns (Macquet et al., 2011). In terms of AGT this could increase the focus on task-involvement, which would limit the findings (Roberts, 2012). Research in AGT is beginning to support a method built on retrospective video-recall (Lyle, 2003; Harwood et al., 2008; Roberts, 2012). As described before Gernigon et al. (2004) used a self-confronting interview which was based on a video-recall method. Nonetheless this method still has some limitations. First of all, the mere idea of being videotaped could induce ego-focus (Ericsson & Simon, 1993; Lyle, 2003; Roberts, 2012). Second, it should be questioned if a person really recalls their original cognitions. Experiments have shown limitations, but a person is still able to remember the essential cognitions if they are reminded shortly after the event (Lyle, 2003; Eccles, 2011). In the latter case one should also remember that the participants have knowledge of the results, which could bestow a positive or negative slant on the recall of cognitions (Eccles, 2011). As regards processes and factors during a competition, many articles note that orienteering demands a lot of cognitive work (Johansen, 1990, 1997; Kvaase, 1992; Eccles et al., 2002; Macquet et al., 2011). Most studies have had the approach that the cognition during an orienteering competition is mainly decision-making (Macquet et al., 2011) or how an athlete is able to translate a visual picture of the map into the actual terrain or, conversely, translate the terrain into the visual picture of the map (Sigurjónsson, 2007). Though these studies do not examine the motivational cognition during competition that is a focus of this study, they still have a lot to offer when it comes to method. The

reason is that the cognition described is the same as that which athletes experience while task-involved, focusing solely on the task at hand.

This study sets out to describe the dynamics of motivation during performance. Despite the limitations described above some clear recommendations can be made that provide a solid methodical framework.

3. Method

3.1 Participants and conditions

All three participants were perceived as experienced high-level athletes, as all were members of the Norwegian national team. The female participant in the first case study was aged 22 was given the pseudonym Anne. The female participant in the second case study was aged 24 and was given the pseudonym Carol. The male participant in the third case study was aged 29 and was given the pseudonym Mike. The Norwegian middle-distance championship (competition time approximately 35 minutes) created the frame of competition that was used in the study. The competition was held near Oslo, Norway. In terms of the Norwegian orienteering environment it was a prestigious event.

3.2 Measurements

To measure the goal-orientation according to AGT a Norwegian translation of the Perception of Success Questionnaire (POSQ, Roberts et al., 1998) was used. This is a 12-item questionnaire which measures the two factors of goal-orientation: task-orientation (e.g. "I feel successful when I reach my personal goal") and ego-orientation (e.g. "I feel successful when I am the best"). The original version of POSQ has been proven as a valid and reliable measurement of task and ego goal orientations in sports (Roberts et al., 1998). The Norwegian version of POSQ has shown acceptable internal consistency (Cronbach alpha = 0.81 for task-orientation and 0.79 for ego-orientation; Roberts & Ommundsen, 1996).

The participants were asked on a scale from zero to 100 to define their current perceived level of self-belief. This was measured in two ways: first, compared with the participants' own potential top level; second, compared with the level of the best in world. The latter measure was simplified by defining world-class (top six in the world championship) as 90 to 100, national top level (top three Norwegian athletes) as 70 to 90, and national level (top 15 Norwegian athletes) as 50 to 70.

3.3 Equipment

During the data collection different equipment was used. To track the runners during competition a general positioning system (GPS unit Tracker TTA-310i) was used. This unit is carried on the back of the participant in a special harness made for the purpose.

To transfer the recorded GPS data from the GPS unit to the map, the software Quick-route was used. This is software especially made for orienteering and shows the movement of the athlete on a specially constructed orienteering map**.** To film the view of the participant during the competition for use in the interview a head camera from Go Pro, HD-hero, was used. This camera was worn on a special headband.

3.4 Procedure

First of all, the study obtained approval from the Norwegian Social Science Data Services (NSD, Appendix C). I have been a member of the elite circle of Norwegian orienteers for many years and was therefore able to contact three top athletes. After they had orally confirmed their interest in taking part, the participants received information about the conditions of the study (see Appendix B) and gave confirmation in writing as well. Before the three case studies were conducted, a pilot was implemented. This made it possible to adjust the measurements and procedure and check that all equipment worked as planned. No significant changes were made after the pilot.

3.4.1 Data collection

Between 60 and 90 minutes before the participants started their race, the POSQ questionnaire (Roberts et al., 1998) was distributed. At the same time the GPS equipment and the head camera were handed to the participants. Two minutes before the start the equipment was checked one last time and the camera turned on. All of the competition was video-filmed from the perspective from the head of the participant. After completion of the course the GPS data were transferred to the orienteering map via Quick-route. After this the route choices from Quick-route (a white GPS track on the orienteering map) for each participant were printed in a 300dpi jpeg version. Less than one hour from the end of the competition the participants were taken through a two-stage interview. The whole session was recorded with both a stationary video camera and a dictaphone for the sound. Before starting the two stages each participant was asked to define their general self-beliefs using the method described above.

In the first stage the participants were introduced shortly to the AGT. This information also served as a briefing, setting the frame for the interview (Kvale, 1996). This information was given to the athlete.

> One theory concerning motivation states that in a situation where it is possible to show competence, it is possible to be motivated from two different directions. When you compete in orienteering, where time is measured, you are in a situation where it is possible to show your competence. One of the directions is ego-involvement. In this state you are concerned with comparing your ability with that of others and your focus is on the result. In sports it reflects how you feel are doing compared with others. The second is task-involvement. In this state you are concerned with mastering the current situation and you measure your performance against yourself. In sports it reflects the technical task. So you do as well as you can, on your own account.

After this introduction the participants were required to define their motivation during the race by colouring their route choice with the use of three differently coloured pens. This was done on the jpeg print of the GPS track. One colour implied ego-involvement, a second colour showed task-involvement and a third colour indicated the participants were in doubt. The "in doubt" situation led to a brief discussion whereby a consensus was reached. It ended with the participant producing a GPS track in different colours, where changes in colour represented changes in motivation as seen in figure1and Appendixes D, E and F. A single change in motivation was defined as being task-involved, changing to ego-involvement and changing back to task-involvement.

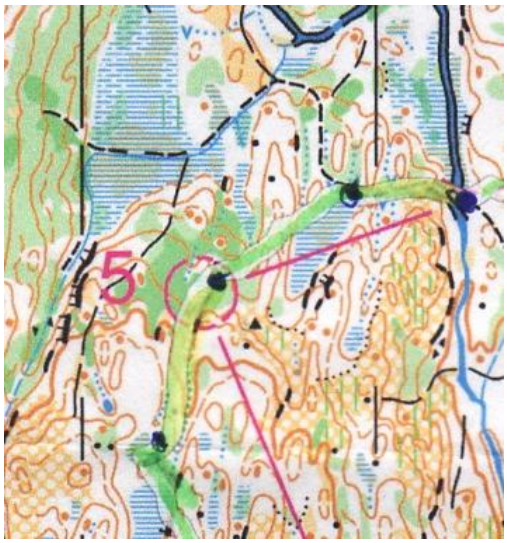

***Figure 1**: The orienteering map coloured by Anne to show changes in motivation.*

The second stage was split into two parts, the first tracking the thoughts during the change in motivation using retro perspective reporting (Eccles, Walsh, & Ingledew, 2005), the second using a semi-structured interview to make the participant reflect on

the situations (Kvale, 1996). While the video-recording of these parts was replayed, the participant described their corresponding thoughts during these clips. When every situation had been covered, the participant was given the possibility to redo the procedure again, if they felt that their thoughts had come out wrong. When the thoughts were in line with the participant's experience of the situation the participant was asked to reflect on it. In this part a semi-structured interview (Kvale, 1996) was conducted which asked three main questions. The questions were both reflective and based on the hypothesis: (1) What is it like listening to your thoughts? (2) Why do you think you get these kinds of thoughts? (3) Did this situation in any way affect your performance today? The aim of the questions was to obtain a rich description of the phenomena (Kvale, 1996). If the interviewer believed the answer from the participant was hiding more information, each question could be followed up by probing or specifying questions (Kvale, 1996). Every single change in motivation was finalised before the next situation was considered. After six or seven different situations had been covered the interviewer asked for situations that the participant perceived as different from the one so far dealt with or situations where the participant met other athletes or passed the arena. The two latter questions were highlighted because according to AGT it is fair to assume that ego-involvement is more likely in situations with spectators or in situation with a direct feedback on performance (Nicholls, 1989, 1984).

3.5 Analysis

The results from the goal-orientation measurement, the measurement of self-beliefs and a schematic illustration of the changes in motivation were used to form a motivational profile of each participant.

The interview was made into a transcript and translated into English. In this part each participant was also given a pseudonym to ensure anonymity.

The analysis of the data from each situation took place in four stages: analysing the registered thoughts during the change of motivation, categorising the reason for the change, giving meaning to the participant expression concerning the change in motivation; outsourcing the consequences the participant experienced with the change in motivation. In the first stages the thoughts were analysed through the lens of AGT to be sure that a change in motivation had really occurred. In the second stage the

registered thoughts were analysed and categorised (Thagaard, 2010) to account for why the changes had happened (Kvale, 1996). In the third stage the reflections concerning the two questions (What is it like listening to your thoughts? Why do you think you get these kinds of thoughts?) were simplified into different meaning simplifications (Kvale, 1996) to provide a richer description of the phenomena. In the fourth stage, the consequences that the participant described when answering "Did this situation in any way affect your performance today?" were analysed and compared with the findings of the other stages.

3.6 Ethical considerations

In any scientific study it is necessary to consider ethical issues. First of all this study has proven support from NSD, which ensured that the right information was given to the participants before the study and that the data were handled correctly, kept safe and not used improperly. Participants were given information in writing about the study's aims and told that they could withdraw at any time. In data processing each participant was given a pseudonym which minimised the risk of anyone guessing who took part. With only three participants plus a camera in a public event, it is hard to secure full anonymity, but all possible efforts were made.

Another point about running with GPS and video is that this could affect the performance of the athlete and reduce their chances of performing well in the competition. Athletes at this level are used to competing with GPS, however, and the use of video is also becoming normal in training situations, so the risk should be low. It should also be mentioned that the participants were aware of this risk when entering the study and none of them reported any effect of running with this equipment on their performance.

During the interview no ethical issues were raised. Although one participant reported strong feelings during the interview afterwards she expressed positivity about the experience.

4. Results and discussion

After discussion of the results, the definition of change in motivation will be provided. After that the personal profile of the participants is presented concerning goal-orientation, general self-beliefs and a description of when the changes in motivation occurred. These results form the basis for the main part of this chapter where the change in motivation is detailed and the findings compared with the literature on AGT. Four main phenomena are presented and discussed: the reason for the change in motivation, what happens in the state of ego-involvement, the consequences of the change in motivation and the dynamics of the change in motivation. Only the most interesting results are presented in this section. To view all transcripts relating to changes in motivation, please see Appendixes G, H and I.

4.1 Defining changes in motivation

In the first stage of the analysis, all the registered situations that the participants defined as changes in motivation were examined to see if they were in line with the AGT. To illustrate this, an example from Mike's analysis is described in Figure 2.

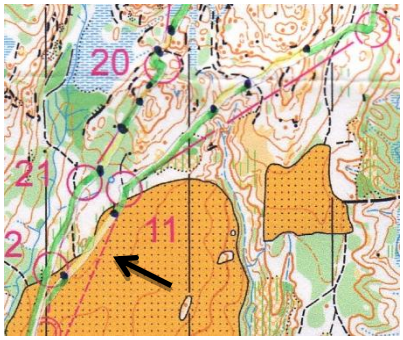

Figure 2: *Orienteering map showing the situation exemplifying change in motivation. The arrow points to the exact place.*

In this situation Mike starts in a state of task-involvement, considering the choice of route.

> *Where do I have to run? I am taking the straight option! It has to be better to go straight! Then I will have to go to the edge of the cutting area, there I have to run along the cutting line and in from there.*

When he has made his decision about route choice, his focus turns to the speaker talking about a competitor [Harry]. This change in focus defines the change to ego-involvement. In the next period he makes an evaluation of the end result based on his experience of the race so far and what is likely to happen in the rest of the course.

> *Harry passed, [he can hear the speaker talk about Harry passing the arena] there was a lot of cheering when he passed. They seem quite eager [can still hear the speaker being enthusiastic], so I think he has a good time. Then he is probably one minute behind me, one and a half minutes behind [referring to real time, not competition time]. I will have to go on, but he runs well. Now will he catch me? It takes a lot to gain that much even if he performs well. I will just have to push on all the way…*

This evaluation is the salient focus for some seconds, before Mike turns back to the task when he arrives at a crucial point for his navigation and again becomes task-involved.

> *Here is the edge of the cutting, and then I have to take a bearing and catch the ravine.*

The defined ego-involving cognitions clearly demonstrate a comparison with a competitor. Mike also uses this comparison to evaluate his performance so far in the race. His comparison with his fellow competitor is a clear measurement of his ability which is in line with the theory on ego-involvement which Nicholls described (1984, 1989). One might suggest that Mike made it a goal to avoid being caught by the competitor [Harry] in the remaining part of the race. At the end of the ego-involved evaluation Mike reflects on increasing his effort, which leads to an adaptive strategy. Compared with the theory this could suggest that Mike has high self-beliefs. The latter point will be dealt with in detail later. The defined task involving cognitions clearly describes a focus on the task. There is no evaluation on the task in comparison with any others. Mike focuses on the task at hand and is trying to optimise his effort. This pattern of cognitions is clearly in line with the theory on task-involvement which Nicholls described (1984, 1989).

In the analysis of the cognitions in all the registered changes of motivation a pattern of self-evaluation in the period of ego-involvement, like the situation above, clearly emerges. It would be wrong, however, to assume that all evaluations done in a competition are the same as being ego-involved. Also, task-involved states can lead to

evaluations (Nicholls, 1984, 1989). So when defining changes in motivation it has been important not to define all evaluations as ego-involvement. Another example from Mike's analysis below exemplifies how task-involved evaluation might occur (this example is not counted as a change in motivation, but the participant thought it could be, so for that reason the cognitions in this situation were recorded).

