Age matters: A study on motivation, flow, and self-esteem in competing athletes

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Forord

Denne oppgaven avspeiler min interesse for emnet idrettspsykologi, og interessen ble videreutviklet til idé i samarbeid med min veileder Susanne Wiking. Jeg synes det har vært veldig lærerikt og spennende å gjøre denne undersøkelsen, og jeg ønsker å benytte meg av senere muligheter med videre forskning innenfor temaet. De fleste har vært positive til å delta i undersøkelsen, men det har vært vanskelig å få tak i visse typer utøvere. Litteratursøk, datainnsamling, plotting av data, statistiske analyser og skrivearbeid har jeg gjort selv. Oppgaven ble skrevet på engelsk, med tanke på publisering i et internasjonalt tidsskrift.

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Age Matters. Variables Predicted by Active Athletes

Varying in Sports and Levels

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Abstract

The present study tested whether there were any differences between athletes varying in age, or practising different sports at different levels, on the variables motivation, flow, self-esteem and personality.

Of the 145 athletes that participated in the study, there were 85 males and 59 females (one missing) ranging from 18 to 40 years of age ($M = 21.34$, $SD = 3.89$). The athletes were grouped as team sport athletes ($n = 74$) and individual sport athletes ($n = 71$) in order to determine if the groups differed on any of the variables. Some of the athletes ($n = 93$) were also grouped as elite athletes. Team sport athletes were shown to have higher scores on the personality trait conscientiousness than individual sport athletes. The group of elite athletes showed a positive correlation with identified regulation and the dimension challenge-skill balance of the flow scale. The results also revealed that age was the best predictor of self-competence, behavioural regulation, and the challenge-skill balance. It seems likely that these results can be generalized to other groups of athletes, and that age might be an important predictor in general.

The 1980's saw a major growth spurt of research in sport psychology, and the growing interest addressed to the theme came from both psychologists and sport scientists (Vealey, 1994). The pressure on athletes has increased from the audience and the media, but also concerning financial and psychological losses to the athlete (Davids, Smith, & Martin, 1991). The fine line between winning and loosing seems to rest within the realm of psychological factors (Nideffer, 1992). However, psychological factors have been largely neglected, both by athletes and coaches (Behncke, 2005). Much of the research concerning sport and exercise psychology has been on non-active athlete subjects. For example, there has been done a large amount of research showing that exercise or physical activity has a positive affect on health and psychological benefits (Giacobbi, Hausenblas, & Frye, 2005; Spence, McGannon, & Poon, 2005).

The present study is part of an expanding field concerning active and competing athletes. The participating athletes have different sport backgrounds and they differ both in their competing sports and levels of competition. There seems to be no research prior to this study concerning differences between athletes practising team sports versus athletes practising individual sports in terms of motivation, flow, self-esteem or personality. Why do some athletes choose team sports rather than individual sports, and vice versa? This study also includes elite athletes; athletes competing at the highest levels. Do elite athletes distinguish themselves in any way on motivation, experience of their performance, self-esteem or personality? These are some of the questions this study tries to elucidate.

Motivation

Theories of motivation have been important in sport psychology for a long time (Li, 1999). Research, however, has been focusing on motivation in academic settings for the most part, and to a lesser extent athletes practising sports (Mallett & Hanrahan, 2004). Deci & Ryan (1985) provided a theoretical framework for examining motivational processes applicable to athletes with their social-cognitive theory of Self-Determination (Mullan, Markland, & Ingledew, 1997).

Deci & Ryan's (1985) Self-Determination Theory (SDT) is based on an organismic-dialectic meta-theory concerning personality and human motivation. The theory assumes people to be active organisms with innate tendencies for psychological development and growth. The social environment will influence these natural human

tendencies, and the tendencies need support from the social environment to function effectively (Deci & Ryan, 2000; Ryan & Deci, 2000a, 2000b).

Behavioural self-regulation is one of the main focuses of the SDT (Ryan & Deci, 2000b). The theory includes a distinction between amotivation, extrinsic or external motivation, and intrinsic motivation. Amotivation is non-intentional and non self-determined regulation. It is a "state of lacking intentions to act" (Ryan & Deci, 2000b, p. 72). The individual does not have control over his or her own behavioural regulation, and is practising the activity because others say he or she should. The individual is not valuing the activity (Deci & Ryan, 2000).

External motivation.

Ryan & Deci (2000b) indicate differences in external motivation in a sub-theory of the SDT called Organismic Integration Theory (OIT). Within the OIT, extrinsic motivation can be classified as either self-determining or non self-determining (Mallett & Hanrahan, 2004). There seems to be different forms of how a person's behaviour can be regulated, which forms a continuum of self-determination (Ryan & Deci, 2000b).

External regulation refers to a non-self-determined behaviour, where external demands, rewards and punishments control an individual's behaviour (Deci & Ryan, 1985). External regulation is close to but distinct from the amotivation on the continuum of self-determined behaviour (Ingledew, Markland, & Sheppard, 2004). Regulatory processes of *introjected regulation* are partially self-determined. The individual has internalized external controls (rewards and punishments) for maintaining self-esteem and escaping guilt, and is applying these former controls to the self (Ryan & Deci, 2000b). However, the individual does not see the behaviour as his or her own (Mallett & Hanrahan, 2004). *Identified regulation* is a more self-determined behavioural regulation than introjected regulation, which states that a person engages in behaviour in order to achieve personally valued outcomes. The action is personally important for the individual, for example to exercise for the reason of staying fit (Deci & Ryan, 1985, 2000). The last form of extrinsic motivation, *integrated regulation* refers to engagement in behaviour that corresponds to the sense of self (Deci & Ryan, 2000). This behaviour is fully self-determined. Integrated regulation differs from intrinsic motivation in that an individual does not take part in the activity for the satisfaction inherent in the activity, but for the outcome of the activity (Deci & Ryan, 2000; Ryan & Deci, 2000a). Mullan et al. (1997) made a scale based on this theoretical ground, the Behavioural Regulation

in Exercise Questionnaire (BREQ), with the inclusion of four factors; external-, introjected-, identified-, and intrinsic regulation (integrated activity was excluded). To avoid confusion, these four forms of regulation will be used throughout this paper.

Intrinsic motivation.

Intrinsic motivation is "the innate tendency to seek out novelty and challenges to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000b, p. 70). Intrinsic motivation is based on the innate need for competence and self-determination in the organism; the capacity to have choices, a need to choose and to be self-determined of one's actions (Deci & Ryan, 1985). The motivational processes are regulated by interest, enjoyment, and inherent satisfaction. Children, for example, are active, inquisitive, playful, curious, and eager to learn and explore without any external rewards (Ryan & Deci, 2000a). Children will start to play for no other reasons than just for the play itself. This is true for adults as well, performing an activity for enjoyment and satisfaction in doing the activity, for example spontaneous play of beach-football in Brazil. Intrinsic motivation is important to athletes because it brings feelings of enjoyment, satisfaction and interest for solely practising the sport.

Intrinsic motivation and the state of flow are closely related. When highly intrinsically motivated and extremely interested in something one is doing, one can experience flow (Deci & Ryan, 1985).

Flow

Mihaly Csikszentmihalyi was the first to use the flow-concept in western psychology (Csikszentmihalyi, 1977). In his first book about the topic *Beyond Boredom and Anxiety* (Csikszentmihalyi, 1977) he describes flow as "the holistic sensation that people feel when they act with total involvement" (p. 36). Flow was first described as an autotelic experience. The word autotelic comes from the Greek word *auto* which means self, and *telos* which means goal or purpose, and refers to an activity that is rewarding for its own sake (Csikszentmihalyi, 1977). An autotelic experience happens when a person does something that is intrinsically motivating. Deci & Ryan (1985) proposed that flow can signify a purer instance of intrinsic motivation. Csikszentmihalyi (1991) has suggested that when experiencing the state of flow in an activity several times, a person will perform that activity for its own sake; thus the activity becomes intrinsically motivated.

Flow is important to athletes, because it facilitates peak performance. When in flow, athletes can be pushed to the limits of their performance (Jackson & Csikszentmihalyi, 1999). Flow is also important to athletes because the experience of flow is rewarding for its own sake, i.e. autotelic or intrinsically motivated. Without flow one might lose the feeling of enjoyment in doing sports (Jackson & Csikszentmihalyi, 1999).

