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Motivation, Passion and Flow in Norwegian Sport High Schools

A Longitudinal Study

Master thesis in Sport Sciences
Department of Coaching and Psychology
Norwegian School of Sport Sciences, 2011

Preface

From day one this has been an incredible year. After five years I have finally achieved one of my first goals, finished a master thesis in sport science with topics that interest me the most. In this instructive period with memories from a lot of good sport discussions in master office 2a and with the employers from the Norwegian School of Sport Science, has helped me to become a better researcher, coach and person. In addition, all the hours of scientific reading have provided me with a better overview of the theoretical framework which have strengthened my confidence and helped my coaching and researcher skills. I am a curios student who like challenges and know that this is just the beginning of something new. Exploring more topics in the area of sport psychology is something I definitely will do. More knowledge means "bigger rucksack" and wider perspective to handle other problems that occurs.

Personally, I will recommend all other students who have the intention to write a master thesis, to set daily- and short time goals through each phase along the year. Start with a plan of how you are going to reach these goals with permanent routines. If you do, probably you don't have to hurry the last months.

I will end this preface to thank my supervisor Anne Marte Pensgaard who have supported me with good constructive feedback and motivated me through the process. She needs bragging for being there and for the challenging questions that actuate my reflecting power. In addition, for borrowing the data from the "Talentproject 2004-2007". Further, thanks to Paul Andrè Solberg from contributing with some of my SPSS analyzes. At the end a thanks to Finn Eriksen and Erling Lyche for corrected my English grammar, which have been one of my biggest challenges though this process.

"Never Give Up, Everything Is Possible"

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Abstract

The main purpose of the present study was to investigate the relationships between Cognitive Evaluation Theory (Deci & Ryan, 1985), The Dualistic Model of Passion (Vallerand et al., 2003) and Flow experience within sport domain. Athletes from four Norwegian Sport High Schools (*N*=95) presenting both genders and thirteen different sports participated in a longitudinal design study. The data collections were conducted with one year interval. Analyses showed a strong link between intrinsic motivation, harmonious passion and flow experience. Extrinsic motivation and obsessive passion partial related positively to flow. The data indicated some similarities and differences among genders development. Changes in intrinsic motivation were the strongest positive predictor explaining changes in flow. The implications of the study have practical impacts and important contribution to theory, on motivation, passion and flow.

Keywords: motivation, passion, flow, gender, development, network relationships, youth elite athletes, sport high schools.

Contents

1. Introduction

Have you ever experienced high effort, total involvement and performing your best in an activity? Maybe you felt something unusual? With a loss of time and self consciousness, where challenges you face is in balances with your capabilities. You will probably refer this to being "in the zone" with a state of enjoyment and high concentration. If you can characterize this experience as one of your own, you already have entered flow state, proposed by Mihalyi Csikszentmihalyi (1975, 1990) which is the main focus of this study.

Seligman and Csikszentmihalyi (2000) were the main founders of positive psychology. Since most of the research in general psychology focus on negative emotions and experiences, they wanted to provide psychologists "a new way of thinking", as we go into the new century. This allows us to know more about which factors that influences individuals, communities and societies to thrive.

It is reasonable to assume that athletes have experienced flow state in some ways while participating in their particular sport. The question should point in the direction of what they associated with the experience and more importantly what influence the development of flow. In this matter, the present study included Cognitive Evaluation Theory (Deci & Ryan, 1985) and The Dualistic Model of Passion (Vallerand et al., 2003), as two aspects of motivation which may relate and enhance flow experience.

The proposed aspects of motivation may form a better and appropriate understanding of this proposed relationship in the population applied in this study, which are 95 participants from four Norwegian Sport High Schools. Every year over two hundred athletes start up every autumn, over a three years period before graduating. All the schools form a basis of values, to organize daily training and follow-ups with an amount of 20 training hours a week, in addition to regular school work (NTG, 2011). The purpose is to learn, train and prepare the athletes to one day become a world class expert in his or her sport.