> *Here I have to run up...what? Now I have to see the narrow march, I will just use a bearing and then it will be okay. Oh my God, it is really bad runability. Okay, there is a narrow march inside, I did not see that. I should have run left here. Now let us see, I have to go on, there is a flag there. I have to go on, with a bearing, straight to the path. I have to cross the path and then further up on the hill.*

Mike found that he chose the wrong route and makes an evaluation. Again, situations like the latter were not registered as a change in motivation.

4.2 Participant profile

This part presents a profile of each participant in relation to measurement of POSQ and self-beliefs. A simplified schematic presentation of the change in motivation is also presented.

Anne

In the case study of Anne, the findings show multiple changes in motivation (Figure 3). Overall Anne experienced salience in task-involvement during the competition. When she experienced a change to ego-involvement it lasted approximately 10 to 60 seconds, before her change back to task-involvement occurred.

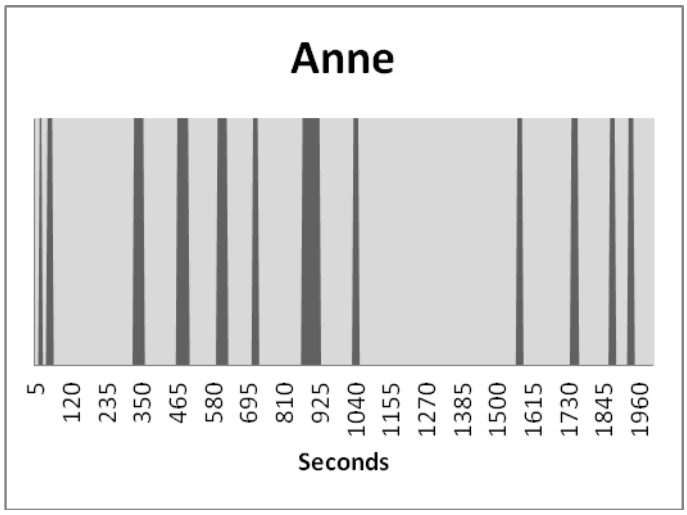

Figure 3: *Anne's self-referred change in motivation during the competition. The dark grey area defines ego-involvement and the light grey area defines task-involvement.*

As seen in Figure 3 the changes are experienced throughout the competition. Anne scores high in both goal-orientations before the competition (Figure 4), which is in line with earlier findings for top athletes (Pensgaard & Roberts, 2000).

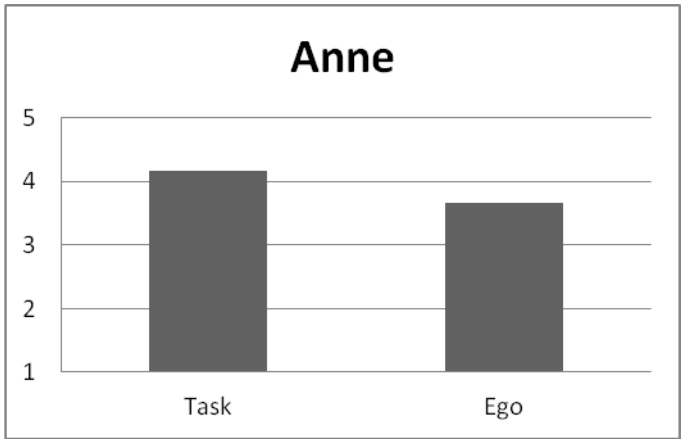

Figure 4: *Presents Anne's goal-orientation scores.*

Finally, Anne describes high self-beliefs concerning her definition of her current level compared with both her own potential and that of her competitors (Figure 5).

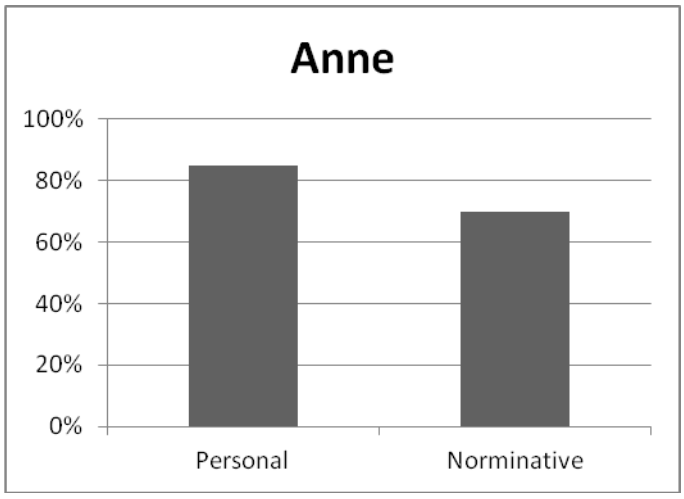

Figure 5: *Presents Anne's self-beliefs.*

Carol

In the case study of Carol, the findings show some changes in motivation (Figure 6). Overall Carol experienced a salience in task-involvement during the competition. When she experienced a change to ego-involvement it lasted approximately 20 to 40 seconds, before her change back to task-involvement occurred. One change in motivation differs from the others, because she stayed in a state of ego-involvement for at least three minutes.

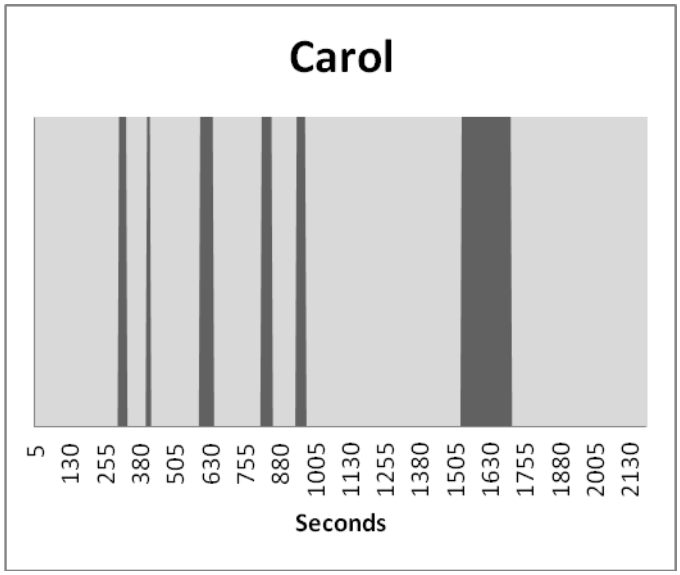

Figure 6: *Carol's self-referred change in motivation during the competition. The dark grey area defines ego-involvement and the light grey area defines task-involvement.*

As seen in Figure 6, the changes are experienced roughly in the middle of the competition. Carol scores high in both goal-orientations before the competition (Figure 7), which is in line with earlier findings for top athletes (Pensgaard & Roberts, 2000).

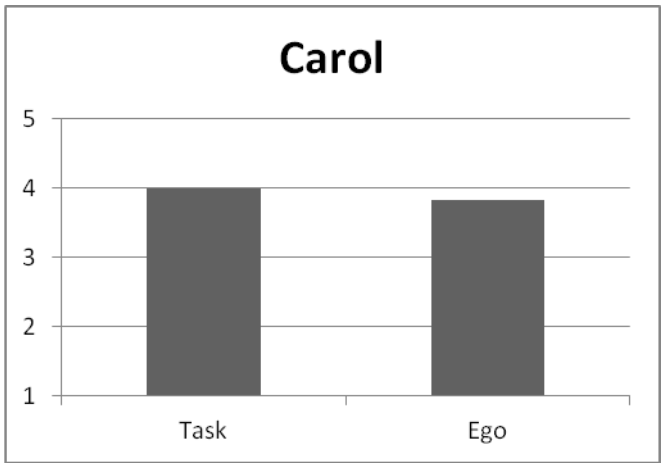

Figure 7: *Presents Carol's goal-orientation.*

Finally, Carol describes high self-beliefs concerning her definition of her current level compared with both her own potential and that of her competitors (Figure 8).

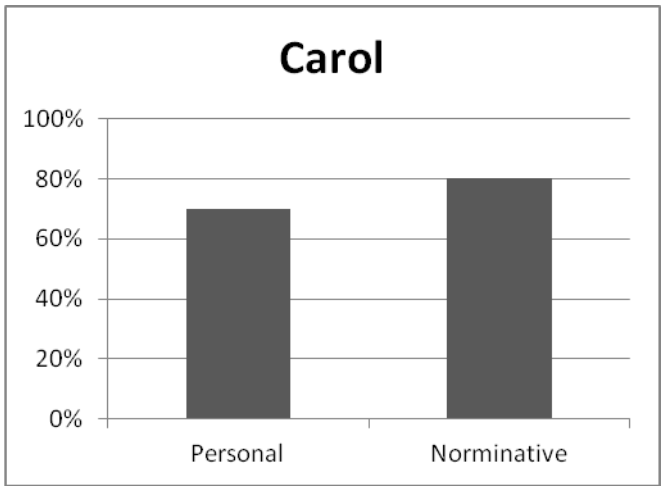

Figure 8: *Presents Carol's beliefs.*

Mike

In the case study of Mike, the findings show multiple changes in motivation (Figure 9). Overall Mike experienced salience in task-involvement during the competition. When he experienced a change to ego-involvement it lasted approximately five to 20 seconds, before his change back to task-involvement occurred.

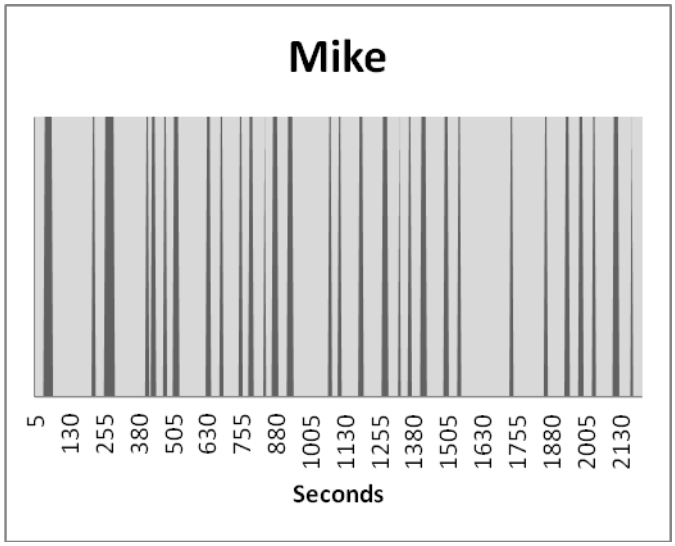

Figure 9: *Mike's self-referred change in motivation during the competition. The dark grey area defines ego-involvement and the light grey area defines task-involvement.*

As seen in Figure 9, the changes were experienced throughout the competition time. Mike scores high in task-orientation and low in ego-orientation (Figure 10) and in that way the finding differs from earlier findings for top athletes (Pensgaard & Roberts, 2000).

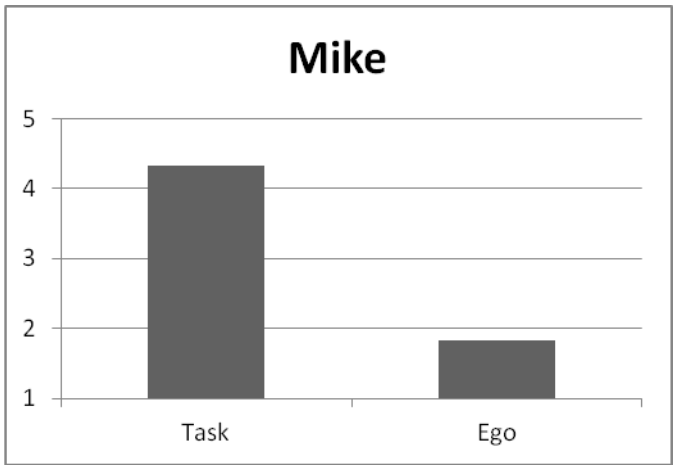

Figure 10: *Presents Mike's goal-orientation.*

Finally, Mike describes high self-beliefs concerning his definition of his current level compared with both his own potential and that of his competitors (Figure 11).

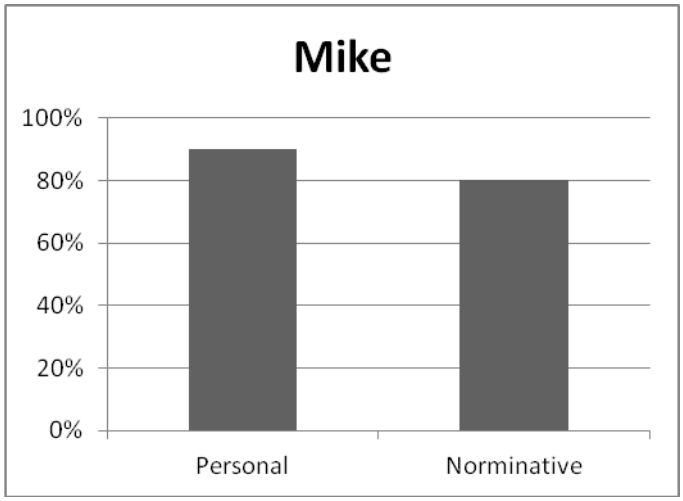

Figure 11. *Presents Mike's self-beliefs.*

The figures presented above clearly show a difference between the different cases. Anne and Mike experience a lot of changes in motivation, whereas Carol experiences few. Also, Anne and Mike differ when it comes to the time they stay in the ego-involvement. Mike seems to spend less time being ego-involved. It is important to mention that even if the figures of change in motivation seem to show accuracy in when and how long the changes in motivation appear it is not so. These figures are made to give an overview of the development, so some allowance should be made when assessing these. Concerning goal-orientation, both Anne and Carol show similar scores, as found in earlier studies,

whereas Mike scores high only in task-orientation. Generally all three participants define high self-beliefs.