According to Jackson and Csikszentmihalyi (1999) there are nine essential elements of the flow state that make athletic activities intrinsically interesting in relation to sports. Jackson and Eklund (2004) developed a scale, the Dispositional Flow Scale (DFS) based on these elements, or dimensions, which are thought to constitute the optimal psychological state of flow (Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004).

1) *Challenge-skill balance*. The first dimension of the flow state is based on Csikszentmihalyi's Challenge-Skill Ratio (CSR), which is the most important part of the definition of flow (Csikszentmihalyi, 1991). In the Model of the Flow State, later to be known as CSR, Csikszentmihalyi (1977) explains two criteria for an optimal experience of flow: a) The perceived challenge in an activity has to be in balance with an individual's perceived capabilities and skills, and b) perceived challenge and perceived skills needs to be high. If the perceived challenge is high and the perceived skills are low, one could experience *anxiety*. If the opposite is true, the perceived challenge is lacking and the perceived skills are high; one could experience *boredom or relaxation*. If both the perceived challenge and skills are low, *apathy* will result, which leads to a feeling of low energy levels, boredom and a lack of attention (Csikszentmihalyi, 1977; 1991).

Flow is experienced when perceived capabilities match the perceived challenges (Csikszentmihalyi, 1991). It is important to remember that it is the subjective perception that predicts flow; what the person thinks his or her capacities are, and what available opportunities the person has to meet the challenges. The belief of what one can do, rather than actual abilities, will determine the experience (Jackson & Csikszentmihalyi, 1999). Examples of challenges one might meet in sports are physical, mental and technical.

2) *Merging of action and awareness*. This dimension refers to an awareness of ones actions, but one is not aware of this awareness. It is like mind and body fuse into one. The person is feeling as one with his or her natural and spontaneous movements, and is

totally absorbed in the activity. There is a feeling of effortless movement, like being on automatic pilot, even when pushed to the limits of ones capacity (Jackson & Csikszentmihalyi, 1999). Athletes often call this "being in the zone" (Jackson & Eklund, 2004). To reach this merging of action and awareness, the skills need to match the challenges, which make this dimension closely aligned to the challenge-skill balance (Jackson & Eklund, 2004).

3) *Clear goals*. The goals need to be so clear that the athlete knows exactly what to do, which will lead to greater concentration and attention (Jackson & Eklund, 2004). The clarity of purpose occurs on a moment-to-moment basis, which leads the performer to be fully concentrated on the task (Jackson & Csikszentmihalyi, 1999).

4) *Unambiguous feedback*. This dimension of the state of flow refers to knowledge about how one is performing, which allows *continuity* in the persuasion of goals (Jackson & Csikszentmihalyi, 1999). The feedback can be on kinaesthetic awareness, or on the quality of one's performance (Jackson & Eklund, 2004).

5) *Concentration on the task at hand*. The task at hand is the focus of attention, on "here and now", and other thoughts are not present. Crowds, noise and distractions are not registered, or not influencing, when totally concentrated. Athletes are focused on doing their job, or focused on their movements. It should be noted that focus on components or team mates can also be important in some sports, for example football (Jackson & Csikszentmihalyi, 1999).

6) *Sense of control*. There are no worries about not having control. This dimension reflects the capability of doing whatever challenges one might encounter, without having fear of not being able to make it (Jackson & Csikszentmihalyi, 1999). The task is doable; the person can do no wrong, and feelings of power and confidence result. One is unbeatable and has all the skills one needs. However, too much control might get a person out of flow, and too little control can lead to anxiety (Jackson & Eklund, 2004).

7) *Loss of self-consciousness*. This dimension represents a total loss of consciousness of ones identity, and "feeling as one" with the activity. Worries, self doubt, self concerns and negative thoughts disappear when in flow. There are no worries about how others might perceive the person (Jackson & Eklund, 2004). However, this dimension might differ in importance for different kinds of sports; for example, figure-skating depends on how others are viewing the performance of the skater (Jackson, Ford, Kimiecik, & Marsh,1998).

8) *Transformation of time*. The perception of time is different, it either feels like it speeds up or it slows down. Hours can feel like minutes, and minutes like seconds. Sometimes minutes can seem like forever, and one has all the time in the world to perform (Jackson & Eklund, 2004).

9) *Autotelic experience*. People seek the experience primarily for its own sake and there are no goals or rewards external to the experience (Jackson & Eklund, 2004). This dimension appears to be closely aligned to intrinsic motivation (Jackson & Csikszentmihalyi, 1999).

Research has shown that each one of these dimension is part of the definition of flow (Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004; Jackson et al., 1998; Jackson, Thomas, Marsh, & Smethurst, 2001). However, Jackson and Eklund (2004) have proposed that some of these flow dimensions can be more relevant than others, and for different kinds of athletes. The challenge-skill ratio has been an important part of the definition of flow (Csikszentmihalyi, 1991). Thus, the challenge –skill balance, which is based on the challenge-skill ratio, seems to be of special importance.

Since Csikszentmihalyi's (1977) initial research on flow, there have been few studies concerning flow in athletes (Sugiyama & Inomata, 2005) except for the work done by Jackson (Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004; Jackson et al., 1998; Jackson et al., 2001). Jackson and Eklund (2004) developed and revised the dispositional flow scale (DFS-2) to assess athletes' experience of the nine flow-characteristics. The athletes are asked about general experiences of the flow experience in a particular activity the athlete chooses. Another scale developed by the same authors is the flow state scale-2 (FSS-2), which assesses the flow state right after completing an activity. The DFS-2 was used in the present study, since the study sought to explore dispositional as opposed to situational flow. Very few other researchers have used this scale, probably due to copyright restrictions.

It has been shown that flow and self-esteem are related. When challenges and skills are high and in balance, self-esteem has also been shown to be high (Csikszentmihalyi, 1988).

Self-esteem

According to Tafarodi and Swann (1995), global self-esteem consists of two distinct dimensions; Self-liking and self-competence. These two dimensions overlap

each other, but are thought to be distinct aspects of global self-esteem (Tafarodi &
Swann, 1995, 2001).

Self-liking is the one of the two dimensions of self-esteem that is most socially
dependent. It reflects appearance, character, social identity and an overall sense of
worth internalized in a person. How a person views oneself has to do with how a person
has been viewed by others. Young individuals, especially children, tend to believe in
what other people say about them, but later on, however, they becomes more reflected
about what other people say. Self-liking is an internalization of others perspectives of
oneself, which apparently is acquired at an early age, but which also is malleable. Self-
liking is said to reflect the intrinsic value of a person, how the person approves his or
her self (Tafarodi & Swann, 1995, 2001).

Self-competence is the competence of a person, what one can do and what one can not
do. It reflects what a person is capable of, how effective one is and if one has control.
Self-competence can be explained as successful manipulation of one's environment,
what a person does (intentions) and what then happens (outcome). If these two match,
and the outcome is seen as a result of the intentions, self-competence is enhanced. In
other words, self-competence depends on the outcomes of our intentions. For a full and
balanced sense of self-competence an experience of autonomy to choose one action to
pursue personal goals, and an ability to respond appropriately to social demands needs
to exist (Tafarodi & Swann, 1995, 2001). Self-competence overlaps with Bandura's
(1977) concept of self-efficacy, in that both are primarily cognitive, while self-liking is
more of an affective judgement (Mar, DeYoung, Higgins, & Peterson, 2006).

This two-dimensional theory of self-esteem, with a distinction between
instrumental value (what an object is good for) and intrinsic value (the qualities of an
object) has been shown to provide a sound theoretical framework and empirical validity
(Mar et al., 2006; Silvera, Neilands, & Perry, 2001; Tafarodi & Milne, 2002; Tafarodi &
Swann, 1995, 2001). A high correlation has been found between self-liking and self-
competence (Tafarodi & Swann, 1995), which can be explained by the fact that the two
constructs are related and influence each other (Tafarodi & Swann, 1995, 2001). Other
researchers argue for a unidimensional measure of self-esteem, like Rosenberg's (1965)
Self-Esteem Scale. However, the dimension of self-competence has been shown to be
important, especially to athletes and sport performance (Whitehead, 2006). A qualitative
survey preformed by Mallett and Hanrahan (2004) on elite athletes indicated that self-
competence was a strong mediating variable in influencing motivation. Achieving ones

goals enhanced self-competence, which in turn led to higher levels of self-determined behaviour. Ntoumanis (2001) did also find that high perceived competence and self-determined behaviour was positively related in competing athletes. Research with non-athletes has also showed that winning will increase perceived self-competence, and hence increase intrinsic motivation (Reeve & Deci, 1996; Vasteenkiste & Deci, 2003).