Historically, high performance is achieved after systematically training over several years, before a level of expertise is attained (Ericsson, Krampe & Tesch-Roemer, 1993). You may become a world champion or you may not. One of the biggest problems is when an athlete experiences a lack of motivation, which in turn, may result in a feeling of less effort and focus

towards sport participation. Investigating development over a one year period, with a longitudinal design, provides us with data that can indicate possible relationships between motivation, passion and flow.

In this study the motivational construct will be presented first. Motivation is divided in three and hereon refers to intrinsic motivation, extrinsic motivation and amotivation. Intrinsic motivation was first proposed by Deci (1975). Vallerand and colleagues (Pelletier et al., 1995; Vallerand, Blais, Brie`re, & Pelletier, 1989) later divided intrinsic motivation into three types (i.e., to know things, to experience stimulation, and to accomplish). Intrinsic motivation epitomizes a behavior of engagement where the person feel self-determined and competent (Deci, 1975). Extrinsic motivation is divided into three (i.e., identified-, introjected-, and external regulation) and refers to the least form of self-determination, where humans engage to obtain something outside the activity, such as status, trophies or money. Amotivation is a lack of motivation and is characterized difficulty to regulate behavior to own desire to accomplish results (Deci & Ryan, 1985). Athletes may participate in an activity out of pleasure and enjoyment, which over time may shift in the locus of causality from internal to external (Pelletier et al., 1995).

Second, athletes in this study is defined as passionate towards their sport, where they engage because they like the activity and find it important for themselves, investing a high amount of time and energy (Vallerand et al., 2003). Vallerand and colleague split passion into two types, harmonious- and obsessive passion. Harmonious passion (HP) refers to an autonomous internalization, based on own interest and desire towards an activity. Obsessive passion (OP) refers to a more controlled internalization, where the activity becomes an addiction and a feeling of pressure to participate. HP and OP emphasizes that the activity is so self defining being a part of the persons own identity (Vallerand et al., 2003).

Further, flow is presented with all nine dimensions describing flow experience (Czikszentmihalyi, 1990; Jackson & Czikszentmihalyi, 1999). In the brief summary of the theoretical framework all concepts are accounted for both historically and limited to a sport perspective on elite athletes. Further, methods and the results are presented with analyses across the variables relationships and development. The results are discussed in light of both empirical studies and theory, and possible explanations are offered.

2. Theoretical Framework

Several researchers have studied the relationship between motivation, passion and flow (Liu & Divaharan, 2008; Vallerand et al., 2003; Wang, Khoo,). While, still there are some unexplored areas which further may explain the flow experience. Motivation is a common word used in all sport and deals with the driving force to perform, especially for young athletes. Most of these athletes participate in sport for mainly intrinsically reasons, which Deci refers to as intrinsic motivation defined as follows: "Intrinsically motivated behaviors are behaviors which a person engages into feel competent and self-determining" (1975, p.61).

DeCharms (1968) considered first that perceiving external rewards would affect intrinsic motivation and drive the attention to a locus of control which influence the person's feelings and cause external motivation. Instead of being fully intrinsically interested in the activity the behavior is controlled by external rewards. Deci (1971) employed monetary rewards performing an activity, which decreased intrinsic motivation relatively. Conversely, verbal reinforcement and positive feedback indicated significant differences and increased intrinsic motivation with the compared group. Deci (1972) found similar findings with positive feedback which increased intrinsic motivation, while negative feedback did not. Allport (1937) who came up with "Functional Autonomy", proposed that many activities might be driven by intrinsically interest, even though they get money for it. Allport suggested that functional autonomy is independent of personality and concrete that interest toward an activity is individually. To understand more specifically the perception of perceiving rewards, Deci (1975) proposed an informal- and controlling perspective. These two perspectives epitomize how we better understand social-contextual factors that influence human behavior, which is the main function of Cognitive Evaluation Theory (CET) proposed by Deci.