4.3 Reasons for changes in motivation

Three participants in this study experienced multiple changes in motivation that were line with the theory of AGT. All these situations started with the participant being task-involved, changing to ego-involvement and back to task-involvement. As regards the reasons for the change from task-involvement to ego-involvement, analyses made it possible to divide reasons into two dimensions, self-induced and other-induced factors. These two dimensions were again divided into six sub-categories (four self-induced factors and two other-induced factors). The sub-categories and dimensions can be seen in Table 1.

Table 1: *Dimensions and sub-categories recording changes in motivation.*

Dimensions	**Sub-categories**	**Examples**
Self-induced factors		
	Technical time loss	Evaluation size and effect of mistake
	Physical sensation	Evaluation of physical sensation compared with expectation
	Free time	Possible evaluation time, because of low technical demands
	Self-beliefs	Evaluation about ability at any time
		Evaluation of performance

Other-induced factors	Meeting other athletes	from the feedback of catching another runner or getting caught, and the level of the runner, compared with expectations
	Feedback passing arena	Evaluation of performance from the feedback on placement and time in front or behind compared with expectation of race result

Self-induced factors

The term *self-induced factors* is based on a change in motivation occurring from the participant internal experience of the situation and in that way develop from the self. In the following section the four sub-categories of the self-induced dimension are described.

Time loss technically refers to how cognitive judgment is grounded and how a technical mistake can trigger a change in motivation. Here is an example from Carol.

> *… I was focused on the right bearing and then I thought that, but here comes the thoughts that this was a mistake. I have made a mistake. Damn, thoughts like that, some anger, but then thoughts that it was only one mistake, and it was not that big. Do not let it ruin the rest of the race, now you have to pull yourself together and focus on the technical part. And then I switch to focus on the technique…*

After getting the right bearing, Carol starts to ruminate on the consequences of the mistake, and she makes an evaluation of the time loss based on the final result.

Physical sensation refers to the feedback the participant gets from the bodily sensations which can trigger a change in motivation. This example from Mike describes how this can appear.

> *At this place, it is tough physically. A lot uphill to the first control. At this place Jim will run fast, he is usually fast at the opening of a race. There I see the*

> *yellow area. I just have go to the end of the yellow area. Be careful that you do not run too fast, run smoothly.*

In this situation Mike becomes aware of his physical sensation and after that clearly compares himself with a competitor (Jim). To a follow-up question Mike states that these kinds of changes often come when he is tired. This could indicate a greater chance of this kind of change occurring at the end of a race.

Free time refers to situations where the technical demands are experienced as being low (like running 200 metres on a path) and can trigger a change in motivation. With fewer demands on cognition for the technical task, the participants have a chance to think about other things, which again could trigger an evaluation of the result. This example is taken from Mike.

> *Here, it is just to run. It feels a bit tough physically today; it is just to keep pushing. Here the others will run faster, push in the uphill, push. It is tough heather today, it feels tough. Then I have to go up and in…*

The example above describes how the phenomena develop and how the participant feels inferior to his competitors at this point on the course.

Self-beliefs refer to the participant experience of uncertainty in ability which can lead to a change in motivation. This uncertainty seems to occur in situations where choices have to be made, but can also happen at any other time when the participant for no obvious reason suddenly starts to evaluate her/his performance compared with the final result. With this in mind it is important to understand that this change could happen at any time. This is an example from Anne.

> *I choose the path and then go on the left route choice. I am really uncertain. I consider going straight, it is shorter and I am uncertain if the competitors will use less time going straight, but I want to make it safe and use the path. I am running along the path, I am once again looking at the route choice to the control. Unsure if this is the right one, but now I have chosen I will go on. I think about how to attack the last part of the leg.*

The uncertainty becomes clear in the evaluation that Anne makes when trying to decide on her route.

Other-induced factors

The definition of *other-induced factors* is based on reasons for changes in motivation which come from the external side. In the following section the two sub-categories of the other-induced dimension are more carefully described.

Meeting other athletes refers to how meeting other athletes can trigger a change in motivation. This example from Carol describes how this could happen.

> *….but then I saw Laura, and a thought came, have I caught her? I did not waste time looking ahead in the course so far and I did not know we had to cross, so it took my focus. Then I started thinking, maybe I am running to the wrong control? Because now I understood that they were on their way to the fourteenth. No, I am not on my way to the wrong control, and then I pulled myself together and looked at the map. I understood that I was on the right way, and then, since Laura started two minutes in front of me, then I thought, okay two minutes, and how far is she ahead of me now? If I just run full speed, then I am maybe not that far behind…*

The example describes how meeting other athletes leads to rumination, in this example confusing Carol but also making her evaluate her result compared with the athlete she has seen.

Feedback passing arena refers to when the participants pass the arena and the speaker's or coach's information on their current position can trigger a change in motivation. This example is taken from Anne.

> *Okay, I punch, now it is just the passing of the arena. You have to read ahead, but how am I doing? How am I doing? I see Susan, good. How am I doing? I want to know how I am doing. No, come on, do your orienteering. Eight seconds after [referring to the speaker's announcement]. I am not going to be beaten by 10 seconds by Isabella this time [she recently experienced a loss just by some seconds]. Focus on the task, come on, focus on the task, and look at the route choice.*

This example describes how passing the arena leads to an evaluation of the performance so far. Interestingly enough, when passing the arena all participants describe longer periods of ego-involvement. It is also obvious that the athlete while passing the arena gets time to think, so there is a clear link between getting time to think and passing the arena. The reason they are differentiated is because while passing the arena the

participant gets information about his or her performance from external sources, whereas getting time to think is an internal process.

The findings above describe both self-induced and other-induced factors that are salient for a change in motivation. All of the six sub-categories show a combined pattern that can be explained as something that occurs because the participant develops a cognitive reaction that is based on their experience of the context. This indicates that the context of the competition has an important effect on ego-involvement and supports the findings of Gernigon et al. (2004), Harwood and Swain (2001) and Cervello et al. (2007) concerning the role of motivational climate in sport. Not only do the findings in general indicate that motivational climate has an effect on goal-involvement, but it makes it possible to deduce certain situations that can lead into a state of ego-involvement. It also should be said that these findings do not tell us anything about why the participants become task-involved but only why they become ego-involved. Though there is support from other studies one must be careful not to allow motivational climate too much influence on goal-involvement. Yet if one addresses the follow-up question in the semi-structured interviews some interesting insights are revealed. Despite experiencing periods of being ego-involved the participants describe task-involvement as an optimal state of motivation. If one should acknowledge the AGT, the participant should decide on their own which goal-involvement to choose (Nicholls, 1984, 1989). The findings cannot confirm this, however all participants contrastingly describe an uncontrolled internal conflict between wanting to be task-involved while still becoming ego-involved.

Anne expresses it like this.

> *I'm really focused on results. I know this is wrong, so when I get this kind of thought, then I try to change the focus to the task.*

Carol expresses it like this.

> *In a way I know what to do, to make a good orienteering race and in that you have to focus on the task. You can't let these thoughts take too much space, because then you often make mistakes on every control, then you get many mistakes. It's about being strict with yourself and saying that now you have to focus on the task.*

Mike expresses it like this.

> *I cannot stop them, so I see no reason to try to get rid of them, as long as I do not feel that it takes my focus away.*

These expressions clearly describe a conflict that the participant experiences while competing. This might indicate that task-involvement is a choice the participant makes, whereas ego-involvement is more the consequence of a situation where the context in interplay with the person creates a need to become ego-involved. Gernigon et al. (2004) suggest goal-involvement should perhaps be seen as a fixed-point attractor. Although Gernigon et al. (2004) had problems clarifying how a fixed-point attractor can affect motivation, ego-involvement as a consequence of the context in contrast with the desire to be task-involved provides a better way to address this phenomenon. If the self-induced and other-induced factors described above are seen as ego-involved attractors (the fixed point being ego-involvement) this could confirm Gernigon et al.'s (2004) suggestion, that a fixed-point attractor exist. When the participant experiences an ego-involved attractor it forces them to become ego-involved. Then, if the athletes experiencing the fixed-point attractor are task-involved it would inevitably lead to a change in motivation. These suggestions also lead us back to the discussion of goal-involvement between leading scientists described earlier. Is it possible to be task-involved in a competition situation? Harwood et al. (2000) suggested splitting the task-focus into one solid task-involvement and one performance task-involvement. Treasure et al. (2001) observed that the athlete would decide their own motivation, grounded on AGT. The suggestion above of a fixed-point attractor does not give much support for either of these views, but suggests that one might have to look elsewhere for better answers.

Another important point is that this study did not shed any light on why all participants described the task-involvement as the optimal state of motivation. Possibly the coach or the environment outside the competition are factors that affect this? This would be in line with the finding on general motivational climate and goal-involvement (Ames, 1992), but this is hard to ascertain from these findings.

When addressing the antecedent of goal-involvement one also has to assess the role of the goal-orientation that the theory suggests affect goal-involvement. All

participants regardless of goal-orientation experience both periods of task- and ego-involvement. Given the POSQ scores, especially Mike's, who scored low in ego-orientation but still experienced a lot of ego-involvement during the competition, the findings will have a hard time if it has to support a link between these. Mike only had to compete for about 90 seconds before his first experience of a period of ego-involvement. This finding supports the finding of Ames (1992) that the motivational climate has a more decisive effect on goal-involvement than goal-orientation has. Though this study could not find support, the possible interplay between goal-orientation and goal-involvement cannot be excluded totally. It might be that Mike's ability to change fast back to task-involvement compared with Anne and Carol stems from his different goal-orientation. The small numbers in this study also limit the findings.

4.4 The state of ego-involvement

A change in motivation described as a fixed-point attractor leads to ego-involvement, as we have seen. Before we look at the consequences of a change in motivation, these periods of ego-involvement will be investigated further. As mentioned before the cognitions in these periods seem to be constructed by self-evaluations of performance. In the self-evaluation different patterns of cognitions seem to develop. First of all the self-evaluation starts in the present, where the participants appraise their ability, either in the light of current feedback (the feedback leading to the change in motivation) or the performance so far. This is an example from Carol, who noticed that she lost some time on a particular leg.

> *…I thought that I was going according to plan, but then I understood that that was not the case. I must have been running with a wrong bearing out of the control. Then I become like, damn now I'm losing even more time... This is stupid, and then I start thinking of my placing and my goals for this race. This I cannot afford and at the same time I start noticing my physical sensation. I remember that it felt tough physically. You cannot afford to do any extra loops now…*

How the participants deal with this appraisal of ability seems to be crucial for how the cognitions in the next part of the evaluation develop and how the participants react to the difference between their achievement goals and the current evaluation. The appraisal can be perceived in three ways: *positively*, if they are perceived better than expected**,**

neutrally, if they meet expectations, or *negatively*, if they are poorer than expected. In the situations described so far in this study the participants have mostly perceive the achievement goals negatively, but it is important to point out that the feedback can also be perceived as positive. To exemplify this, Anne 's experience of a positively angled ego-involvement is described below.

> *Now you have to run, Anne, to the path, find the last control, it is easy. Now you just have to run, then this could be an amazing result. You gave a superb performance; you have gone straight into every control. Now you just have to run with all you got.*

In this situation Anne understands that her performance could be really good, which the evaluation dwells on.

With reference to the evaluation, when the participant experiences the feedback as *positive* or *neutral* the specific situation confirms high ability. At this point the self-belief of the participant is confirmed or even increased which turns the last part of the evaluation towards this. Though it seems obvious that this would create an adaptive strategy, we will see later that this is not always the case. If the feedback on the other hand is perceived as *negative* it can create a complex situation. With an experience of negative feedback, the participant feels that their perceived level of ability is shaky. At this point self-beliefs will decide how the last part of the evaluation develops. On the one hand if the self-beliefs are low the participant receives confirmation of low abilities and the last part of the evaluation shows how to deal with this. On the other hand if the self-beliefs are high an internal conflict between the experienced negative feedback and high self-beliefs will be salient in the last part of the evaluation. As we will see later, this pattern of cognitions can lead to different consequences, but it must be understood that when a negative feedback is perceived, the self-beliefs will decide the patterns of cognitions in the last part of the evaluation. The findings are in line with how Nicholls described a self-evaluation occurring in AGT (Nicholls, 1989) and confirms the finding of Ntoumanis and Biddle (1998), who found that cognitive and somatic anxiety were exerted through self-confidence. How the evaluation appears during competition is a new insight, however, and sheds fresh light on how ego-involved evaluation develops during a competition and how the role of achievement-goals and self-beliefs affect an athlete while competing. The role of self-beliefs in particular is a question that can be

discussed further because there seems to be little correspondence between general self-beliefs and the self-beliefs the participant experiences during competition. All participants report high self-belief, but during competition they all experience feeling inferior, which then affects evaluation as described above. This means that even though self-belief in general is high, the findings indicate that it is not stable during competition. Finally, presenting the state of ego-involvement as the person making appraisals of the current situation, a clear link to theories on stress and emotions appears.[2] With this link in mind it can be suggested that change in motivation triggers a stress-emotion reaction and that the period of ego-involvement is actually stress response. This study will not elaborate on this suggestion but the findings indicate that there is a link between these theories.

4.4.1 Subjective, irrational and uncontrolled self-evaluations

What is interesting is that even though the feedback can be perceived as positive, neutral or negative, most of the evaluations the participants make are based on subjective feedback. It is generally accepted that during an orienteering race there is not much objective feedback available. When they become more experienced an athlete can become better at judging the level of the performance while performing, but nonetheless most of these judgements will be made on subjective feedback. Especially in situations where the participant describes a negative physical sensation subjective judgement is really strong. Another point that is as least as interesting is that Anne sometimes describes her cognitions as irrational**.** For example:

> *Compared with the other Norwegian girls, then 10 seconds is nothing, so everything is very stupid.*

At another time she describes the irrationality like this.