Perception of high levels of self-competence or sport ability is important for athletes to experience the state of flow. If athletes believe in their skills and competence, the likelihood of experiencing the challenge-skill balance increases, which again increases the chance of getting into the state of flow (Jackson et al., 1998; Jackson et al., 2001; Nakamura, 1988).

In summary, the separation of self-esteem into the components self-liking and self-competence seems particularly useful for studies in the context of sports.

Personality

The function and development of personality within social contexts is of importance to the SDT (Deci & Ryan, 1985). A distinction has been drawn between malleable personality traits and core personality characteristics. Less stable surface personality traits, like self-esteem, are more open to relationship influences and, hence, more likely to be influenced by contextual or cultural influences. Core personality characteristics, however, are based on genetic differences and are believed to have an impact on human behaviour. Influence from the environment, life events or culture is thought to have little or no effect on these core personality characteristics (Asendorpf & Aken, 2003). Underlying mechanisms on motivation and personality has been given little attention, even less concerning competing athletes (Ingledew et al., 2004).

Personality researchers seem to have come to some form of consensus for a multidimensional perspective on personality. Some might argue that certain personality traits are more important than other traits, however, to get a global perspective one needs to take all the components into account (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2006).

The Big Five model of personality has a growing acceptance by personality researchers (Goldberg, 1993), and has shown a stable and predictive validity (Goldberg, 1990; Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, & Gough, 2006; Gow, Whiteman, Pattie, & Deary, 2005; McCrae & Costa Jr., 1999; McCrae, Costa Jr., & Martin, 2004; McCrae, Martin, & Costa Jr., 2005). This model consists of five core

personality characteristics; extraversion, agreeableness, conscientiousness, emotional stability (which is the opposite of neuroticism), and intellect or imagination, also called culture or openness to experience (Goldberg, 1990).

Team sports athletes and individual sports athletes

There seems to be no research prior to this study concerning differences between team sport athletes and individual sport athletes on motivation, flow, self-esteem and personality. Some possible differences between the two groups are suggested below.

Concerning motivation, there might be differences in the two groups. For example in team sports, team mates could contribute to the social relationship which might be a positive reinforcement for continuing doing sports. There does also seem to be more financial rewards in team sports, like football, than individual sports, like skiing. Financial rewards are not enough for athletes to continue competing solely for these reasons (Mroczkowska, 2003), however, it might lead team sport athletes to be more externally regulated than individual sport athletes.

Different studies concerning flow have suggested that the state of flow is universal phenomenon across sports (Young & Pain, 2006). However, there could be differences between different types of sports. For example, could it be that team mates might increase or decrease the likeliness of experiencing flow in other team mates?

Self-competence is important for athletes by increasing motivation when winning, and also increasing the likelihood of flow (Jackson et al., 1998; Jackson et al., 2001; Nakamura, 1988). Self-Competence seems to be associated with history of success (or failure) at achieving goals, which would be important to both groups. Self-liking is a malleable internalization of other's perspectives of oneself (Tafarodi & Swann, 1995). It could be that playing team sports, and getting positive reinforcement from team mates, and coach (assuming good team cohesion), might lead to greater self-liking.

Some personality traits could be associated with an athlete's choice to compete with a team or alone. Team sport athletes might for example have higher scores on extraversion, which includes sociability, social worth and satisfaction. This trait seems to be a result of a high number of social contacts (Blatny, Jelinek, Blizkovska, & Klimusova, 2004). Agreeableness has been shown to lead to positive experiences in social situations (McCrae & Costa Jr., 1999). Extraversion and agreeableness might be more associated with team sport athletes than with individual sport athletes. Another

personality trait, conscientiousness, which includes order, dutifulness, achievement striving, and self-discipline, seems to lead to a reduction or elimination of stress (Blatny et al., 2004). McCrae and Costa Jr., (1999) have suggested that conscientiousness may lead to positive experiences in achievement situations. Conscientiousness has been associated with less external regulation and more intrinsic regulation (Ingledew et al., 2004). This trait then, seems to be important in both groups of athletes.

Age

Extrinsic motivation seems to be important, along with intrinsic factors, for 13-18 years olds (Mroczkowska, 2003; Weiss & Smith, 2002). However, intrinsic motivation seems to become more important after adolescence, and tends to increase with age (Mallett & Hanrahan, 2004; Weinberg, Tenenbaum, McKenzie, Jackson, Anshel, Grove, & Fogarty, 2000). It has been suggested that older people and people with higher education tend to view intrinsic rewards as more important than external rewards (Csikszentmihalyi, 1977). Taking this into account leads to the prediction that age would show a positive relationship with intrinsic motivation, and a negative relationship with external motivation.

Self-esteem has shown positive correlations with age (Mroczkowska, 2003). As girls and boys go through adolescence and become adults, their self-esteem has also been shown to increase. This relationship is also expected in the present study.

Delle Fave and Massimini (2004) have found that people can experience flow independent of age and gender. However, in particular two of the nine dimensions of the flow scale (Jackson & Eklund, 2004) seem to be of special importance in relation to age; autotelic experience and the challenge-skill balance. Autotelic experience is the dimension most closely aligned to intrinsic motivation (Jackson & Csikszentmihalyi, 1999). Since intrinsic motivation has been shown to be positively correlated with age (Csikszentmihalyi, 1977; Weinberg et al., 2000) one could expect that autotelic experience would *also* be positively correlated with age. The challenge-skill balance is the one of the flow dimensions that is based on Csikszentmihalyi's (1991) challenge-skill ratio, which has been an important part of the definition of flow. Flow is closely aligned to intrinsic motivation, which shows a positive correlation with age (Csikszentmihalyi, 1977; Deci & Ryan, 1985; Jackson & Csikszentmihalyi, 1999). When challenges and skills are high and in balance, self-esteem tends to be high (Csikszentmihalyi, 1988). Self-esteem has been positively correlated with age

(Mroczkowska, 2003) and this might suggest that the challenge-skill balance would also be positively correlated with age.

Elite athletes

Elite athletes are a rare and unique population. Does this group differ on any of the variables of motivation, flow, self-esteem, or personality? Elite athletes are found to be more self-motivated than non-elite athletes (Kajtna & Tusak, 2003). This suggests that the group might have higher scores on the more self-determined regulation of behaviour, like identified- and intrinsic regulation. In relation to flow, it is likely that the athlete's competitive level shows a positive relationship with autotelic experience, since this dimension and intrinsic regulation are closely related. Another dimension of the flow scale, the challenge-skill balance, an important part of the definition of flow (Csikszentmihalyi, 1991), could also show a positive correlation with the athlete's level of competition.

There does not seem to be any previous studies comparing self-esteem in elite athletes and non-elite athletes using the self-liking and self-competence (SLSC) scale, which is used in the present study. However, one study showed that elite athletes had slightly higher global esteem than non-athletes (Marsh, Perry, Horsely, & Roche, 1995). Self-competence has, in particular, been shown to be important to elite athletes (Mallett & Hanrahan, 2004). This suggests that elite athletes might have high scores on self-esteem.

There have been no previous findings of differences in personality for elite athletes and non-elite athletes (Kajtna & Tusak, 2003).

Other expected correlations

When challenges and skills are high and in balance, self-esteem is highest (Csikszentmihalyi, 1988). A positive correlation between challenge-skill balance and self-esteem, self-liking and self-competence, is predicted. Autotelic experience is predicted to be positively correlated with intrinsic regulation, since the two are closely related in theory (Jackson & Csikszentmihalyi, 1999).

Methods

Participants

Of the 145 subjects participating in the study, 59 were females and 85 were males (one missing), with an age raging from 18 to 40 years of age ($M = 21.34$, $SD = 3.89$). The subjects represented a range of sports in which they were specialized, including cross country skiers ($n = 41$), soccer players ($n = 54$), handball players ($n = 20$), biathlon ($n = 9$), swimmers ($n = 6$), bicycling ($n = 3$), Nordic combination ($n = 2$), orienteering ($n = 2$), and one of each for bowling, athletics, ski jumping, climbing and training (three missing). The subjects practising team sports were active in the Premier Division ($n = 28$, 19.3%), First Division ($n = 19$, 13.1%), Second Division ($n = 11$, 7.6%), Third Division ($n = 3$, 2.1%) and the Forth Division ($n = 3$, 2.1%) in Norway, including both soccer and handball athletes. Ten (7.1%) of the subjects in this group competed in lower divisions. The subjects practising individual sports competed on a national level ($n = 49$, 33.8%), as juniors ($n = 19$, 13.1%) or as seniors ($n = 3$, 2.1%). About half of the subjects were practicing team sports ($n = 74$, 51%), and the other half were practicing individual sports ($n = 71$, 49%). The athletes had been competing from one to 28 years, with an average of ten years.