2.1 Cognitive Evaluation Theory

CET is a sub theory of Self-Determination Theory (SDT). SDT is based on an organismic integration theory, causality orientation theory and basic needs theory too. These theories form the basis and support SDT of how we can understand motivation. During the last four centuries this theory has developed to become a social engaging, personal and psychological functional theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000, 2002). SDT focus on a goal direct behavior, but also on human psychological needs for competence, relatedness and

autonomy to be a human drive to get energized in activity and for good health (Deci & Ryan, 2000). *Competence* is based on White's work (White, 1959). Human and animals interact with manipulated surroundings and environments, producing effective changes in behavior and learning how to retain the value of it. *Relatedness* deal with people's needs for bounding to others, with a feeling of being loved and cared for (Baumeister & Leary, 1995; Harlow, 1958). The need for relatedness is fundamental and is proposed to be necessary for well-being and motivation (Baumeister & Learly, 1995). *Autonomy* emphasizes volition actions that come from within, have an organismic desire and origins from the individuals own behavior (deCharms, 1968; Ryan & Connell, 1989). However, humans intrinsic motivation is steered by the central nerve system and have the origin of the individual own needs. CET deals with different contextual factors that can affect the individual intrinsic motivation in a positive- or negative direction. Intrinsic motivation is linked to ones personality and act on behalf of own interest and desire, independent on external factors (Deci, 1975). A situation can then emphasize personal development through the cognitive, social and the physical aspect of the context.

In sport and other physical activities we can assume that personal development is important. Activity creates challenges, challenges increase own capacity and skills (Frederick-Recascino & Ryan, 1995). As mentioned earlier, we can find many people participating in sport and physical activity for mainly intrinsic reasons. A golfer playing by own interest outside organized training practices, shows high degree of intrinsic motivation. This can be achieved individually at different levels, especially for the population in this study.

The contextual factors can have varying effect on the individual intrinsic motivation (i.e., build on competence and self-determination). The *informative* perspective relates to increased competence, self-determination and intrinsic motivation. Conversely, a *controlling* perspective can decrease intrinsic motivation by controlling behavior and performances, feeling less competence and self-determination. In general, the individuals perception is based on the meaning the situation provides, not the contexts one find oneself in (Deci & Ryan, 1985).

Positive feedback and oral reward being informative are expected, on a general basis, to increase intrinsic motivation and competence. This can be developed by setting personal and realistic goals (Deci, 1975). Achieving goals can lead to increased competence, intrinsic

motivation, perceive ability, personal control and experience of flow state (Jackson, 1996; Jackson, Ford, Kimiecik & Marsh, 1998; Mallett, Kawabata, Newcombe, Otero-Forero & Jackson, 2007; Sturman & Thibodeau, 2001). Deci and Cascio (1972) supported CET, and found that negative feedback and treats decreased intrinsic motivation. CET specifies that competence will increase intrinsic motivation, if the situation provides the person with a feeling of autonomy (Deci & Ryan, 1985). Negative feedback, such as "I want and you must perform" or "You need to do better", possibly creates a controlling perspective and may prevent intrinsic motivation and flow. Considering that coaches and other personal can have an effect on athletes' behavior, positive response and communication may absolutely be necessary to enhance intrinsic motivation.

To clarify the meaning of autonomy, deCharms (1968) emphasized actions that come from within the individuals and have the origin of own behavior, in contrast to extrinsic factors (e.g., external materialistic rewards, negative feedback) which may be responsible for behavior and preventing intrinsic motivation (Deci, 1971, 1972; Deci & Cascio, 1972). However, if the external reward is interpreted as controlling they will all fall under the same category, no matter what the external rewards are.

Contrary to CET, Eisenberger and Selbst (1994) suggest that high monetary rewards can increase children's creativity, if the reward is out of sight and the task required higher level of incongruous intendance to a completely new task. The intrinsic interest is based on individual perception and personality, being varying, especially if there is a lack of interest completing the task with extrinsic rewards (Eisenberger & Cameron, 1996). However, this concerns the athletes in this study, because we know that youth athletes in their adolescent are under the influence of other opportunities life have to offer. Their feelings and choices can be affected in different ways and in worst case scenario, to an outcome that leads to less participation and enjoyment with a consequence of drop out from sport.