> *I become a little bit desperate, because I think that it's done. Everyone can make mistakes, and this was maybe a 10-second mistake, and it made me think like this.*

[2] Richard Lazarus presented in his studies of stress and emotion a process which included primary and secondary appraisal. Primary appraisal refers to considering the situation as positive, negative or neutral. Secondary appraisal refers to an evaluation of the resources to cope with the situation (Lazarus, 1991)

These findings indicate that the evaluation not always are built on rational thinking and might to some extent be out of control. The above also shows this irrationality when Anne overdramatises the consequences of the mistake. This phenomenon has not yet been studied in orienteering. Studies have found that orienteering athletes are good at spotting a mistake (Kvaase, 1992), but the findings in this study indicate that the reaction to it may create a totally different challenge. Furthermore other findings indicate that there is a difference in athletes' perception of control when changes in motivation occur. When asked why changes occurred, Mike expressed awareness about the change of motivation that gives him a kind of control in situations.

> *And then I think the reason they popped up was that I had a technical control; I knew where I was going. Then I let them [the thoughts] appear, to some degree.*

Anne's experience is sometimes the opposite. She seems to be unaware of the change in motivation, and not in control of what happens.

> *One the other hand it is all about the result. My thoughts ruminate around this. I try to stop these thoughts and think of the performance, picking the control, but everything gets mixed.*

Carol also expresses some awareness about change of focus in some situations.

> *I'm used to reacting like this. This is often the way I think when I pass the arena. I do not suddenly get new ways of thinking.*

AGT states that a person will build their achievement goals on a rational platform in a situation. The participants in this study might act rationally in the situation but afterwards they say that they acted irrationally. The findings in this study indicate that in some situations rationality could be questioned. The athlete feels that in the situation they set up the right goal but from a wider perspective it is hard to see any rationality. Comparison of the participants showed that such irrationality was only found in Anne’s and Carol's cases. Orienteering is a sport where experience is salient and one must not forget that both have practised it for five years fewer than Mike. Another factor is gender. How this could affect cognition is not addressed in this study, but more data on how the role of experience and gender could affect cognition during competition may provide some interesting findings.

4.5 Consequences of being ego-involved

As stated above, the findings indicate both self-induced and other-induced reasons for a change in motivation to occur that is suggested being fix-point attractors. For ego-involvement the findings indicated that different patterns of cognition develop from appraising achievement goals in the light of feedback. The feedback is evidently highly subjective. The salient role of self-belief in evaluation is noted, but there are indications that evaluations are not always rational and controlled.

Analysis shows that the participants described *positive*, *negative* and *no consequences* when asked what effect change in motivation had on their performance.

Negative consequences

As regards the *negative* consequences analysis shows four main categories: *interfering ruminations*, *choosing the easy task*, *changing route choice* and *negative focus on physical sensation*.

Interfering rumination refers to ego-involved evaluation which disturbs the technical demands of the current situation. Orienteering is a sport with high cognitive demands (Johansen, 1997; Macquet et al., 2011), so if a change in motivation occurs in a situation where the technical demands are high, then there is a risk that the evaluation could reduce the performance because the participant does not have the time to make the right choices. This means that becoming ego-involved can reduce the performance. Anne describes it like this.

> *One the other hand it is all about the result. My thoughts ruminate around this. I try to stop these thoughts and think of the performance, picking the control, but everything gets mixed.*

Furthermore, when presented with the consequence, she even saw the ruminations as reasons for her disqualification and a major influence on her performance.

> *Yes, If I just focused on the task at hand, then this extra focus would have given me time to look at all of the course. This would have reduced the chances of skipping the fourth control [the participant didn't see the control and skipped it, going straight to the fifth control. She was therefore disqualified].*

It would be hard to call this a maladaptive strategy in line with AGT, because it is the evaluation itself that effects a reduction in performance. It is still a negative consequence of the change in motivation, however, so it should be included. The findings indicate that it only affects participants if they experience cognitions to be out of control at a time where the technical demands are high. This also means that if the participant experience the feedback as positive or negative in the appraisal does not have any effect on this kind of consequence. It is more decisive at which time of the course it happened. This phenomenon can also be explained by other theories, especially the cognitive load theory (Paas, Renkl, & Sweller, 2003). The cognitive load theory suggests that there is a limit to how many cognitive tasks a person can do at one time. So if there is a need for too many cognitive tasks to be dealt with at the same time, the performance is reduced either because the athlete cannot deal with the tasks completely or chooses to do only one task (Paas et al., 2003).

Choosing the easy task refers to how the participant simplifies the task in such a way that the technical solution is insufficient. The participants describe this phenomenon as "*not doing the technical job well enough*", focusing mainly on the physical task or trying in some way to avoid the technical task. Carol explains what happens in such a situation.

> *Yes, I think that it did. Because in a way, I became a little excited on advancing fast. So I did not take the time to orienteer safely to the fourteenth control, because of the thoughts of meeting Laura. I had to run, I could not make mistakes, so then you think, it is actually quite stupid, because you know that you must not make mistakes, but then you make a mistake because you think of not making a mistake.*

In this situation Carol is focused on the physical part of the performance. She simplifies the technical job in such a simple way that she has to relocate, which is time-consuming and constitutes a maladaptive strategy. The findings indicate that in an ego-involved state the task the participant focuses on narrows down to the physical part. Also Anne experiences these phenomena at a time in her performance, and tries to avoid doing a technical job at all. This is how she describes what happens.

> *I know I have to read the map, but I do not want to. In that way I will gamble on finding the control.*

It is clear that for some reason she does not want to deal with the task. The situation leading to the development of this maladaptive strategy develops from the last part of the self-evaluation the participants undergo. The task becomes oversimplified if the participant seeks to avoid showing incompetence and has low self-confidence. Also controlled, uncontrolled and irrational cognitions were registered in these situations. The findings are in line with AGT, because the participant shows low effort, and chooses an easy task. The avoidance of the technical part could even be linked with AGT suggesting not to attend at all. Therefore the findings support the maladaptive pattern suggested in AGT concerning avoiding a show of incompetence. The latter can also be seen as a stress reaction in escaping the situation, denying that the technical demand exists. Earlier the link between changes in motivation and stress and emotion was suggested. These findings also indicate that there could be a link in this situation as well.

Changing route choice refers to how the participant changes his or her decision based on an evaluation done on a comparison with the competitors. In orienteering a lot of decisions are made. The athlete is likely to make a decision based on technical difficulty, runability and the strength they think they have (Macquet et al., 2011). A clear example is the situation where Anne changes her route decision after rumination on what her competitors might do.

> *I reconsider if this is a good way? I am very insecure, I am very impatient. I am not going to run all the way to the crossing. I will take a short cut [she exchanges the route for a straighter one]. I get very unsecure, because now I think I have done something stupid….*

One could question if this really is a maladaptive strategy, especially if with hindsight one can see that the change in route is beneficial. Yet the situation can be seen as maladaptive for two reasons. The first is that the choice is made on the basis of others and not one self which should not make the overall self-beliefs better, that again could have a negative effect on the evaluations in the remaining competition. The second is that this extra evaluation, "*was this the right choice?*", could take the focus away from the task at hand and lead to rumination. In the self-evaluation the change of the route choice seems to be based on low self-beliefs that are being reinforced, which leads to the maladaptive strategy of changing route. The findings also indicate that irrationality

and not having control of cognitions seems to affect this maladaptive strategy. The findings here are also in line with AGT, in that changing the route is a proof of the athletes' low confidence and leads to a maladaptive strategy. As stated above, route choice can also be done generally on the basis of the athletes' judgements of their own abilities compared with others. A runner who sees him/herself as physically strong compared with competitors could choose a route where this ability is more relevant. This means that some athletes might already use a norminative appraisal in terms of how they make the route choice. Greater use of this strategy might lead to easier change of route and could also affect the phenomenon of changing routes and make it more complex. This study does not shed any light on the question, however.

Negative focus on physical sensation refers to the participant becoming more aware of physical sensations which lead to a more negative focus on the physical part of the performance. This statement from Carol describes it well.

> *Yes, I think it did. I started to think more about the physical part. If I had not made this mistake and thought I had lost time, then I don't think I would have started thinking that it was tough.*

Mike describes how focusing on the physical part affects him.

> *When you do the right things, then you do not think so much about the physical or I do not, but when I make mistakes and realise that I have been running further than the others, then I start noticing the physical sensation, like today it's tough. So I think it had a small negative effect, that I became too focused on the physical part.*

Furthermore Mike also says that he gets the feeling of not running fast enough and that this is something he often has to deal with. All three participants report that a negative focus on the physical part reduced their overall performance, because of feeling inferior to their competitors; they did not make a wholehearted effort in the competition. The findings indicate that the reasons for changes in motivation seem to develop this maladaptive strategy, but the participant needs to perceive the feedback as negative and reinforce the negativity with low self-beliefs for it to develop. The finding is clearly in line with AGT and the maladaptive strategy of not making full effort.

Johansen's (1997) study on cognitions in orienteering also found that when orienteering athletes do mistakes, they act in a manner similar to what is described in these findings. Johansen (1997) found that orienteers become less accurate and effective in their planning and behave in a defensive way. Though motivational issues were not a consideration for Johansen (1997), these oversimplifications, difficulties in making choices or not attending to the task at all seem to complement and support the findings in this study. Acknowledging the findings in this study it can be suggested that changes in motivation can contribute to explain Johansen's (1997) findings.

Positive consequences

Second, if we look at what the participants referred to as having a *positive* effect on their performance two main factors stand out in the analysis. *More effort* and *more technical focus* were the two consequences reported as positive.

More effort refers to the participant pushing themselves harder, without risking losing control technically. Anne described it like this.

> *Yes, because I said those things to myself, it made me push harder and I went faster in this part.*

And Mike in this way.

> *I think it gave me an edge, to the last loop. I knew that if I made a good last loop, then it was not impossible. The others could make mistakes. If I run well I might take a place.*

In these situations the participant is more on the offensive and seeks the task at hand. There is also an echo of Gernigon et al. (2004) whose participants described approaching the task similarly. The findings indicate that all kinds of self-evaluations can foster greater effort and can be seen as adaptive strategies. The deciding factor is found both in the first part and the last part of the self-evaluation. In the first part if the feedback is perceived as positive or in line with the achievement goals, more effort will occur. If it is perceived as negative, high self-beliefs will make the participant put in more effort. These findings support AGT, because high self-beliefs produce greater effort.

More technical focus refers to the participant focusing more on the technical part of the performance. Orienteering is not only about running fast; the athlete needs to know where he or she is going. Therefore athletes experience the technical demands during competition as a main driver (Macquet et al., 2011; Kvaase, 1992; Johansen, 1997). The participants described how change in motivation made them focus more on the task, which was a positive factor in the overall result. Anne describes it like this.

> *It made me even more focused on doing my job technically.*

Mike described it like this.

> *Maybe a possibility for a little positive effect, because I tried to be more sharp on the last part. I felt a little bit hunted, but then I took it positively, knowing that I had to focus on the technical part.*

and

> *Yes, in that I believe that I thought more about this. I cannot afford to lose time, if I have to be in the match today. So now I am behind schedule.*

The findings indicate that self-evaluation can lead to greater focus on the technical task and for that reason it should be seen as an adaptive strategy. The deciding factor is found both in the first part and the last part of the evaluation. In the first part if the feedback is perceived as positive or in line with the achievement goal, more focus will occur. If it is perceived as negative, high self-beliefs will persuade the participant to employ a more technical focus. These findings support AGT, because high self-beliefs lead to an adaptive strategy.

No consequence

The last of the three main factors is *no consequence at all***.** This refers to when the participants felt that change in motivation had no effect on their performance at all. This in an example from Anne.

> *Oh, a yellow marsh? That's wired. It has been so many strange features in this part of my route! Where am I? Where is the boulder? Damn, did I run too far? But the control is simple from this point [relocated on the yellow march]. Don't think of the result, DON'T think of the result, just follow the march downwards,*

then you'll come straight to the control. Now it's just simple, follow the march downwards. No the race is done, no it's not done, you can still get a good result, just focus on the task from this point.

In this situation it seems like the self-evaluation suddenly ends with the participant focusing back on the task, without any change in strategy. The participant seems to accept or simply come to the end of the self-evaluation. The link to a more technical focus described above is tenuous, but what makes the difference is the participant's experience of the situation. This phenomenon is hard to discuss in terms of AGT, because little is said about goal-involvement not having any effect on the strategy. Certainly these findings are important because they indicate that one has to be careful about maladaptive and adaptive strategies, but also suggest a change in motivation does not to have any effect on the participant at all.

In sum, these findings indicate and emphasise the important role self-beliefs have when an athlete is ego-involved, as confirmed in the section 4.4 concerning the state of goal-involvement. Here the consequences are presented in different categories, but it is important to understand that there is a thin line between the negative, positive and neutral consequences. A finding that is especially interesting is that a perceived positive feedback can have negative consequences for the performance. The findings indicate that interfering rumination and choosing too simple a task, the latter mainly because the athlete wants to avoid showing incompetence, are negative consequences. This also confirms that with low self-beliefs ego-involvement seems to develop a maladaptive pattern even if the feedback is perceived as positive.

So far in this chapter links to AGT have been discussed which suggest new perspectives on how motivation can affect the competitor while competing. Such rich descriptions should lead to a clearer picture of AGT's role in sport performances. As regards change in motivation, the reasons for the change, self-evaluation and its consequences, Figure 12 shows how these states succeed each other.