Most of the subjects exercised more than one sport; weight lifting ($n = 113$, 77%), fitness ($n = 107$, 73%), jogging ($n = 71$, 49%), football ($n = 65$, 44.8%), skiing ($n = 60$, 41.4%), bicycling ($n = 48$, 33.1%), and other activities like roller-skiing**,** telemark, paddling, vigour, speed, handball, futsal, orienteering and swimming ($n = 47$, 32.4%).

Procedure

To recruit participants, 35 letters of proposals for conducting a survey were forwarded to ten athletic colleges, 18 teams and seven athletic organizations in Norway (see Appendix A). The questionnaire was attached to this letter for informational purposes. In addition, five questionnaires were sent by personal acquaintance. Five out of the colleges, two teams and six organizations were negative about participating in the study.

After sending the letters of proposals, the teams, colleges and organizations were contacted by phone, and questionnaires were sent to the volunteers by postal mail. Some of the questionnaires were handed out to the subjects by teachers, team leaders or coaches, and the rest of the questionnaires were sent to athletes individually. 395

questionnaires were sent out, and 171 were returned. However, 26 of the questionnaires had to be discarded. In all, 145 questionnaires were usable. The subjects participating in the study came from four different colleges of athletics, (three of the colleges were specialized on skiing), one athletic organization, eight soccer teams and a handball team. The participation was voluntary and the subjects did not get any rewards for participating.

Measures

The questionnaire consisted of four scales; Self-Liking/ Self Competence Scale (SLSC), Behavioural Regulation in Exercise Questionnaire (BREQ), IPIP-50 Big-Five Factor Markers, and Dispositional Flow Scale-2 (DFS-2). The scales were handed out in this order. In addition to the scales, questions for assessing demographics and sports participation were added at the end of the questionnaire. The questionnaire required approximately 15 minutes to be completed.

Self-Liking/ Self-Competence Scale (SLSC) (Tafarodi & Swann, 1995). A Norwegian version of the Self-Liking and Self-Competence-Scale was used, and this version has shown appropriate psychometrical properties similar to the English version (Silvera et al., 2001). The SLSC-scale consists of two dimensions: *Self-Liking*, which is a sense of social worth (e.g. "I feel comfortable about myself") and *Self-Competence*, which is a sense of personal efficacy (e.g. "I am a capable person"). The scale consists of 20 items, where each half of the items represents each of the two dimensions. The respondents rate themselves on a 5 point Likert scale, ranging from A (strongly disagree) to E (strongly agree). Ten of the items, five for each of the subscales, need to be reversed before adding the subscales. High or low scores on the subscales indicate high or low self-liking and self-competence respectively.

Behavioural Regulation in Exercise Questionnaire (BREQ) (Mullan et al., 1997). This 15 items scale is based on a four factor model of the SDT, and comprises four forms of regulation: External (4 items, e.g. "I exercise because other people say I should"), Introjected (3 items, e.g. "I feel guilty when I don't exercise"), Identified (3 items, e.g. "I value the benefits of exercise"), and Intrinsic (4 items, e.g. "I exercise because it's fun"). A later version of the scale (BREQ-2) includes the amotivational factor (Markland & Tobin, 2004). In the present study the subjects are athletes who exercise regularly, and the amotivational factor is therefore irrelevant, hence, the original BREQ is used. This scale has shown evidence of validity (Mullan et al., 1997; Wilson,

Rodgers, & Fraser, 2002). The subscales of the BREQ can also be added up, representing an overall dimension of self-determination; the Relative Autonomy Index (RAI) (Markland, 2006). A high score on the RAI then represents greater self-determination. However, use of the RAI-score results in a considerable loss of information, and therefore only the original four scales where used in this study.

The BREQ scale used in the present study is a version translated into Norwegian by Salomonsen (2005). On the 15 item BREQ scale respondents rate themselves on a five point Likert scale ranging from 0 = "not true for me" to 4 = "very true for me". None of the items are in reversed form.

IPIP-50 Big-Five Factor Markers (Goldberg, 1999; International Personality Item Pool, IPIP, 2001). The IPIP-50 Big-Five factor markers is an inventory of 50 items, with ten items for each of the five factors. For each of the items, there is a sentence in a fragmented form: Extroversion (e.g. "Am the life of the party"), Agreeableness (e.g. "Am interested in people"), Conscientiousness (e.g. "Am always prepared"), Emotional Stability, which is the opposite of Neuroticism (e.g. "Am relaxed most of the time") and Intellect, also labelled Openness to Experience or Imagination (e.g. "Have a rich vocabulary"). The scale has displayed an internal consistency as high as 0.84 in a recent study (Gow et al., 2005). Compared to other scales, for example McCrae and Costa Jr.s' (2004) NEO-FFI, the IPIP-50 items are revised more often and, hence, more improved due to free downloading from the internet (Goldberg et al., 2006). The scale that is used in this study is a Norwegian version of the IPIP-50 scale (E. Røysamb, personal communication, February 18, 2006). Respondents are asked to describe themselves the way they usually are on a five point Likert scale from 1 = "very inaccurate" to 5 = "very accurate". Half of the questions on each of the subscales need to be reversed prior to adding the scores.

Dispositional Flow Scale-2, DFS-2 (Jackson & Eklund, 2004). This scale is used for assessing flow in physical activity, and it is based on nine dimensions, which are thought to describe experiences of flow. These dimensions are: Challenge-Skill Balance, Merging of Action and Awareness, Clear Goals, Unambiguous Feedback, Concentration on the Task at Hand, Sense of Control, Loss of Self-Consciousness, Transformation of Time, and Autotelic Experience. The scale consists of 36 items, and responses are given on a five point Likert scale (from 1 = "never" to 5 = "always"). The nine subscales can be used as nine different dimensions of flow, or added together to

represent an overall flow-scale, however, this is not recommended (Jackson & Eklund, 2004). None of the items are to be reversed prior to adding the nine subscales.

The scale was translated from English to Norwegian for the purpose of this study. The translation process was conducted as follows: Two persons who were bilingual in Norwegian and English translated the scale independently into Norwegian terms. A third person, also bilingual in Norwegian and English, made one scale out of the two alternatives. A forth bilingual English and Norwegian speaker translated the scale to English for comparing these questions to the original scale. Discrepancies were discussed, and some small adjustments were made in order for the Norwegian scale to resemble the original scale. Due to copyrights, the questions used in the questionnaire from the DFS-2 are not included in Appendix, contact the author of this paper for a translation of the scale.

Demographics. Sixteen questions for assessing demographics and sports participation of the subjects was added at the end of the questionnaire (see Appendix B). These include six questions about gender, age, education, living condition, and civil status. The 9 remaining questions were focused on the exercising activities of the subjects. These were questions about hours of exercising per week, years of exercising, other preferred activities for exercise, if they exercise alone or with others, if the subjects practice individual or team sport, if the subjects were competing or not, level of competition, years of competing, and chosen competing activity.

Results

Descriptives

Information about the subjects' demographics showed that 71 (49%) of the subjects were single and 74 (51%) had a partner. Twenty-three (15.9%) were living alone, 42 (29%) with their partner, 52 (35.9%) with their parents and 28 (19.3%) of the subjects were living with someone else. Sixteen (11%) of the subjects had finished high school, 96 (66.2%) had finished college, and 30 (20.7%) subjects had a university degree (three missing).

Seventeen subjects (11.7%) reported exercising four times per week or less, 43 (29.7%) exercised five to six times weekly, while 85 (58.6%) exercised more than six times per week. Hours of exercise per week ranged from one to three hours (1.4%) to

more than 19 hours (5.5%), with an average on ten to twelve hours of exercise per week (35.2%). Most of the subjects had been exercising this amount for four years or less (63.4%) or seven years or less (80%), while two subjects had been exercising this amount for 26 years (1.4%).

The subjects had been exercising in general from four to 30 years, with an average on 13 years ($M = 13.43$, $SD = 4.64$). Eight subjects (5.6%) exercised most of the time alone, 61 subjects (42.4%) exercised most of the time with other athletes, while 75 subjects (52.1%) exercised both alone and with other athletes. Most of the subjects were competing in their field of sport ($n = 137$, 94.5%), while seven (4.8%) did not compete (one missing).