Vallerand and colleagues proposed three types of intrinsic motivation; *intrinsic motivation to know things, intrinsic motivation to experience stimulation and intrinsic motivation to accomplish* (Pelletier et al., 1995; Vallerand et al., 1989). *Intrinsic motivation to know things* characterizes when people indeed want and need to participate in an activity, trying new things, being curious, understandable and exploring at the same time they are learning. *Intrinsic motivation to experience stimulation* includes the experience and excitement the

activity provides (Cziksentmihalyi, 1990). *Intrinsic motivation to accomplish* involves the person in an activity by own worth and the experiences itself, rather than the outcome. More specifically, achieve the process behind and surpass oneself.

Deci and Ryan (1985) proposed three types of extrinsic motivation, namely *identified-*, *introjected-* and *external regulation*. *Identified regulation* is the closes to self-determination and refers to an activity that is less attractive for the person, but he or she freely accept it, based on own decision (e.g., a boy cleans his football shoes, to make them last longer). *Introjected regulation* occurs when people avoid consequences or negative feeling the behavior can give, choosing social approval instead of own interest (e.g., participate in training practice, instead of feeling guilty not participate). *Extrinsic regulation* describes when behavior is regulated by rewards or constraints (e.g., such as money, medals or trophies). Amotivation is a lack of motivation, it is not intrinsic or extrinsic motivation, but rather difficult to regulate behavior to own desire to accomplish results (Deci & Ryan, 1985). This can be understood as helplessness, where the individual have an internal or external boundary that can result in uncontrollable forces (e.g., forgetting or refusing a task) and difficulty to regulate feelings, such as jealousy or anger (Abramson, Seligman, & Teasdale, 1978). Highlighting some of the implication in sport has pointed in several directions. When we perform a task that requires effort, our motivation can be varying depending on our interest completing the task.

2.1.1 Research on Intrinsic Motivation in sport

In several sports there is a lot of money at stake, with high salaries and sponsorships that can influence athletes' motivation. In light of CET perceiving external rewards (e.g., money, medals) as the driving force, may produce complications for motivation, being controlling towards participation. Second, perceiving external reward can strengthen intrinsic motivation and autonomy if it comprehended as informative (Deci & Ryan, 1985).

In order to gain further knowledge of how the interpretation of external rewards affects athletes in this study, we assumed that several factors should be considered. Summarized briefly, empirical studies reveals positive effects of intrinsic motivation in sport with mainly positive outcomes such as better sportsmanship (Donhue et al., 2006), increased competence (Sturman & Thibodeau, 2001), decreased burnout (Lonsdale, Hodge & Rose, 2009), increased enjoyment (Deci & Ryan, 1985) and better concentration (Pelletier et al., 1995). Donahue et

al. (2006) found that intrinsic motivation enhances sportsmanship in elite sport and extrinsic motivation undermines it. Athletes with high intrinsic motivation endorse positive sportsmanship and less use of performance-enhancing substances (e.g., anabolic steroids, growth hormone, amphetamines). Conversely, athletes with high extrinsic motivation were most likely to use performance enhancement-substance and conducted less sportsmanship. A previous study by Vallerand and Losier (1994) supports the relationship between motivation and sportsmanship. In another study with icehockey players which received positive feedback, increased intrinsic motivation and perceived competence, compared with the control group which received no feedback. However, no relationship was found between intrinsic motivation and competence (Vallerand, 1983).

Further, Amorose and Horn (2000) reported that athletes who received partial or full scholarship scored higher on competence and intrinsic motivation, especially those athletes with full scholarship compared with non-scholarship. This finding was contrary to most research on CET (Ryan, 1977, 1980). However, Amorose, and Horn (2001) proposed no changes in intrinsic motivation in athletes receiving scholarship or non-scholarship during a pre- and post-season measure. Same study investigated coaches' behavior, which positively related to effective positive changes in intrinsic motivation, employing an instructional style of leadership. Autocratic leadership related negatively. These findings are interesting and relevant to the athletes in this study.