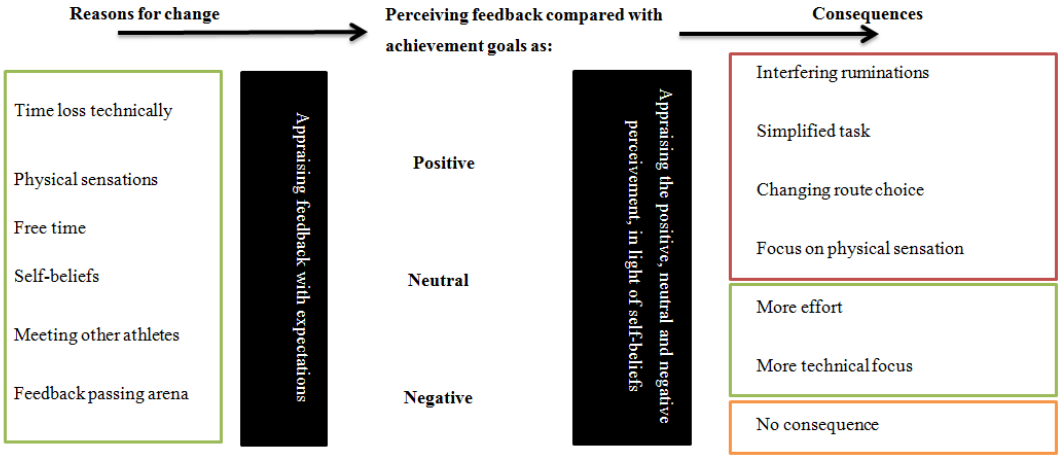

Figure 12: *Presents the different stages of a change in motivation.*

First of all, change in motivation stems from six factors. This leads to an appraisal of the current feedback with an expectation which is perceived as positive, negative or neutral. After this a second appraisal occurs whereby the situation compared with beliefs in abilities (self-beliefs) is evaluated. This finally leads to negative, positive or no consequence for the performance.

4.6 Dynamics of goal-involvement

Albeit the findings presented and discussed so far may seem fairly straightforward, or at least it has been the aim to make them so, the phenomena of changes in motivation are more complex. It is difficult to see changes in motivation during competition as isolated situations that do not have any effect on each other. The findings indicate that every situation has potential to affect what happens later in the competition, and introduces a dynamic approach to change in motivation. Mike describes how things happening in the race can affect the rest of the race.

> *It's hard, the more negative feedback you get when you think you performed OK, the more it will affect you.*

Carol makes a clear statement about it.

> *This situation affects your subconscious and it will affect the rest of the race.*

These statements support the finding of Gernigon et al. (2004) that a situation that develops during the competition affects situations later in the competition. For example, if a person evaluates a feedback as positive for the end result, then in the next situation the person will be more likely to evaluate the feedback as positive. The reverse is true of a negative evaluation, as described by Carol when she realises that she has made her second mistake.

> *…Then I become like, damn now I'm losing even more time…*

It would seem obvious that this kind of effect can lead into some kind of spiral, negative or positive. Even if general self-beliefs are high it is likely that the interplay between changes in motivation affects them over the course of the competition and so they evolve or decrease. The salience of self-beliefs concerning maladaptive and adaptive strategies was described earlier, and the dynamic suggested in this part could mean that self-beliefs are also affected by earlier situations. Another point that seems important in the dynamics is that in some situations the consequences seem to complement or succeed each other. This seems especially clear in situations where a clear negative feedback is experienced. Making a mistake, getting caught by other athletes or getting negative feedback when passing the arena are good examples. The example below from Carol shows how the different factors affect her evaluation.

> *I think that I'm going according to plan, but then I understood that that was not the case. I must have been running with a wrong bearing out of the control. Then I become like, damn now I'm losing even more time. Then I decide where I am. Then I run against the hilltop against the path and then I think; damn, now you have lost time. This is stupid, and then I start thinking of my placing and my goals for this race. This I can't afford and at the same time I start noticing a physical sensation. I remember that it felt tough physically. You can't afford to do any extra loops now. But then while running along the road I start telling myself, pull yourself together. Focus on the technical and I feel that I make a new start, when I pass the stream. Then I'm back on track, in the concerns of focus.*

It is clear that Carol not only has to struggle with current feedback but also with the feedback from earlier in the competition. It may seem obvious that situations affect each other, but with the approach of changes in motivation the findings describe how and what. So apart from each change in motivation, the findings suggest than one also has to take into account the dynamics of each state of ego-involvement and their effect on each

other. The later suggestion is in line with the finding of Gernigon et al. (2004) that the different states can oppose, run in parallel with and complement each other.

5. General discussion

The findings presented above show that participants experienced a reduction in their performance because of change in motivation from being task-involved to becoming ego-involved. The reasons they give for the time loss appear to be multiple and complex. In the theory chapter 3 it is clear that studies that have investigated this phenomenon before are limited. The findings in this study therefore offer new angles and a better description of the phenomenon of goal-involvement in AGT. To shed more light on this it is interesting to discuss the what optimal goal-involvement during competition actually is. Clearly, changes in motivation are a complex phenomenon that have different outcomes when it comes to the overall performance, but the analysis showed that it might be possible to navigate in this complex jungle. The participants in this study reported both a salience in task-involvement during competition and a link between a good performance and being task-involved. Yet the findings indicate that the picture is not so simple. First of all, if a change in motivation develops because of a fixed-point attractor stemming from the context of the situation over which the athlete, has little control then even if the athlete wants to be task-involved they need to be able to handle the situation when ego-involved to perform optimally. This suggestion is supported by Harwood and Swain (2001) who found athletes had a powerful tendency to be ego-involved during competition. If this is so, the ability to deal adaptively with a change in motivation so it can lead to more effort or more focus or at least not have a negative consequence becomes a crucial issue. Second, the findings on the consequence of an adaptive strategy of being ego-involved indicate contrastingly the aim of the study also an adaptive angel. This suggests that changes in motivation can lead to different consequences and not just negative consequences. With this in mind the general difference in the consequences should be examined. In general, being ego-involved at the wrong time can have a negative consequence, so the time at which the change happens can have an important effect on the performance. The findings suggest that having some kind of control of the change in motivation is a salient ability, as is being able to change back to being task-involved. Low self-confidence seems to develop a maladaptive strategy; even if the feedback is perceived as positive it can lead to a maladaptive strategy if the athletes want to avoid showing incompetence. On the other hand, to develop an adaptive strategy there is a need in the period of self-evaluation either to experience a positive feedback or have high self-beliefs. This means that when

the ability is perceived as negative high self-beliefs can still create an adaptive pattern. Furthermore it is important to note the subjectivisms and irrationality in the self-evaluation which were described earlier. With a fixed-point attractor that in some way forces the participant into ego-involvement, it can be suggested that the only thing that the participant seems to be in control of is the change back to task-involvement. This would also mean that the context and the cognitions are not likely to be fully under the athlete's control. The positive and negative spiral was explained earlier, but in general the context might have more effect on the participant than one would think. In this context, another point should be noted. The findings showed that no consequence is also an option for the participants: the participant just accepts the situation and rationally changes their focus to task-involvement. Therefore accepting the current ego-involved thought can at least ensure no negative consequence. Tying all of these loose ends together, one could suggest that not just being task-involved but also changing back to task-involvement when ego-involved would give the best overall performance, but if the self-beliefs are high or the subjective feedback in the performance is perceived as positive, the performance can be at least as good. These suggestions support AGT in that self-beliefs mediate the consequences of being ego-involved.

The findings also describe in a new way the interplay between the different goal-involvements during competition. This raises the question of how sports psychology looks at AGT and the finding that the optimal result is the creation of a mastery climate (Ames, 1992). The finding of Cervello et al. (2007) that there is no clear link between a mastery climate and performance could be supported by this study. The findings that the participants express both concepts of goal-involvement in competition should be taken seriously and for the reasons above one can suggest that dealing with ego-involvement is at least as important as setting the stage for task-involvement. In terms of how to deal with change in motivation in more adaptive ways mindfulness (Kabat-Zinn, 1991) offers interesting possibilities. With mindfulness the athlete would learn to accept ego-involved thoughts and prevent change in motivation from having any effect on performance. Another solution would be to deal with irrationality and subjectivity by using cognitive behaviour therapy (Wright, Basco, & Thase, 2006), to change thought patterns. Because of this study's limitations only suggestions are offered on how these interventions could be achieved.

5.1 Credibility and limitations

The methods used in this study have some limitations. First of all, the cognitions the participants describe must be handled with care, as they might not remember the exact cognitions. Another limitation that might affect the result is the athletes' knowledge of being videotaped and tracked by the GPS system. Lately all major orienteering events have used “live” GPS-tracking. This means that all athletes have become used to being “tracked” while competing. This should reduce the likelihood of an effect on their performance. AGT suggests that motivation ebbs and flows and so different strengths of goal-involvement should be measurable. This study did not consider this aspect of AGT, but instead saw goal-involvement as either task- or ego-involved. The participants were introduced to the theory at the start of the interview. This might have forced the participants to present their cognitions so as to please the researcher or to over-emphasise the effect of the phenomenon. Yet compared with earlier studies in orienteering there is a clear similarity between the reported cognitions. The participants describe positive, negative and neutral consequences, which would suggest some differences in the effect the phenomenon has. Last but not least, with only three participants it is not possible to draw definitive conclusions from the findings; only suggestions can be made.

5.2 Further studies

Because of the limitations described above, certain aspects have been disregarded which it would be interesting to address more specifically. Gernigon et al. (2004) discussed a need for looking at standardised sport situations. With the findings in this study it could be possible to pinpoint which situations can be isolated. The suggestion that a fixed-point attractor in certain situations during the competition creates a change in motivation would be a natural place to start. Linking this with the early findings of Ames (1984) and trying to identify ego-attractors in different sports would be interesting. The question of why the athletes perceive task-involvement as the optimal state while ego-involvement can also lead to positive consequences could also be addressed. How the climate or the psychological development affects these phenomena could be an interesting angle to explore.

The low number of observations in this study should prompt future research to use more participants and more competitions. With more observations it would also be possible

to define the time the participant spends in each goal-involvement. The possibility of complementing the change in motivation with behaviour during the change could also be interesting. In the orienteering environment some athletes and coaches are starting to explore how the frequency of map-reading and performance level are linked. There is some indication that a high frequency of map-reading and good performance correlate. Combining changes in motivation with tracking map-reading frequency could be interesting. Although only three participants were used in this study the findings suggest that there could be a gender difference in how they experience a change in motivation. For that reason it would be interesting to look for differences in gender and experience. Finally, concerning the suggestion that mindfulness could be an adaptive mental tool, it would be interesting to apply an intervention teaching mindfulness and measuring the effect it has on dealing with change in motivation and performance.

In sum, the qualitative analysis and findings from this study indicate that the phenomena of changes in motivation can affect the orienteering athlete in both adaptive and maladaptive ways. This study has suggested how to approach goal-involvement during competition, which again has found support and criticisms for earlier studies on the topic. A new approach which sees change in motivation in the light of an ego-involved attractor is a compelling idea. Further studies need to explore the phenomena more deeply to clarify their complexity.

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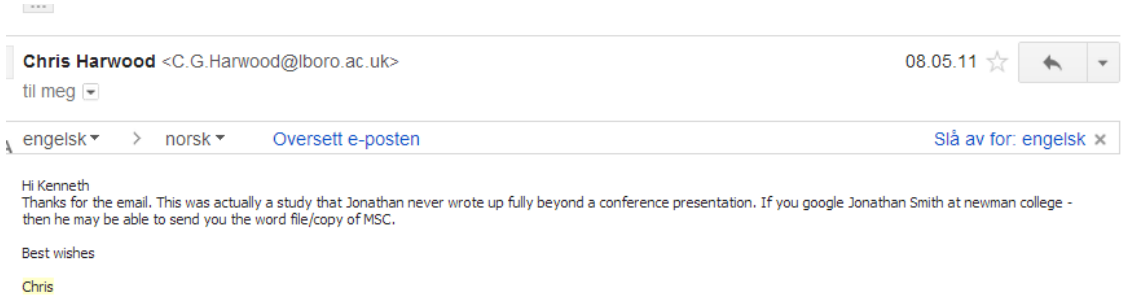
List of tables

List of figures

Overview appendix

Appendix A

Mail correnspondance from Chris Harwood.



Chris Harwood <C.G.Harwood@lboro.ac.uk> 08.05.11

til meg

engelsk › norsk Oversett e-posten Slå av for: engelsk

Hi Kenneth
Thanks for the email. This was actually a study that Jonathan never wrote up fully beyond a conference presentation. If you google Jonathan Smith at newman college - then he may be able to send you the word file/copy of MSC.

Best wishes

Chris

Appendix B

Kjære _____navn_____.

I forbindelse med mit masterprojekt i idrettspsykologi ved Norges idretthøgskole har jeg behov for noen forsøkspersoner. Etter en vurdering av ønsket nivå og erfaring innen orientering, er du blevet plasseret i min målgruppe for denne forskning.

Mit tema er endringer i motivasjon under konkurranse og jeg kommer å bruke NM mellomdistanse til min forskning. Annen informasjon ønsker jeg ikke å gå ut med, da det vil kunne påvirke forskningen i en uønsket retning. Selve resultatet av konkurransen har ingenting for forskningen å si.

For din del, forventes det at du før start (ca. 30 min før) utfylder et spørreskjema omkring motivasjon (tar ca. 5 min). Etter det skal du gjennomføre løypen din på beste sett og som du vanligvis gjør, dog påmontert et kamera på hodet. Til slutt vil du 1-2 time etter konkurranse gjennomføre et 45-60 min. langt intervju med mig, hvor du skal forklare hvordan du tenkte hele veien igjennom løypen, med videoen fra løypa som støtte. Intervjuet vil bli opptatt på video, samt diktafon.

Kamera er på størrelse og veier det samme som en hodelykt, så det kommer ikke til å påvirke din prestasjon. Du skal selvfølgelig få lov til å teste utstyret ut skikkelig, så du bliver komfortabel med det. Dette betyder at du i slutten av august og i starten av Septemper får låne kameraet til eget bruk.

All informasjon og matriale vil bli forsvarlig oppbevaret i et avlåst rum, mens studiet foregår. Derutover vil alle opplysninger fra deg, senest en måned etter intervjuet bli anonymisert. Videomatriale og andre opplysninger vil bli slettet etter endt studie (30/5-2012), slik at du ikke kan spores etter studiet. Som forsker er jeg underlagt taushetsplikt, slik at informasjon fra deg ikke går videre.