Scales

Reliability analyses of the scales were done using Cronbach's alpha coefficient. This test shows how the items in each scale correlate, and how different items of a scale together represent the scale (Pallant, 2005). All the scales showed an acceptable level of internal reliability, except one dimension on the DFS-2 flow scale (see Table 1). The dimension Concentration on the Task at Hand showed a low level of reliability ($r = .53$), and was excluded from further analyses. The other dimensions of the DFS-2 scale showed high reliability coefficients. Most of the subscales correlated with one another, except Loss of Self-Consciousness and Transformation of Time which showed low levels of correlation with the other scales.

Team sports athletes versus individual sports athletes

The 74 team athletes had an age ranging from 18 to 35 years ($M = 22.24$, $SD = 4.09$). Cross tabulation showed that there were 31 women and 43 men practising team sport. Five had finished high school, 44 college and 24 had a university degree (one missing). Seven of the team athletes had been exercising for 10 years, 33 for 15 years, 25 for 20 years and four over 20 years (two missing).

The 71 individual sport athletes ranged from 18 to 40 years of age ($M = 19.79$, $SD = 2.97$). Cross tabs show that there were 28 women and 42 men in this group (one missing). Eleven had finished high school, 52 college and six had a university degree (2 missing). Twenty-nine of the individual athletes had been exercising for 10 years, 34 for 15 years, eight for 20 years and none over 20 years.

Table 1. *Means, Standard Deviations, Variable Distributions and Correlations for Flow.*

	M	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9
1 Challenge-Skill Balance	15.21	2.20	-.57	1.14	(.77)								
2 Merging of Action and Awareness	14.56	2.41	-.37	.20	.43**	(.80)							
3 Clear Goals	15.62	2.61	-.71	1.09	.53**	.33**	(.79)						
4 Unambiguous Feedback	15.72	2.28	-.33	.15	.44**	.19*	.51**	(.70)					
5 Concentration on the Task at Hand	15.23	2.12	.08	-.66	.57**	.27**	.52**	.52**	(.53)				
6 Sense of Control	15.18	2.20	-.65	1.78	.54**	.47**	.56**	.54**	.55**	(.71)			
7 Loss of Self- Consciousness	11.92	3.21	.47	.50	.16	.20*	.10	.11	.13	.17*	(.85)		
8 Transformation of Time	12.69	3.22	.12	.58	.24**	.14	.17*	.10	.16	.11	.40*	(.88)	
9 Autotelic Experience	16.77	2.33	-.82	.98	.61**	.38**	.51**	.40**	.49**	.39**	.20*	.24**	(.78)

Note. Values enclosed in parentheses represent Chronbach's α. * p<.05. ** p <.01 (two-tailed).

In order to control for any initial differences between team sport athletes and individual sport athletes, the two groups were compared in one-way ANOVAs. The results showed significant differences between the two groups on age [$F(1, 143) = 26.18$, $p = .001$], education [$F(1, 140) = 13.51$, $p = .001$], years of training [$F(1, 140) = 13.45$, $p = .001$] and years of competing [$F(1, 132) = 9.36$, $p = .003$]. Since the variables education, years of training and years of competing showed positive correlations with the variable age, age may be the main variable differing between the groups. There were no significant differences between the groups on the variables gender [$F(1, 142) = .05$, $p > .10$] or athlete's competitive level [$F(1, 143) = .28$, $p > .10$].

Self-esteem, motivation, personality and flow

Multivariate analyses of variance (MANOVAs) were done to investigate if the two groups of team athletes and individual performers differed on self-esteem, motivation, personality and flow.

Self-esteem, the SLSC-scale. Two dependent variables were used; Self-Liking and Self-Competence. The results show a statistically significant difference on the two groups only for Self-Liking [$F(1, 141) = 4.64$, $p = .033$, partial $\eta^2 = .03$]. An inspection of the mean scores indicated that team athletes reported higher levels on Self Liking ($M = 42.19$, $SD = .68$) than did the individual athletes ($M = 40.09$, $SD = .70$). However, when controlling for age using multivariate analysis of covariance (MANCOVA), no differences between the groups were detected on Self-Liking [$F(1, 140) = 2.52$, $p > .10$, partial $\eta^2 = .02$].

Motivation, the BREQ-scale. Four dependent variables were used: External -, Introjected -, Identified -, and Intrinsic Regulation. The results show a statistical difference on External Regulation [$F(1, 137) = 7.50$, $p = .007$, partial $\eta^2 = .05$] and Internal Regulation [$F(1, 137) = 5.26$, $p = .023$, partial $\eta^2 = .04$]. On the comparison of means, scores indicated that individual athletes reported higher levels on External Regulation ($M = 1.27$, $SD = .07$), while team athletes reported higher levels on Intrinsic Regulation ($M = 1.44$, $SD = .07$). When controlling for age on MANCOVA, no differences between the groups were detected neither on External Regulation [$F(1, 136) = 2.71$, $p > .10$, partial $\eta^2 = .02$] nor Internal Regulation [$F(1, 136) = 1.90$, $p > .10$, partial $\eta^2 = .01$] for the two groups.

Personality, the IPIP-50 scale. Five dependent variables were used: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect or Imagination.

The results show a statistical difference for the two groups only on Emotional Stability [$F(1, 129) = 4.54$, $p = .035$, partial $\eta^2 = .03$]. An inspection of mean scores indicate that team athletes scored higher ($M = 36.33$, $SD = .78$) that the individual athletes ($M = 34.02$, $SD = .76$) on this variable. When controlling for age on MANCOVA, no differences between the groups were detected on Emotional Stability [$F(1, 128) = .89$, $p > .10$, partial $\eta^2 = 01$]. However, another result emerged when controlling for age; Conscientiousness showed significant differences between the groups [$F(1,128) = 7.24$, $p = .008$, partial $\eta^2 = .05$]. An inspection of the mean scores showed that team athletes scored higher ($M = 36.45$, $SD = .72$) than the individual athletes ($M = 33.56$, $SD = .74$). *Flow, the DFS-2*. Eight dependent variables were used: Challenge-Skill Balance, Merging of Action and Awareness, Clear Goals, Unambiguous Feedback, Sense of Control, Loss of Self-Consciousness, Transformation of Time, and Autotelic Experience (the item Concentration on the Task at Hand was excluded due to low levels on the Chronbach's alpha). The results show a statistical difference between team and individual athletes on the item Challenge-Skill Balance [$F(1, 131) = 6.00$, $p = .035$, partial $\eta^2 = .04$] and on Merging of Action and Awareness [$F(1, 131) = 5.14$, $p = .025$, partial $\eta^2 = .04$]. Mean scores showed that the team athletes had higher scores on both Challenge-Skill Balance ($M = 15.67$, $SD = .24$) and Merging of Action and Awareness ($M = 15.06$, $SD = .27$) than the individual athletes ($M = 14.83$, $SD = .25$, and $M = 14.16$, $SD = .29$ respectively). When controlling for age on MANCOVA, no differences between the groups were detected on neither Challenge-Skill Balance [$F(1, 130) = 2.10$, $p > .10$, partial $\eta^2 = .02$] nor Merging of Action and Awareness [$F(1, 130) = 1.98$, $p > .10$, partial $\eta^2 = .02$].

Age and elite athletes

Age was predicted to show a negative relationship with External Regulation, and a positive relationship with Self-Liking, Self-Competence, Intrinsic Regulation, Challenge-Skill Balance and Autotelic Experience. The results of Pearson product-moment correlations confirm the predicted hypotheses (see Table 2), except for a relationship between age and Self-Liking, which was not found. Challenge-Skill Balance and Autotelic Experience showed a high correlation with age as expected, and they both correlated with Intrinsic Regulation. Challenge-Skill Balance also showed high correlations with Self-Liking and Self-Competence, which was not predicted.