Ryan (1977, 1980) investigated in two studies based on CET and the perception of receiving scholarship and gender differences. Male athletes received the scholarship as controlling and caused lower level of intrinsic motivation, especially for football players that usually received scholarship. Females expressed more feelings of competence, and interpreted the scholarship as informative, resulting in less controlling and retaining of intrinsic motivation. Ryan argued that the scholarship was just established and could be an important factor to explain this outcome. In addition, male wrestlers increased intrinsic motivation, probably because of the infrequency of perceiving scholarship. Deci, Cascio, and Krusell (1975) based on Deci's work (Deci, 1971, 1972) suggested also differences in gender. They investigated positive feedback on a free time puzzle, where male participants increased intrinsic motivation and females decreased intrinsic motivation. These results highlight implications attached to males and

females on how intrinsic motivation can affect behavior and will be further investigated in this study.

Furthermore, Chantal, Guay, Dobreva-Martinova, and Vallerand (1996) studied the link between motivation and performances involving the best Bulgarian athletes. The successful athletes showed high level of non-self determinant motivation. Title defenders and medal holders felt bigger pressure to perform from external primary sources. This pressure resulted in successful athletes with higher extrinsic motivation, than the non-successful group. Contrary to males, intrinsic motivation was higher among female athletes while there was no difference in extrinsic motivation.

Kingston, Horrocks, and Hanton (2006) measured the three types of intrinsic motivation (i.e., to know things, to experience stimulation, and to accomplish) and two types of extrinsic motivation (i.e., introjected-, and external regulation) on the effect of receiving scholarship. The study demonstrated lower level of intrinsic motivation and higher level of introjected and external regulation among the male athletes receiving scholarships, than non-scholarship athletes. Compared with females, the only difference was higher external regulation for the males. This may concern the participant in this study, because all perceive financial support parental or scholarship given by others. Pelletier et al. (1995) presented a significant higher score on intrinsic motivation to know things and intrinsic motivation to accomplish among female athletes, but rather lower on external regulation compared with male athletes. The perception of competence was positively linked to self-determined form of motivation and negative related to the less self- determined form of motivation. Equal results with autonomy were found, perceiving informational intrapersonal behavior from the athlete`s coaches.

For most athletes in this study, competition is an important aspect of sport and may indicate if all the training gives you satisfying results, and as described before this can be steered in two directions (Deci & Ryan, 1985). The informative perspective can optimize challenges and competence with positive feedback, providing increased enjoyment and intrinsic motivation in the sports, equal for winning a competition. As for the controlling perspective, if winning becomes an important dominance, “ego” involvement and controlling force can be created (Ryan, 1982). CET describes this as a forced situation and will effect in negative direction, by decreasing autonomy and prevent intrinsic motivation (Deci & Ryan, 1985). Creating a positive competition environment where “task” -oriented participants is cultured, primary to

master challenges, independent of competition results, the chance to increase autonomy, competence and intrinsic motivation is considerable (Deci & Ryan , 1985). Ryan (1982) showed that “ego”-involved athletes had lower intrinsic motivation than ”task”-involved participants and may cause for concern principle for sport environment. However, sport can be an arena with experiences and memories that is unforgettable. Athletes may identify themselves with the activity, which in addition, creates positive or negative outcomes, depending on how passionate you are towards an activity.

2.2 The Dualistic Model of Passion

Vallerand and colleagues (2003) proposed Passion as a new concept in social psychology and the relation to positive and negative outcome towards activity. The activity needs to give a meaning and interest for the person, being a part of their lives while they spending time doing it. ”Passion is defined as a strong inclination toward an activity that people like, that they find important, and in which they invest time and energy” (Vallerand et al., 2003, p. 757). For youth athletes they may start on a sport high school because they want to train more to improve their performances. Passion however, is suggested to develop one person’s internalized identity, being so self-defining, that the activity can emphasize the person’s identity and the value it manufacture (Vallerand et al., 2003). In line with SDT (Deci & Ryan, 1985, Ryan & Deci, 2000), the organismic integration process, that affects the individual more comprehensive over a period of time, can play a different part for some activities and take a central place in the person’s identity. Contrast to passion, intrinsic motivation is known by engaging in an activity for the pleasure and enjoyment, and regularly not associated with an internalization into the person’s identity (Ryan & Deci, 2000), even though intrinsic motivation and passion share some similarities towards activity. Further, A Dualistic Model of Passion is represented, splitting passion into two types, harmonious- and obsessive passion (Vallerand et al., 2003).