Din deltagelse er frivillig og som i all forskning har du mulighet til å hoppe fra om du ikke føler at du har lyst til å delta likevel. Det kan du gjøre på eget initiativ, når du vil, og uten at det får noen konsekvenser for deg.

Ta gjerne kontakt om du har spørsmål.

Student; Kenneth Buch, Kjelsåsveien 88b, 0491 Oslo. Tlf 41282829

Veileder; Professor Anne Marte Pensgård, Norges Idrettshøgskole. Sognsveien 220, 0863 Oslo. Tlf 23262421

Skiftlig samtykke

Jeg _____ har lest for forstått ovenstående informasjon og akseptere de konsekvenser dette projekt har for meg og samtykker til min frivillige deltagelse.

Dato/Sted:

Underskrift:

Appendix C

Norsk samfunnsvitenskapelig datatjeneste AS
NORWEGIAN SOCIAL SCIENCE DATA SERVICES

Harald Hårfagres gate 29
N-5007 Bergen
Norway
Tel: +47-55 58 21 17
Fax: +47-55 58 96 50
nsd@nsd.uib.no
www.nsd.uib.no
Org.nr. 985 321 884

Anne Marte Pensgaard
Seksjon for coaching og psykologi
Norges idrettshøgskole
Postboks 4014 Ullevål Stadion
0806 OSLO

Vår dato: 02.09.2011 Vår ref: 27708 / 3 / PB Deres dato: Deres ref:

KVITTERING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 12.08.2011. All nødvendig informasjon om prosjektet forelå i sin helhet 01.09.2011. Meldingen gjelder prosjektet:

27708	*Ændringer i motivation under en konkurrence: Et studie af eliteudøvere indenfor orienteringsløb*
Behandlingsansvarlig	*Norges idrettshøgskole, ved institusjonens øverste leder*
Daglig ansvarlig	*Anne Marte Pensgaard*
Student	*Kenneth Buch*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven/-helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/forsk_stud/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://www.nsd.uib.no/personvern/prosjektoversikt.jsp.

Personvernombudet vil ved prosjektets avslutning, 30.05.2012, rette en henvendelse angående status for behandlingen av personopplysninger.

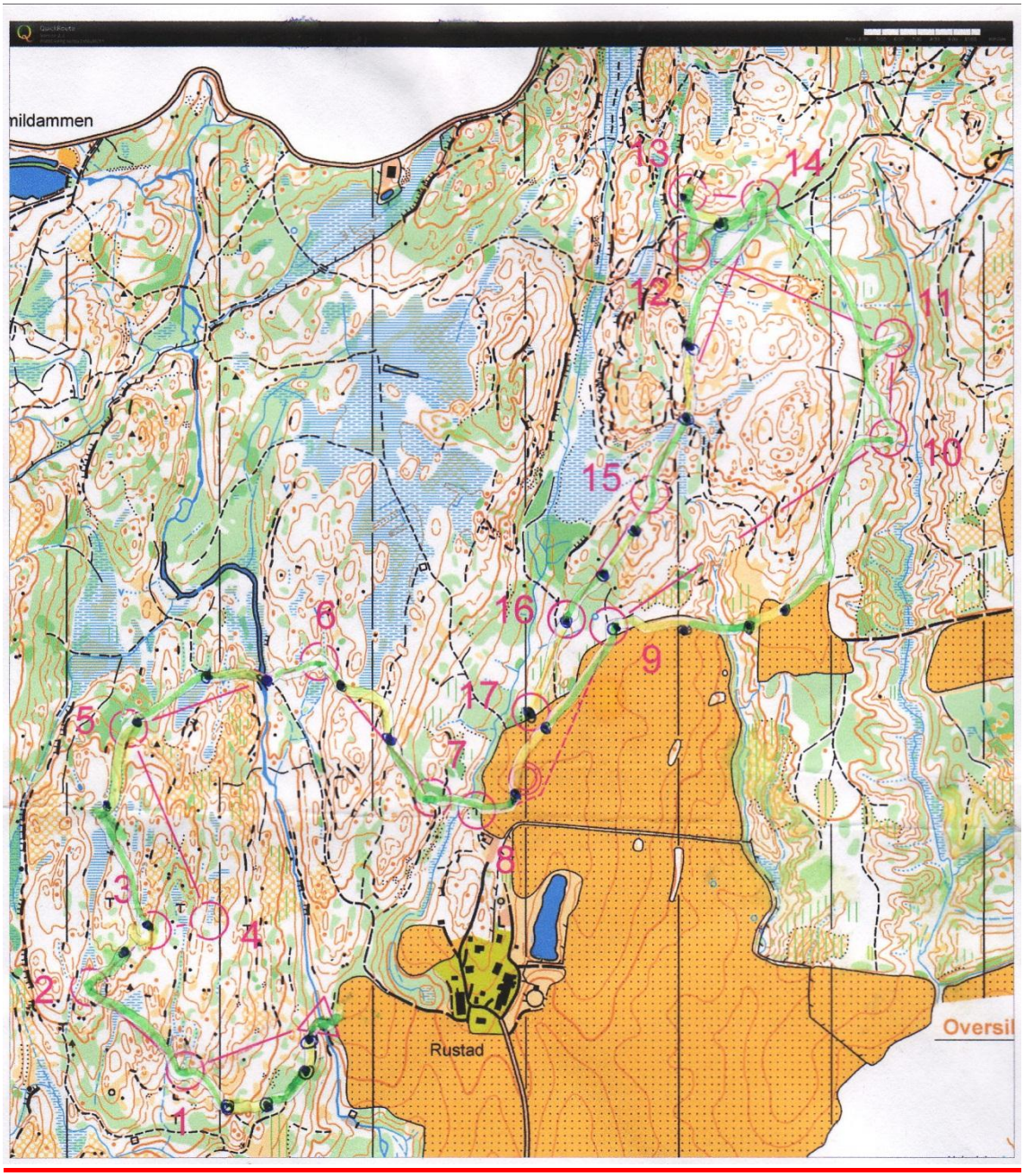
Vennlig hilsen

Vigdis Namtvedt Kvalheim

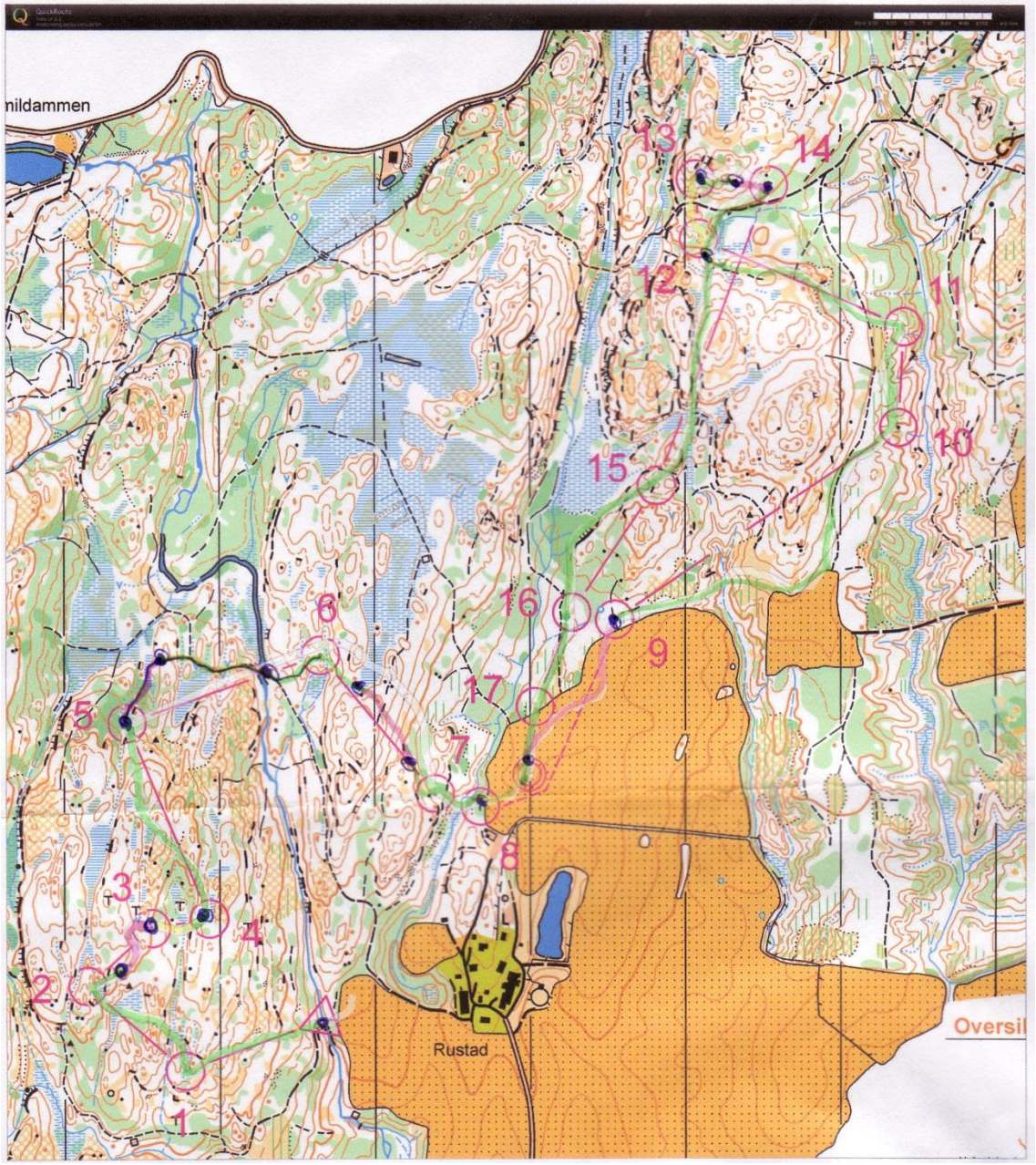
Pernilla Bollman

Kontaktperson: Pernilla Bollman tlf: 55 58 24 10
Vedlegg: Prosjektvurdering
Kopi: Kenneth Buch, Kjelsåsveien 88B, 0491 OSLO

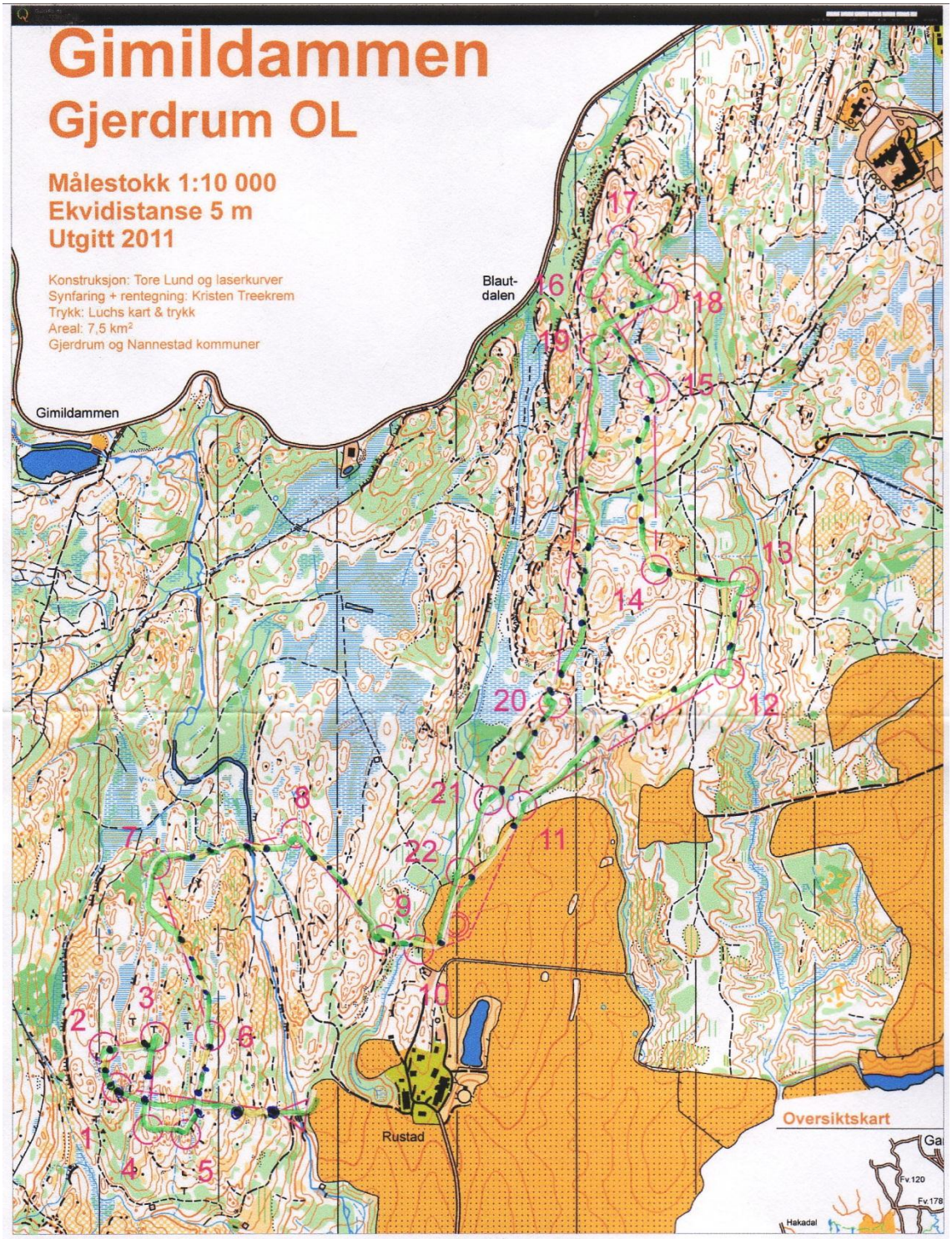
Appendix D



Appendix E



Appendix F


Gimildammen
Gjerdrum OL
Målestokk 1:10 000
Ekvidistanse 5 m
Utgitt 2011
Konstruksjon: Tore Lund og laserkurver
Synfaring + rentegning: Kristen Treekrem
Trykk: Luchs kart & trykk
Areal: 7,5 km²
Gjerdrum og Nannestad kommuner
Blaut-
dalen
Gimildammen
Rustad
Oversiktskart
Fv.120
Hakadal

Appendix G

The case study of Anne

A presentation of the different types of changes in motivation that Anne experience, during her race. If the same type change appeared twice, it will only be presented in one example here.