Table 2. *Means, Standard Deviations, Variable Distributions and Correlations for Age, Elite Athletes, Self-Esteem, Motivation and Flow.*

		M	SD	Skweness	Kurtosis	1	2	3	4	5	6	7	8	9	10
1	Age	21.34	3.89	1.97	4.55	-									
2	Elite	.64	.48	-.60	1.67	.19*	-								
3	SL	41.17	5.90	-.84	.27	.15	-.01	(.86)							
4	SC	41.63	4.95	-.48	-.08	.22**	.02	.67**	(.82)						
5	External	1.35	.58	2.60	8.31	-.27**	-.02	-.22**	-.18*	(.80)					
6	Introject	2.97	1.11	.07	-1.01	-.16	.01	-32**	-.16	.20*	(.74)				
7	Identified	4.54	.62	-1.60	2.27	.15	.17*	-.04	.06	-.19*	.36**	(.76)			
8	Intrinsic	4.50	.56	-1.45	1.76	.22**	.16	.15	.15	-.27**	.03	.51**	(.77)		
9	CSB	15.21	2.20	-.57	1.14	.24**	.20*	.33**	.30**	-.17*	.01	.18*	.36**	(.77)	
10	AE	16.77	2.33	-.82	.98	.24**	.02	.21*	.13	-.21*	.03	.20*	.45**	.61**	(.78)

Note. Elite= Elite Athletes, SL = Self-Liking; SC = Self-Competence; CSB= Challenge-Skill Balance; AE = Autotelic Experience. Values enclosed in parentheses represent Chronbach's α. * p<.05. ** p < .01 (two-tailed).

The subjects in the group elite athletes were team athletes from the Premiere Division and First Division in Norway, and individual athletes competing on an international or a national level. Of 93 (64.1%) subjects in the group of elite athletes, 57 were men and 36 were women, with a mean age of 22 years ($M = 21.89$, $SD = 3.88$). This variable of athlete's level was also taken into the correlation matrix, and it showed significant correlations with age, Identified Regulation and Challenge-Skill Balance.

Self-esteem, motivation, personality, flow and age

To check out which independent variable or variables that could best predict the outcome of the dependent variables, stepwise multiple regression analyses were used. In this analysis, the data program enters, or takes out, the variables in the model in a certain order based on the strength of their correlation with the dependent variable (Brace, Kemp, & Snelgar, 2003). The independent variables used in these analyses were team athletes versus individual athletes, gender, age, athlete's level, years of training and years of competing.

Gender, being male (unstandardized $\beta = .29$, $SE = .99$, standardized $\beta = .29$, $p = .001$), was the best predictor of Self-Liking [$R^2 = .117$, $F(2, 128) = 8.50$, $p = .001$], but also team athletes (unstd. $\beta = -.2.40$, $SE = .97$, std. $\beta = -.21$, $p = .015$) did contribute to predict Self-Liking, even though it did so to a smaller extent. Age (unstd. $\beta = .25$, $SE = .10$, std. $\beta = .21$) was the best predictor of Self-Competence [$R^2 = .044$, $F(1, 130) = 5.95$, $p = .016$]. Age (unstd. $\beta = -.04$, $SE = .01$, std. $\beta = -.27$) was also the best predictor of External Regulation. A negative relationship showed that younger individuals were more externally regulated [$R^2 = .071$, $F(1, 129) = 9.85$, $p = .002$]. Age (unstd. $\beta = .03$, $SE = .01$, std. $\beta = .21$, $p = .015$) did predict Intrinsic Regulation [$R^2 = .084$, $F(2, 126) = 5.79$, p = .004] along with gender, women (unstd. B = -.20, $SE = .09$, std. $\beta = -.19$, $p = .027$). The Challenge-Skill Balance of the Flow scale [$R^2 = .061$, $F(1, 128) = 8.32$, $p = .005$] was also best predicted by age (unstd. $\beta = .13$, $SE = .05$, std. $\beta = .25$).

Discussion

The results show reliability on the DFS-2, flow scale items, except on the item concentration on the task at hand. Team sports athletes were shown to differ from individual sports athletes only on the personality trait conscientiousness, which was predicted to be associated with both groups of athletes. Age was predicted to be negatively correlated with external regulation, and positively correlated with intrinsic regulation, self-liking, self-competence, challenge-skill balance and autotelic experience. The results confirmed this prediction, except for the correlation between age and self-liking, which was not obtained. Regression analysis showed that age was the best predictor of self-competence, external regulation, intrinsic regulation, and the challenge-skill balance. Being female was shown to contribute to predict intrinsic motivation with age, while being male was the best predictor of self-liking, accompanied by playing on a team. Athlete's level showed a positive correlation with identified regulation and challenge-skill balance, but not with intrinsic regulation, self-liking, self-competence and autotelic experience as predicted.

DFS-2, the flow scale

The DFS-2 scale (Jackson & Eklund, 2004) was translated from English to Norwegian. All the items, except concentration on the task at hand, showed high levels of reliability. Jackson and Eklund (2004) found slightly higher levels of reliability for their subscale items, however, one could expect to find higher levels of reliability when using the translated scale on a larger number of subjects. The item concentration on the task at hand showed lower levels of reliability (.53) than the other items. Jackson and Eklund (2004) also found higher reliability (.80 and .84) for this item in their studies. A qualitative study preformed by Sugiyama and Inomata (2005) showed that concentration on the task at hand was one of the most reported items of the dimensions of the flow state, and the authors suggest that this item might be one of the basic flow characteristics, along with autotelic experience and unambiguous feedback. In their studies, Jackson and Eklund (2004) found higher levels of reliability on all their subscales, and the subjects in their study practiced sport at different levels, practised different sports, both team sports and individual sports, and gender was also equally represented. The age of the athletes, however, varied from 16 to 82, with a mean on 26.3 years, while the subjects in the present study had a mean of 21.36 years of age.

Jackson and Csikszentmihalyi (1999) have mentioned that although the dimension concentration on the task at hand seem to be one of the nine dimension in the flow state, they acknowledge that focus on components or team mates are of importance in some sports, for example football. This might have an effect on the comprehension of the questions for this particular item, since about half of the subjects ($n = 74$, 51%) in the present study were practising team sports. An example of a question for the concentration on the task at hand is to be totally focused on what one is doing. This statement might not fit team sport athletes very well, since they need to be particularly focused on what their team mates and opponents are doing.

Loss of self-consciousness might differ in importance for different kinds of sports (Jackson et al., 1998). Jackson and Eklund (2004) have also proposed that some of the flow items seem to be more relevant than others, and also differ in relevance for different kinds of athletes. Loss of self-consciousness and transformation of time showed low levels of correlation with the other scales. Jackson and Eklund (2004) found that these two items showed low factor loadings, and time transformation in particular had the lowest relationship with the other subscales. This might indicate that these two items are related to other dimensions of the state of flow. Some items are expected to be related, for example merging of action and awareness and loss of self-consciousness. A description of action and awareness merging is that mind and body fuse into one (Jackson & Csikszentmihalyi, 1999), which might seem to be closely aligned with the item loss of self-consciousness. It could be suggested then, that since some of the items are more relevant than others, and more closely related to each other, one might not need to use all the nine dimensions for measuring the state of flow.

Team sports athletes

Conscientiousness.

Some differences were found between team sports athletes and individual sports athletes. Team sports athletes had higher scores on self-liking, intrinsic regulation, emotional stability, challenge-skill balance and merging of action and awareness, while the individual sports athletes had higher scores on extrinsic motivation. When controlling for age, none of these results remained, but another result emerged: Team sports athletes had higher scores on conscientiousness than the individual sports athletes. If a person scores high on conscientiousness, he or she is dutiful, achievement striving, and has high self-discipline (Blatny et al., 2004). This personality trait was

predicted to be positively associated with both groups of athletes, because a trait like self-discipline would seem to be important to all athletes who are training many hours a week. However, team sports athletes had higher scores than individual sports athletes on this particular trait.

A reason for team sports athletes, rather than individual sports athletes, to have higher scores on this trait could be that they feel a pressure from their team mates and coach to make their best effort for the team. Research concerning group norms has shown that individual members of a group experience pressure to conform to the norms and behave appropriately, like working hard or strive for success for the group (Patterson, Carron, & Loughead, 2005). Team sports do seem to have a strong relationship between cohesion and performance (Carron, Colman, Wheeler, & Stevens, 2002), and strong social norms and high social cohesion have been associated with best performance in teams (Patterson et al., 2005). Research with individual team sports athletes seem to indicate low strength in their group norms, which might be explained by lower communication and interaction as individual sports athletes do have individual tasks and not tasks that are common to the group (Colman & Carron, 2001). Team sports athletes have common goals and the team members are striving to achieve these set goals (Colman & Carron, 2001). It seems understandable then that high levels of conscientiousness, like dutifulness and self-discipline could be associated with team sports athletes.