Harmonious passion (HP) refers to the autonomous internalization into the persons own identity, towards an activity. Such as being free to engage for own sake, by feeling no pressure or addiction to participate. Rather choose what they intend to do, using variety in activities make it in harmony and flexible for other important sides of life (Vallerand et al., 2003). If a football player can experience positive outcomes during an activity more freely, the better are the chances that the individual continues to engage in the activity. Empirical

studies suggest that HP lead to adaptive outcomes such as well-being (Vallerand et al., 2006, study 2), positive emotions (Philippe, Vallerand, Andrianarisoa & Brunel, 2009), flow (Philippe, Vallerand, Andrianarisoa, & Brunel, 2009; Vallerand et al., 2003, study 1), quality coach-athlete relationship (Lafrenière, Jowett, Vallerand, Donahue, & Lorimer, 2008) and more self-determination (Séguin-Lévesque, Laliberté, Pelletier, Vallerand & Blanchard, 2003).

On the other side obsessive passion (OP) refers to a controlled internalization towards the persons own identity in an activity. Such internalization occurs when inter or/and intrapersonal pressure caused by contingencies lead to addiction to an activity, such as desire for social acceptance, self-esteem or the excitement. In general, the passionate activity can become uncontrollable and take place in the person's identity, resulting in complication and conflict with other aspects of life (Vallerand el al., 2003). If a handball player can't stop thinking about practicing new techniques, while spending time with friends and family, this can be problematic. OP has lead to less-adaptive or maladaptive outcomes, such as conflict in life domain (Vallerand et al., 2003), aggression (Donahue, Rip & Vallerand, 2009) guilt, negative emotion and anxiety (Mageau, Vallerand, Rousseau, Ratelle, & Provencher, 2005).

Vallerand and colleagues have proposed passion in many fields such as musicians (Bonneville-Roussy, Lavigne & Vallerand, 2010), gambling (Philippe & Vallerand, 2007), internet (Séguin-Lévesque, Laliberté, Pelletier, Vallerand, & Blanchard, 2003), activity (Vallerand et al., 2003, study 1) and sport (Vallerand et al., 2003, study 2, 3; Vallerand et al., 2008). Thus, it was interesting to investigate how passionate Norwegian youth athletes are towards their sport.

2.2.1 Research on Passion in sport

Vallerand et al. (2003, study 2) investigated football players during a season course and showed that HP increased positive affect in general life domain and OP lead to increased negative affect. Further, intrinsic and extrinsic motivation was included, but respectively passion was beyond and over the changes, leading to more general positive and negative affects. Determinants such as sport valuation and personally orientation, was measured with HP and OP. Sport valuation refers to how important and how much the person identifies them self with the activity, dividing personal orientation into autonomous (participating for own sake and pleasure) and controlling (participate for internal or external pressure). HP showed

positively relation with sport valuation and autonomous personality orientation, and OP with sport valuation and control personality orientation (Vallerand et al., 2006, study 1). In study 2 positive affective indicators (i.e., subjective well-being, satisfaction with sport, vitality in sport, and positive affect) significantly correlated with HP positively. OP was significantly related to negative affects. Study 3, found a positive relationship between sport valuation, autonomous personality and HP at time 1 and subjective well-being at time 2. OP, sport valuation and controlled personality was positively (but not significant) related to well-being.

Measuring coach-athlete relationship (CART-Q) and its relationship with passion, linked HP to all components of a high quality coach-athlete relationship. OP was significantly correlated with direct commitment (e.g., "I like my coach"), but negative related to meta-complementary (e.g., "My coach likes me"). In sum, the study suggests a high quality coach-athlete relationship is more related to HP, than to OP (Lafrenière et al., 2008, study 1). This is an important aspect that considers youth athletes in this study and the relationship to their coaches.