Situation number 1:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

> *I choose the path and then go on the left route choice. I'm really uncertain. I consider going straight, it's shorter and I'm uncertain if the competitors will use less time going straight, but I want to make it safe and use the path. I'm running along the path, I'm once again looking at the route choice to the control. Unsecure if this is the right one, but know I have chosen, so I'll go on. I think about how to attack the last part of the leg. I reconsider if this is a good way? I'm very insecure, I'm very impatient. I'm not going to run all the way to the crossing. I'll take a short cut [she changes the route choice for a more straight solution]. I get very unsecure, because now I think I have done something stupid. Focus on the map, all the time on the map. Kenneth will look at this after words. Calm down, find out where you are. I see the yellow area. In front of this, I know that I have to see the yellow reentrance; I know that I have to follow this yellow reentrance.*

How do you feel listening to your experience?

> *It's not something I'm especially fond of.*

> *I'm aware that these thoughts exist when I compete.*

> *I judge myself a lot (don't think of this, focus on the task).*

Why do you think you have these thoughts?

> *I'm really focused on results. I know this is wrong, so when I get this kind of thoughts, then I try to change the focus to the task.*

Do you have any tactics changing your focus?

I don't have any tactics

Did this situation have any effect on your performance today?

Yes, If I just focused on the task at hand, then this extra focus would have given me time to look at all of the course. This would have reduced the chances of skipping the 4th control [the participant didn't see the 4th control and skipped it, going straightly to the 5th control. From this she got disqualified].

Situation number 2:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Now I have to read the map. Now I have to see the yellow. I have to read the map. I try to see the stone, I can't find it, there it is. Keep running, now I have to read the map or else I will miss. I have to be focused on the task. Still, I don't have that much time, I have to find the flag, I have to find the flag. Argh… I will properly see the hill. Oh, what? Another athlete! He is properly coming from my control! [She runs to the control ahead that the other athlete came from]. Is this my control? No, there is a lake a this control, so it's not mine, where is mine? I have to go the other side of the hill. Damn, now I will lose a lot of time. Refocus now, try to read the map, read the map, proper direction, to the other side of the hill and then down to the boulder. Come one, you didn't lose that much time. Find the boulder and then follow through, then you can limit this one. It doesn't have to be as bad as you think. I see the flag, focus on the next leg. A long leg! Just follow the yellow. Get into the task.

How do you feel listening to your experience?

It's embarrassing to tell that I don't do the task properly.

I know I have to read the map, but I don't want to. In that way I will gamble on finding the control.

Orienteering is about using the map to find the way.

Why do you think you have these thoughts?

Because I have high expectations.

How do these expectations affect you?

On one side it makes me do a good job. It makes me nervous and then I do a good job.

One the other side it's all about the result. My thoughts ruminate around this. I try to stop these thought and think of the performance, picking the control, but everything gets mixed.

Did this situation have any effect on your performance today?

Yes, I got stressed and that made me take less time making a plan for the next control.

I try to force myself going on.

What happens when you get stressed?

I make bad decisions.

I don't take time to do a good job, making a good plan.

Would it have made a difference if you didn't have had the thoughts on the result?

I don't think this is the case here. I feel stressed all the time. Then I don't have a plan further, but I concentrate a lot on just this leg and not a lot on the next one. Still I "let go" of the thoughts, and let go of the orienteering a little bit here, so I think it has an effect on the next things happening.

Situation number 3:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Oh, a yellow march? That's wired. It has been so many strange features in this part of my route! Where am I? Where is the boulder? Damn, did I run too far? But the control is simple from this point [relocated on the yellow march]. Don't think of the result, DON'T think of the result, just follow the march downwards, then you'll come straight to the control. Now it's just simple, follow the march downwards. No the race is done, no it's not done, you can still make a good result, just focus on the task from this point.

How do you feel listening to your experience?

I become a little bit desperate, because I think that it's done. Everyone can do mistakes, and this was maybe a 10 second mistake, and it made me think like this.

Compared with the other Norwegian girls, then 10 seconds is nothing, so everything is very stupid.

It's like I feel, that I have to perform over my ability, to have a chance against the other Norwegian girls. I've been running against them often, so I know that I'm not that bad.

Why do you think you have these thoughts?

I didn't experience the ups the others did this year, and the Norwegian champs is the only place to compete against the once who ran the World championship. So in this race I had to prove, that I'm not far from their level. I was unlucky this spring; I could have made the World Championship team, so I want to show, that I have the level.

Did this situation have any effect on your performance today?

No!

Situation number 4:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Now I have to approach the path. I have to find the path, or else I will lose too much time, I can't lose more time. Finally, the path. Good, come on, speed up, speed up Anne. You should just follow the path, NO, you have to read the map, you HAVE to read the map. You can't spend useful time thinking, that you have run fast. Come one. Isabella's speed on this path is properly really fast, come on, read the map. The passing [crossing a bridge], then you have to turn into the forest again.

How do you feel listening to your experience?

I'm not surprised [almost delusional]

Why do you think you have these thoughts?

Because I'm unsecure about myself.

Did this situation have any effect on your performance today?

No!

Situation number 5:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Okay, make a good plan, don't mess, don't mess. No wrong direction, come on, look at the compass, look at the compass, okay I have to go this way, up the hill, come on, a little bit further up, don't be a coward, you have to push, you have to run Anne. The other girls are running up this hill, you have to push. You have a lot to loose by walking up this hill, come on, run, come on, you also need a plan for the next control, this control is really demanding, you need a plan.

How do you feel listening to your experience?

It was okay.

Why do you think you have these thoughts?

I'm unsecure.

To push myself properly.

Did this situation have any effect on your performance today?

Yes, because I also had power in the end of the course.

I didn't feel tired after this part and I manage to focus on my orienteering when I reach the edge.

Yes, that I said those thing to myself, made me push harder and I went faster in this part.

Situation number 6:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Okay, I punch, now it's just the passing of the arena. You have to read ahead, but how am I doing? How am I doing? I see Susan, good. How am I doing? I want to know how I'm doing. No, come on, do your orienteering. 8 seconds after [referring to the speaker announcement]. I'm not going to be beaten by 10 seconds by Isabella this time [she recently experienced a loss just by some seconds]. Focus on the task, come on, focus on the task, and look at the route choice.

How do you feel listening to your experience?

Not that nice.

Why do you think you have these thoughts?

Because I want to do well referred to my result.

I want to be up high on the result board.

To win or do a good placement, that is always my first thought

When I think these thoughts, then I try to focus on my performance and that is what should be in focus.

Did this situation have any effect on your performance today?

Yes, I manage to focus on the task, even thinking that I'm doing well, still I would have been better to focus on the task all the time.

Situation number 7:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Okay, I see the flag. I'm going along the fields to the next one. It must be the best to run on the field. Shit, I lost so much on the long distance [referring to the Norwegian championship long distance two days earlier] running on the field. I try to look for a straight alternative, no that's not a good choice, so I'll take the field. I will run to the field. It's not sure that it will be the fastest, but now you made a choice, run to the field. You have to push. You have to run Anne. Orienteer properly; you don't have time to loose on this. Damn is it allowed to run on the fields? It said in the bulletin that is was allowed, so it must be okay.

How do you feel listening to your experience?

I get delusional.

It feels a bit grows, that I just don't trust myself, because I know I can.

I should stand for the choices I make and not doubt them.

Why do you think you have these thoughts?

Because I'm unsecure

Because I lost time using the fields on the long distance [still referring to the Norwegian championship long distance two days earlier], which I was sure that I wouldn't have lost time on.

Did this situation have any effect on your performance today?

I made me even more focused on doing my job technically.

Situation number 8:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

This is not Good! Now I'm going to lose so much on this. God damn, there is for sure pure white open forest on the other route choice. Work Anne, work Anne. This is muddy, but for you this is no problem, just up on the field and into the control. Work on, work on…

How do you feel listening to your experience?

It's a lot of the same issues; I have no more special feelings about this.

Why do you think you have these thoughts?

No other reasons than what I have mentioned before.

Did this situation have any effect on your performance today?

Yes, every time I get these thoughts on me losing time ,then today I was excellent and put my focus back on the task, going into the controls. My focus was; that I should not lose any time into the controls.

Situation number 9:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

Anne, don't! I know I have the same control as the boy, but he doesn't look that skilled [she can see another athlete in front of her], I don't know who he is. Make a solid plan, enter the reentrance. Make a secure plan for 2nd last control. You've been orienteering very well. See the boulder; you do not gamble not seeing the boulder. I see the boulder and I can see the hill on the right side. Do not orienteer on the person in front of you, use your eyes, look around, it's seems so open, find the knoll, find the knoll.

How do you feel listening to your experience?

This is good thoughts.

Why do you think you have these thoughts?

Because of my experience, because at earlier times, I have just been running along, thinking this will work itself out. So to think that this is difficult, you need proper focus and really achieve proper focus, that is good.

Did this situation have any effect on your performance today?

Yes, I found the control properly.

I was more focused into the control, the last difficult one.

Situation number 10:

In the self-defined situation of change in motivation, Anne expressed these thoughts.

There is the knoll, but where is the control? It should be here, yes there it is. Now you have to run Anne, to the path, find the last control, it's easy. Now you

just have to run, then this could be an amazing result. You made a superb performance; you have gone straight into every control. Now you just have to run with all you got.

How do you feel listening to your experience?

It's a little bit on the border, I would have liked that I had a little bit more focus on the task. In practice to other situations or other races. Because the control was quite simple and it's not always that's the case. So it's important to be focused all the way.

Did this situation have any effect on your performance today?

It made me run a bit faster.

Maybe situation! For validation!

The next control seems difficult. Should I approach it just straight on or go around, but I didn't see… Find this control first, there it is. Stop, and take a look at the route choice. No, going straight is too difficult. I will use the path, even if I didn't see the flag from the path [the athlete has passed this area earlier in her race]. Come on, you have to run, now you have to run. Now orienteer, get the yellow field on your left. There I see the yellow field. Run a little bit further.

Appendix H

The case study of Carol

A presentation of the different types of changes in motivation that Carol experience, during her race. If the same type change appeared twice, it will only be presented in one example here.

Situation number 1:

In the self-defined situation of change in motivation, Carol expressed these thoughts.

> *Get out of the control. Then I remember well that I was focused on the right bearing and then I thought that... but here comes the thoughts that this was a mistake. I have made a mistake. Damn, thoughts like that, some anger, but then thoughts that it was only one mistake, and it were not that big. Don't let in ruin for the rest of the race, now you have to pull yourself together and focus on the technical part. And then I switch to focus on the technique. So that was good.*

How do you feel listening to your experience?

> *I have to concentrate to remember everything. It's not all I can remember, but some things I remember better.*

> *What I feel is that I don't put my focus on the technical part away. I simplify, like you have to run to that hill. On the way to the hill you have room for other thoughts.*

Why do you think you have these thoughts?

> *Because I don't like to make mistakes*

> *I have ambitions to do well, so mistakes can ruin those.*

> *I also know that I don't have to think much about these things, it was early in the race and a lot can still happen.*

Did this situation have any effect on your performance today?

> *Without this mistake I would have made the 3rd place.*

This situation affects your subconscious and it will affect the rest of the race.

Positive, to some degree.

I have to accept that I have made the mistake, without it having an effect the rest of my race

To still be focused, and think, one mistake is no problem.

This is undone.

Situation number 2:

In the self-defined situation of change in motivation, Carol expressed these thoughts.

*I thought that I had was to get through the dense forest and up on the...cause I thought I was up higher in the slope, then to get up on the hilltop. Then I'm running along and I see a march and then I think that I'm according to plan, but then I understood that, that was not the case. I must have been running with a wrong bearing out of the control. Then I become like**,** damn now I'm losing even more time. Then I make a conclusion on where I am. Then I run against the hilltop against the path and then I think; damn, now you lost time. This is stupid, and then I start think of my placement and some thought on my goals for this race. This I can't afford and at the same time I start noticing my physical sensation. I remember that it felt tough physically. You can't afford to do any extra loops now. But then while running along the road I start telling myself, pull yourself together. Focus on the technical and I feel that I make a new start, when I pass the stream. Then I'm back on track, what concerns focus.*

How do you feel listening to your experience?

It's quit okay.

Why do you think you have these thoughts?

These thoughts often come when you realize that you have made a mistake, because you don't want to lose time.

You want to do an optimal race.

I'm like this, when I realize that I have made a mistake, then these thoughts appear automatically. These thoughts like, damn and so on.

How do you manage to switch back to focus on the task?

> *In a way I know what to do, to make a good orienteering race and in that you have to focus on the task. You can't let these thoughts take too much space, because then you often make mistakes on every control, then you get many mistakes. It's about being strict against yourself and say, that now you have to focus on the task.*

Did this situation have any effect on your performance today?

> *Yes, I think it did. I started to think more about the physical part. If I wouldn't have made this mistake and thought that I lost time, then I don't think I would have started thinking that is was tough.*

> *When you do the right things, then you don't think so much on the physical or I don't, but when I make mistakes and realize that I have been running further that the others, then I start noticing the physical sensation, like today it's tough. So I think it had a small negative effect, that I became too focused on the physical part.*

Situation number 3:

In the self-defined situation of change in motivation, Carol expressed these thoughts.