High levels of conscientiousness in athletes, like self-discipline and achievement striving seems to be positive traits in team sports. High levels of dutifulness, for example doing what the coach says to enhance performance, and being self-disciplined, might also lead athletes to get better at their sport as well. It might be that team sports athletes have allowed this personality trait to become more prominent. Since conscientiousness is a core personality trait, influence from the environment is thought to have little or no effect (Asendorpf & Aken, 2003). Either there is a little effect, for example influence from team mates that might lead team sports athletes to have higher levels of conscientiousness. Or, it could also be that the athletes scoring high on this personality trait would choose team sports over individual sports. Most likely both of these explanations apply. Younger athletes often participate in many different sports, however, as they grow older, the physical activity drops off (Weinberg et al., 2000). Reasons for continuing and specializing in one sport over another might be many. Might a personality trait, conscientiousness as the present study suggests, be a predicting factor

in choosing team sports rather than individual sports? Future research would help determine this possibility.

Having high levels of conscientiousness has been found to lead to positive experiences in achievement situations (McCrae & Costa Jr., 1999). This might be due to the fact that the stress is reduced or eliminated (Blatny et al., 2004). Affectively pleasant interactions among athletes have been shown to be characteristic for cohesive teams (Lowther & Lane, 2006; Pink, Lane, Jones, & Hall, 2000). Lowther and Lane (2006) suggested that negative psychological states after defeat could also be alleviated by feelings of cohesion in team athletes. Conscientiousness has been found to be associated with less external regulation and more with intrinsic regulation (Ingledew et al., 2004). This might also be associated with positive experiences in achievement situations, since interest, enjoyment, and inherent satisfaction have been associated with intrinsically motivated individuals (Ryan & Deci, 2000a). This is also in accordance with theories about flow (Jackson & Csikszentmihalyi, 1999; Nakamura, 1988). However, team sports individuals did not have higher scores on intrinsic motivation than individual sports athletes. Interestingly, Vallerand (1997) has proposed that both external and intrinsic motivation exists within humans at different degrees. This might explain the fact that team sports athletes did not have higher levels on intrinsic regulation. When both external- and intrinsic regulations exist within the individual, these regulations may vary independently. Flow has also been known to vary within situations and over time, and some people experience flow often, others rarely (Jackson & Csikszentmihalyi, 1999). Individual or situational differences within team sports athletes and individual sports athletes might be a reason for not finding any differences between the two groups on motivational regulation and flow.

Differences between the groups.

There were found significant differences between team sports athletes and individual sports athletes on age, education, years of training, and years of competing. There were no significant differences between the groups on the variables gender and competition level. The variables education, years of training and years of competing did show positive correlation with the variable age, which indicates that age might be the critical variable. In the regression analysis, age was shown to be the best explanatory factor for most of the dependent variables. If the two groups had not differed in age, other differences might have been found between the groups. However, it may also be

that there are few differences between team sports athletes and individual sports athletes.

It was predicted that team sports athletes would have higher scores on personality traits that are important to social relations, like extraversion (Blatny et al., 2004) or agreeableness (McCrae & Costa Jr., 1999). This was not found. Of the athletes participating in this study, eight subjects exercised most of the time alone, while the rest exercised both alone or with others or most of the time with others. Most of the athletes, 128, reported that they exercised five to six times weekly or more. This shows that individual sports athletes might be just as social as team sports athletes, which might explain that individual sports athlete and team sports athletes did not differ on these two personality traits. Indeed, research on athletes and non-athletes concerning personality traits has shown that male athletes are more outgoing, self-reliant, emotionally stable and socially competent than male non-athletes (Lanza, Prisco, Salmoni, & Varriale, 1989).

There were no differences between the two groups on self-esteem. Self-competence is shown to be important for all types of athletes (Csikszentmihalyi, 1988; Jackson et al., 1998; Jackson et al., 2001; Mallett & Hanrahan, 2004; Nakamura, 1988; Ntoumanis, 2001; Whitehead, 2006), and it was predicted that the athletes would not differ on this dimension. Self-competence depends on the outcome of an athlete's intentions. When athletes feel their intensions are successful, their self-competence increases (Tafarodi & Swann, 1995). The feeling of being self-competent and have a history of success seems to be important for all athletes practising sport. The results of the present paper fall in line with previous theories and research stating that self-competence is important for all athletes.

It was predicted that team sports athletes might have higher scores on self-liking. No differences were found in the MANOVA on self-liking. The regression analysis showed that being male predicted self-liking best, along with playing on a team, explaining 11.7% of the variance. As girls and boys go through adolescence and become adults, their self-esteem has also been shown to increase (Mroczkowska, 2003). Research has also indicated gender differences, showing women to have lower self-esteem than men (Lepore, 1998; McMullin & Cairney, 2004). These studies did not use the SLSC-scale, so it is difficult to conclude whether these findings reflect only the variable self-liking, or both self-liking and self-competence. The results also showed that team sports athletes contributed to predict self-liking, as suggested. This indicates

that playing on a team and getting positive reinforcement from team mates and the coach might lead to greater self-liking.

Age

Age was shown to be negatively correlated with external regulation, and positively correlated with intrinsic regulation. Regression analysis show that age was the best predictor of external regulation, explaining 7.1% of the variance, showing a relationship between younger athletes and external regulation. Age was also the best predictor of intrinsic regulation, along with the gender variable female, explaining 8.4% of the variance.

Age being the best predictor of external- (negative relationship) and intrinsic regulation (positive relationship) is in accordance with other findings in research. Approval from peers seems to be important in adolescence (Mallett & Hanrahan, 2004), and external motivation seems to be more important for 13- 18 years olds than older athletes (Mroczkowska, 2003; Weiss & Smith, 2002). However, as athletes grow older, intrinsic motivation seems to increase (Mallett & Hanrahan, 2004; Weinberg et al., 2000). The SDT states that there are general organismic tendencies for greater self-determined behaviour with age, where regulatory styles become more intrinsic over time (Ryan & Deci, 2000a). Some researchers have found that as people grow older, they tend to view intrinsic rewards as more important than external rewards (Csikszentmihalyi, 1977; Mallett & Hanrahan, 2004). Further, SDT states that rewards to an individual can either promote or undermine intrinsic motivation (Deci & Ryan, 1985). If winning and financial incentives are in focus, this can lead to lower levels of self-determination, and lower levels of intrinsic motivation. This is also in accordance to theories of flow (Csikszentmihalyi, 1977, 1988, 1991; Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004). If winning an event is in focus, one might loose the focus or mental states that can lead to optimal performance.

Results by Rose, Parfitt and Williams (2003) showed that intrinsic regulation did not increase for participants who have spent more time exercising than those who had spent less time exercising. Results by Mroczkowska (2003) also suggest that a long lasting engagement in sports is rooted on intrinsic motivation, i.e. the joy of practising the sport. External motivation or reinforcement, like money, is not enough for athletes to continue with their sport activity. Vallerand (1997) proposed that both external and intrinsic motivation exist within humans at different degrees. Age was shown to predict

external- (negatively) and intrinsic (positively) regulation in the present study. Studies have shown that older people and people with higher education tend to view intrinsic rewards as more important than external rewards (Csikszentmihalyi, 1977), and as athletes grow older, intrinsic motivation become more important to them (Csikszentmihalyi, 1977, 1988, 1991; Deci & Ryan, 1985; Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004). This suggests that athletes that were motivated by external rewards, and not intrinsic rewards, would decide to stop doing sports as they grew older.

Age was the best predictor along with the female gender variable for the dependent variable intrinsic motivation. Deci & Ryan (1985), however, have suggested that males like competing more than females, and that this will lead men to be more intrinsically motivated than females when it comes to sports. Other researchers have shown that women appreciate intrinsic rewards more than men (Csikszentmihalyi, 1977; Mroczkowska, 2003). The results of the present study do also indicate that women are more intrinsically regulated than men. One might think that practising an activity for the sake of the intrinsic value in the activity itself could be related to self-esteem. However, men have been found to have higher scores than women on self-liking, as indicated by the present study and by previous studies (Lepore, 1998; McMullin & Cairney, 2004). No differences were found between the genders on self-competence. An explanation for women to have higher scores on intrinsic regulation than men could be that there often are lesser external rewards for women than men in the context of sport. In some sports, for example football, external rewards (like money) are larger for men than women. This could lead men to be less intrinsically motivated, women more intrinsically motivated, or a combination of the two.