> *Here I thought that now I hear the speaker tell that I'm in 7th position. Then I thought, damn this is bad and I became a little bit disappointed about it. I felt that even if I knew that I made a small mistake, I hoped that I was fighting for a higher placement, when I passed the arena. Then I run along the marking and then I hear someone say 1 minute. Then I thought that it's a long last loop, so I started changing focus a little bit, when I ran along. Then I feel that the physically sensation is not that good, so then I had more focus on, that it was tough. Here I remember, that I thought that I was finished with these thoughts on passing the arena and placements. So I thought on keeping up the speed and then inside the forest, I changed to focus on the technical.*

How do you feel listening to your experience?

> *It's okay.*

Why do you think you have these thoughts?

> *I'm used to reacting like this. This is often the way I think when I pass the arena. I don't suddenly get new ways of thinking.*

Do you have a tactic to change back and forth? Could you repeat, how you think about this?

> *I think that I have to orienteer and that is what makes a good performance. That I do my working points for the task.*

> *Most often I feel that I manage this trough a race, it's not that many thoughts that is invested in results. It's like suddenly there is a new leg at hand and you are on your way to think on the task. Not just running there and then, but thinking off your plan for the task.*

Did this situation have any effect on your performance today?

> *I think it gave me and edge, to the last loop. I knew that if I made a good last loop, then it's not impossible. The others can make mistakes. If I run well I might take some places.*

So I gave you optimism for the last loop?

> *Yes.*

Situation number 4:

In the self-defined situation of change in motivation, Carol expressed these thoughts.

> *Here I remember that I focused on the technical part and that I ran downhill. Check that I'm right and that I am where I thought. The suddenly I see Lilly pass in front of me. Then I became a little out of focus, because I was not prepared to see her, but at the same it didn't really affect me. But then I saw Laura, and a thought came, have I cached her? I didn't spend time to look ahead in the course so far and I didn't know we had to cross, so it took my focus. Then I started thinking, maybe I'm running to the wrong control? Because now I had understood that they were on their way to the 14th. No, I'm not on my way to the wrong control, and then I pulled myself together and looked at the map. I understood that I was on the right way, and then, since Laura started 2 minutes in front of me. Then I thought, okay 2 minutes, and how far is she ahead of me now? If I just run full speed, then I'm maybe not that far behind. It was stupid thoughts, but at the same time the next control was quite easy. So then, I focus on the right things technically, but the same time I remember that I thought a lot on running well and not making mistakes. Now you are maybe behind. A lot of stupid thoughts, just because I saw Laura, in general it was really stupid. Then I thought, this is a difficult control and I tried to do it right, but then the thoughts came; that this control is just down there in the slope, and you can just run down there because you will properly see the flag. I didn't and it made me stressed, because my god, you can't afford to lose even more time, on a small mistakes.*

Why do you think you have these thoughts?

I don't know. It's like I'm disturb in my focus. I had not foreseen this, because I where not that much ahead, that I saw the course crossing. So if I had known this, then I would have understood it immediately. Then they were on their way further, but it became like this, oh did I catch them or did I run to the wrong control?

I became really stressed about the situation, because I suddenly thought that I had run against the 14th control, but I hadn't. Then I managed to calm down and understand that I didn't make any mistake, the others were just ahead in their race. But the reason was that it was unexpected.

Tell me more about the stress that you feel!

I think it's like this. That right now I know that Laura is in good shape and are running well, so I started to calculate how far I was behind and that's a bad sign. I managed to understand that she was properly in front of me. I thought those 2 minutes for this small loop that is to less.

If you have to find a place, how far did you get before you let go of the thoughts of meeting Laura?

Before 14th [she meet Laura on the way to the 12th control], or on the way to the 14th. So it went a while, before I manage to focus on the technique.

Did this situation have any effect on your performance today?

Yes, I think that it did. Because in a way, I became at little excited on advancing fast. So I didn't take the time to orienteer safely to the 14th control, because of the thoughts of meeting Laura. I had to run, I couldn't make mistakes, so then you think, it's actually quit stupid, because you know, that you shall not make mistakes, but then you make a mistake because you think of not making a mistake.

So it was a negative affect that episode.

Would you say that you could have been running faster between 12th and 14th if you hadn't had these thoughts?

Maybe not from 12th to 13th, but to 14th. Because I made a 30 seconds mistake on the 14th. I was almost at the control, but I was not in control of how I

approached it from the hill, so it became like running, there and then into the control.

Appendix I

The case study of Mike

A presentation of the different types of changes in motivation that Mike experience, during his race. If the same type change appeared twice, it will only be presented in one example here.

Situation number 1:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

> *At this place, it's tough physically. A lot uphill to the first control. At this place Jim will run fast, he's usually a fast in the opening of a race. There I see the yellow area. I just have go to the end of the yellow area. Be careful that you don't run to fast, run smoothly.*

How do you feel listening to your experience?

> *It's okay. I remember some things clearly and then there are some things that I presume.*

Why do you think you have these thoughts?

> *In this situation, there are 2 reasons. The first is that I didn't feel at my peak today, physically. Then your thoughts will easily turn to the point that others are running faster than you. And then I think the reason they popped up, was that I had a technical control; I knew where I was going. Then I let them [the thoughts] appear, to some degree.*

Did this situation have any effect on your performance today?

> *I don't think so; I think I managed to turn them around. Every time I had to do it, I manage and I don't think it had a negative effect on the performance, or that I ran more slowly.*

Situation number 2:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

Here, it's just to run. It feels a bit tough physically today; it's just to keep pushing. Here the others will run faster, push in the uphill, push. It is tough heather today, it feels tough. Then I have to go up and inn, and then I have to find the narrow march. The march is tough. Then I stumble [refers to video, were the participant is seeing himself stumbling], typical of me. Then I run up the hill.

Why do you think you have these thoughts?

I often work with reentering my focus, when these thoughts of results occur.

They often come when I'm tired.

The more tired I am, the more often they come.

Because it's often that I think that I'm not running fast enough.

They often come when I know where I have to go, the next 10-15 seconds as example. I'm in control that there is not much to read on further on, so instead of a mental breakdown, these thoughts come, and then I have to work my way out of them.

It's typical and I have worked with it [the thoughts] out on the course today, more than once. Because physically, it felt a little bit bad.

So in total I felt that I managed to get back every time I had to, but I had to work today.

You say that you have to work. Do you have a special technique to handle these changes?

Mostly it's about saying to my-self, that I have to look on the map, maybe just look on the map, because then it happens, automatically.

It happens, when I understand that there is a change.

It's possible that it happen unconscious, but in this this place it's "read the map". Because then I automatically get focus on something else than the physics.

I have worked a lot with this, so I might be automatically.

Situation number 3:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

> *There is the control, now it will be exiting to know how I'm doing. How am I doing? It's just to run with the same speed over the arena. 29 seconds behind [hear the speaker saying that]. It was almost like expected. It felt basically good, so this is like expected. Okay, 9th place [hear the speaker], that was bad. A lot of runners are running well today. I will just have to fight all the way and then try to perform well technically and then see the how I'll do. I will properly loose some time at the last loop. Let's see, where am I going to the next control? There, 11. Control, should be right in there and then route choice to the 12. I will take that later.*

Why do you think you have these thoughts?

> *It's partly based on the experience about how the result will be according to how it feels.*

> *So, when you can move the focus away from the map reading, then these thought appear.*

> *I can't stop them, so I see no reason to try to get rid of them, as long as I don't feel that it takes my focus away.*

> *If they are to negative, then I try to focus on running technique or something like that.*

> *At this point I manage to run with the same speed and keep up the pressure, so then I manage with some map reading, but it appears often in positive or negative direction, when I have a lot of time.*

> *So why they come is hard to say, but mainly it's based on feeling. How it feels or how I have experienced the race so far.*

You mentioned that it was according to your expectation, the feedback you got at the arena. What if it hadn't been according to your expectation?

> *There is always hope. If I perform technically well, then I often experience that I'm doing better than I thought. I was not surprised when I knew that I was a little bit behind, even if I had done a good race, because it had felt tough physically so far.*

I thought, if I'm in the lead or one minute behind, I will not be surprised. Because I would have been surprised if I had been in the lead with margin, it had felt that bad, so based on the physical feeling.

Did this situation have any effect on your performance today?

No, it could have had, but I'm really pleased that when I came into the forest again, then I manage again to focus on what I had to do.

It had no positive nor negative effect, even if I had some negative thoughts. I thought, here is no chance, because I have been performing okay so far and I don't have any more to give in the end. So I can have an honorable placement, because it will take a lot to fight in the top, when I a bit behind now. So that was what I thought of negative thoughts.

Let's say you had been in the lead with 1 minute, what would have happened then?

Then I would have been surprised, maybe felt a bit lighter physically.

Then I would have thought that it was natural to feel like this, because the terrain was heavy or something like that.

I would properly have given me a kick, and that I would feel better physically that I did, when I got the feedback.

I would maybe have had a positive effect.

Then, if you would have been behind with 2 minutes?

No matter how far I'm behind, I push all the way.

I might have had more negative thoughts on the last loop, but I would have managed to turn them around, so I would still have performed well technically.

It's hard, the more negative feedback you get when you think you performed okay, the more it will affect you.

Situation number 4:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

Where do I have to run? I'm taking the straight option; it has to beneficial to go straight. Then I have to go to the edge of the cutting area, there I have to run along the cutting line and in there. Harry passed [hear the speaker talk about Harry passing the arena], there was a lot of cheering when he passed. They seem quit eager [can still hear the speaker being enthusiastic], so I think he has a good time. Then he is properly 1 minute behind me, 1 and a half minute behind [referring to real time, not competition time]. I will have to go on, but he runs well. Now he will catch me? It takes a lot to gain that much if I run well. I'll just have to push on all the way in. Here is the edge of the cutting, and then I have to take a bearing and catch the ravine.

Why do you think you have these thoughts?

It's a good speaker sound, so I hear it when I approach the field. It's hard to avoid this, it affects you.

And then there is the small negative feedback. I know Harry made a good championship so far, so I thought that I was not surprised, that he passed in a good time. I reflected a bit over it, so affected me in of the same reasons as everything else is.

At that time I have a pause, where I know where to run, so I get some stimuli, and the thought came immediately, because I'm tired.

Did this situation have any effect on your performance today?

Maybe a possibility for a little positive effect, because I tried to be more sharp on the last part. I felt a little bit hunted, but then I took it positively, concerning that I had to focus on the technical part.

I know that if I perform technically well, then there is little to gain, no matter if you run a bit faster physically.

Situation number 5:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

Here is the top, now I have to follow the top, out here on bearing and then down into the green. It's just to stay with the bearing. Here is tortious, a lot of trees in the way, so I switch to a rougher bearing. Now I'm on the flat area, then it starts to get closer [ref. to the finish]. It's exciting to see how I'm doing, but I have to push, I have to push all the way. Let see, I'm not in control. No, I'll approach the control with a bearing, oh....I see the flag, yes there I am, now it's just running on bearing.

Is this concerning your results?

Yes, I felt that I was a bit lazy. The focus should have been on running on bearing and then push on, but I was drawn out be different things and I think that I focused on that it was close the finish, but I had no expectation that the result would be any good, when I ran there. So it was in no way thoughts like, this could be great. I was more like, you relaxed because you didn't have anything to read on. Downhill [ref. to the downhill part of the leg] I got lazy, and then there came some other thoughts. So I don't think I thought more on the result, more than I said. Nothing special, because I didn't have any expectation, about the result. It's possible that I thought it would be exciting to hear how I've done. Because, at that time I had an expectation that I would be 1 to 3 minutes behind making an okay placement. Because it was a feeling based on the feedback from the passing and that it had been a bit worse physically in the end, even if the technical performance was good.

Did this situation have any effect on your performance today?

I found the control okay and quickly changed the focus on my way to the last control, so it didn't have any special consequences. I could have been a bit more offensive on the bearing and gain some seconds on that.

I was drawn out of my task focus and I felt I was a bit slaloming and hesitating a bit.

Other situations:

On the 3rd control, the result came. I can't remember exactly what I thought, but I thought something about the result. Something negative, according to the result.

When we went through it you said, damn now I'm missing and then, presence, focus on the task. In this "damn now I'm missing" was this where you think of the result?

Yes, in that I believe that I thought more thoughts concerning this. I can't afford to lose time, if I have to be in the match today. So now I'm behind schedule.

I didn't think that, this was the chance of victory, that I missed or now I missed something, but that now I'm behind schedule, which I can't afford.

Did this have any effect on your performance?

No, I don't believe that. I managed to turn it around and got a good leg afterwards. So then I got a good feeling. I don't think it affects anything.

Can I ask about the run-in, where were your thoughts then?

> *Yes, mostly on giving my arms some more speed, then the legs will follow. So it was mostly task focus. Because I know that if I don't focus on that, then I will be slow.*

You didn't hear how you were doing?

> *I heard the crowd, but I didn't hear anything else. I heard the speaker on the way to the last control. So there might have been a small gap, where I heard something about it being at tight race or that it was good or something. That I got some positive feedback, which gave me even more task focus in the run-in, because I knew, that it was about seconds. Then it's even more important to focus on running as fast as possible all the way to the finish. So in all of the run-in was my focus on frequency, frequency, frequency.*

Situation number x: maybe validation

In the self-defined situation of change in motivation, Mike expressed these thoughts.

> *Here I have to run to the march, up on the edge. I think that I have to get up on the plateau, and then run the plateau upwards. Here is a tree; I have to jump the tree. And then I change focus to the map.*

Situation number x:

In the self-defined situation of change in motivation, Mike expressed these thoughts.

> *Here I have to run up...what? Now I have to see the narrow march, I will just use a bearing and then it will be okay. Oh my god, it's really bad runability. Okay, there is a narrow march inside, I didn't see that. I should have run left here. Now let's see, I have to go on, there is a flag there. I have to go on, with a bearing, straight to the path. I have to cross the path and then further up on the hill.*

Why do you think you have these thoughts?

> *Because I think that I should have foreseen this, that a passage with a narrow march. You know this could be rough. So I think that this I should have thought of it, compared with my experience with orienteering technique.*

Did this situation have any effect on your performance today?

No, I manage to change the focus fast, so I was neither negative nor positive.