Age showed a positive correlation with self-competence, meaning that older athletes seem to have higher self-competence than younger athletes. The regression analysis showed that age was the best predictor of self-competence, explaining 4.4% of the variance in the regression analysis. A study done by Mallett and Hanrahan (2004) showed that when athletes grow older, being self-competent becomes more important than external influences, like approval from peers, money or winning. The authors proposed that external rewards might positively influence athletes' self-competence, or loose their effect as athletes age (Mallett & Hanrahan, 2004). This is in accordance with results from the present study, and also with earlier studies stating that as athletes

mature, they become more intrinsically regulated (Csikszentmihalyi, 1977, 1988, 1991; Deci & Ryan, 1985; Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004).

Elite Athletes

Athlete's level showed a positive correlation with identified regulation and challenge-skill balance, but not with intrinsic regulation, self-liking, self-competence and autotelic experience as had been expected.

A positive correlation with identified regulation is in accordance with the prediction, and other studies that have shown that elite athletes are more self-motivated than non-elite athletes (Kajtna & Tusak, 2003). We did not, however, find a positive correlation with intrinsic motivation, or autotelic experiences.

The challenge-skill balance is positively correlated with the athletes' level of competition. Thus, for elite athletes, the challenge-skill balance seems to be higher than for athletes at lower levels. This dimension of flow has been the most important part of the definition of flow in the challenge-skill ratio, which states that in order to achieve flow, the perceived skills needed to meet the perceived challenges (Csikszentmihalyi, 1991). Flow seems to be especially important to elite athletes and can lead athletes to be pushed to the limits of their performance (Jackson & Csikszentmihalyi, 1999). It was no surprise then that this dimension was shown to be associated with the athletes' level of competition in the present study.

One reason for not finding all of the expected results might be the definition of this group. The elite athletes participating in this study were competing on international and national levels. However, other definitions of elite athletes have been stricter, only including athletes attending the Olympics (Sands, McNeal & Stone, 2005). Having such a narrow definition, however, might be difficult for many reasons. One reason is that with a small number of athletes, one would need most of the athletes from the group in the study, but some might be unwilling to participate in research. A small and non-homogeneous group is also difficult to use for statistical measurement. Measuring small groups might lead to different findings for each measure due to individual and situational differences (Sands et al., 2005).

It is also difficult to generalize results since this group is so rare and distinct. Finding an appropriate comparable control group is also difficult, which is desirable for this kind of research (Sands et al., 2005). Later studies should have this in mind when studying the special group of elite athletes.

Limitations of the study

The two groups of team sports athletes and individual sports athletes were not alike concerning age, education, years of training, and years of competing. This may have influenced the results. The problem was evident in the regression analysis, where age could predict most of the variables. However, the effects of age were also taken out by using age as a covariate in the MANCOVAS, and another explanation might be that there are no big differences between the two groups. The only difference concerning this subject found in the present study was that team sports athletes had higher scores than individual sports athletes on the personality trait conscientiousness. However, before any conclusions can be drawn, other studies need to replicate this finding.

Age was shown to be the best predictor for most of the variables. However, high levels of conscientiousness might be a predicting factor for choosing team sports over individual sports. Other factors predicting the activity the athlete chooses (team- versus individual sports) are likely, for example which activity the athlete is best at. Later research might determine the effects of other variables.

Concerning generalization, the results in the present study could possibly be generalized to other athletes practicing different sports at different levels. The results suggest that age is an important factor in predicting many of the variables used in this study. Although the present study only included athletes, later studies of other population groups should consider age as an important predicting factor.

Summary

The DFS-2 showed reliability in the present study, except on one item. The present study suggests that some of the items of the DFS-2 might be overlapping, and that it might not be necessary to use all the items when measuring the state of flow. Further research might help determine which of these items are most useful in assessing the state of flow.

There does not seem to be any differences between athletes that are practising team sports versus individual sports, except for the personality trait conscientiousness. This study suggests that high scores on this trait might be a predictor for athletes to choose team sports over individual sports.

Age was found to be the best predictor of external regulation (negative relationship) and intrinsic regulation, self-competence, challenge-skill balance and autotelic experience (positive relationship). Age did not explain a lot of variance, but

was shown to be a better predictor than team sports athletes, individual sports athletes, gender, level of competition, years of training and years of competing on most of the variables. This study concludes that age matters for athletes' motivation, flow and self-competence.

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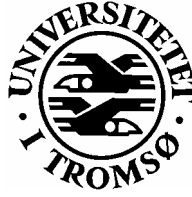
Appendix

Contents

Appendix A: Information about conducting a study.

Appendix B: Questions for assessing demographics.

Appendix A

Dato: 14.02.2006.

Forespørsel om deltagelse i et forskningsprosjekt

Dette er en spørreundersøkelse i forbindelse med min hovedoppgave i psykologi ved Institutt for Psykologi, Universitetet i Tromsø. I denne anledning søker jeg frivillige forsøkspersoner til å delta i dette prosjektet.

Studien tar for seg ulike psykologiske faktorer som kan være med på å påvirke idrettsprestasjoner. Mer spesifikt ønsker jeg å se på ulike holdninger, meninger, interesser, følelser, personlighetskarakteristikker, flyt og motivering hos den enkelte idrettsutøver, og i hvilken grad dette vil påvirke idrettsutførelser sammenlignet med andre idrettsutøvere.

Deltakelse er frivillig. Alle besvarelser vil bli anonymisert og all informasjon behandles konfidensielt. Opplysninger om deg som navn og adresse vil oppbevares helt atskilt fra all annen informasjon du gir, og vil bli slettet ved prosjektets avslutning.

Spørreskjemaene inneholder spørsmål og påstander jeg ber deg ta stilling til. For påstandene finnes det ingen fasitsvar. Dersom ingen av svaralternativene passer helt for deg, krysser du av for det som passer best. Det er viktig at du besvarer alle påstander og spørsmål. Besvarelsen tar cirka 15 minutter.

Ved spørsmål vedrørende dette prosjektet kan du henvende deg til meg eller til min veileder Susanne Wiking ved Institutt for Psykologi, Universitetet i Tromsø. Du kan også kontakte oss hvis du ønsker informasjon om resultatene fra prosjektet.

På forhånd takk for hjelpen!

Med vennlig hilsen

_____   _____
Toril Fossmo   Førsteamanuensis Susanne Wiking
tof028@student.uit.no   wiking@psyk.uit.no

Appendix B

BAKGRUNNSOPPLYSNINGER

Kryss av det som passer:

1. Kjønn:

☐ Kvinne
☐ Mann

2. Fødselsår:

19_____

3. Sivil status:

☐ Singel
☐ Partner
☐ Gift eller samboer
☐ Separert eller skilt
☐ Enke eller enkemann

4. Bosituasjon:

☐ Bor alene
☐ Bor sammen med partner
☐ Bor sammen med foreldre
☐ Bor sammen med andre

5. Høyeste utdanning:

☐ Grunnskoleutdanning
☐ Videregående utdanning
☐ Universitets-/høyskoleutdanning

6. Arbeidssituasjon:

☐ I jobb
☐ Under utdanning
☐ Hjemmeværende
☐ Annet, eventuelt hva_____

7. Hvor mange ganger i løpet av en uke trener du i gjennomsnitt, slik at du blir andpusten og/eller svett?

☐ 1 – 2 ganger
☐ 3 – 4 ganger
☐ 5 – 6 ganger
☐ En eller flere ganger pr dag

8. Hvor mange timer i løpet av en uke trener du i gjennomsnitt?

       ☐ 1 - 3 timer
       ☐ 4 – 6 timer
       ☐ 6 – 8 timer
       ☐ 8 – 10 timer
       ☐ 11 – 12 timer
       ☐ 13 timer eller mer

9. I hvor mange år har du trent?

       _____ år

10. Hva trener du vanligvis?   (sett gjerne flere kryss)

       ☐ Styrke
       ☐ Kondisjonstrening
       ☐ Jogging
       ☐ Fotball
       ☐ Ski
       ☐ Sykling
       ☐ Annet, eventuelt hva _____

11. Trener du vanligvis alene eller sammen med andre?

       ☐ Oftest alene
       ☐ Oftest sammen med andre
       ☐ Både alene og sammen med andre

12. Hva slags idrett driver du mest med?

       ☐ Lagidrett
       ☐ Individuell idrett

13. Driver du med konkurranseidrett?

       ☐ Nei
       ☐ Ja

       Hvis ja, hvilken type idrett_____

       Hvilket nivå_____

       Hvor mange år har du konkurrert_____