Vallerand et al. (2008, study 1) conducted a study with basketball players both female and male, but found no gender difference. HP and OP was associated with deliberate practice (e.g., putting several elements into a learning process) and was in tune mirrored in performances. In study 2, HP related positively to mastery goal and subjective well-being (SWB), which was not the case for OP. OP linked positively to mastery-, performance-approach- and performance-avoidance goals, but not to SWB. In another study obsessive passionate basketball players showed higher level of aggressive behavior than athletes with high on HP. This in turn, reflected in denunciatory situations with aggressively behavior, to obtain their identity (Donahue et al., 2009, study 1, 2). In order to define the activity as passionate, individual experiences, significant differences and amount of time doing the activity is important. Almost all of this studies presented form a basis and provide results that support The Dualistic Model of Passion (Vallerand et al., 2003).

A passion towards sport and activity seems to be an important aspect to engage athletes to invest time and energy, where they identify them self with the sport. Crucially, a harmonious passionate person may experience adaptive behavior and an obsessive passionate person less adaptive- or maladaptive behavior which evidentially will be presented for the athletes in the present study. A high harmonious passionate and intrinsically motivated person may have the

advantage to experience flow state. In light of flow theory, both concepts are reported to relate positively to flow.

2.3 Flow

Across decades flow is discovered in exercise (Vlachopoulos, Karageorghis, & Terry, 2000), education (Engeser & Rheinberg, 2008), outdoor activities (Csikszentmihalyi, 2000; Fave, Bassi, & Massimini, 2003), work (Salanova, Bakker & Llorens, 2006) and sports (Jackson, 1992, 1995; Jackson & Csikszentmihalyi, 1999). ‘‘Flow is defined as a psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy’’ (Moneta & Csikszentmihalyi, 1996, p. 277). Flow was first described as an autotelic experience and a dynamic state (i.e., feeling of total control and involvement) that was intrinsically rewarding for the mind and couldn’t be experienced in regularly and normal life settings (Csikszentmihalyi, 1975, 2000). Csikzentmihalyi (1975) suggested two types of flow, macro (i.e., high challenges and skills in extreme situation) and micro (i.e., everyday life setting). Jackson (1992) who is one of the leading researchers in flow found that peak performance was linked to flow state on collages athletes and characterize the feeling as conscious, total focus and absorbed in the activity, where emotions and thoughts are excluded, emphasized an extraordinary and optimal experience. Flow also contains feelings of enjoyment. Even though medals and victories are important, flow offers something beyond success, something abnormal where you feel awake and in harmony with the activity you perform (Jackson & Csikszentmihalyi, 1999).

Flow is built on Csikszentmihalyi’s (1975, 1990) studies of peoples happiness. In order to experience flow in an activity it needs a curtain of meaning, invest of time, energy, some skills and challenges (Jackson & Eklund, 2004). Jackson and Csikszentmihalyi (1999) describes nine dimensions of flow characteristics; *Challenge-skill balance* (e.g., opportunities for action or situation demands to the ability or capacity to master a situation), *Action-awareness merging* (e.g., totally absorbed in the situation when body and mind work together on the maximum of your limits), *Clear goals* (e.g., working systematically in the achievement process and get results), *Unambiguous feedback* (e.g., guiding the athlete in right direction towards optimal performance), *Concentration on the task at hand* (e.g., totally focus on the task being in the present), *Sense of control* (e.g., totally control of own actions and the environment), *Loss of self-consciousness* (e.g., freely apply the attention towards the self in

the situation), *Transformation of time* (e.g., feeling freely released from the pressure of time), and *Autotelic experience* (e.g., perform the activity for intrinsically rewarding). Illustration of the flow model (see figure 2.1) explains how to achieve and prevent flow state. The most optimal zone to experience flow is the "the golden rule", where high challenges meet high skills. The last three other zones present an imbalance between challenge and skill with a non-optimal state. Jackson and Csikszentmihalyi (1999) exemplify that some athletes experience flow and possible anxiety competing in a world championship, when challenge is above average skills. In addition, they underscores that the experience between the skill-challenge dimension, depends on the athletes' perception in a curtain situation.

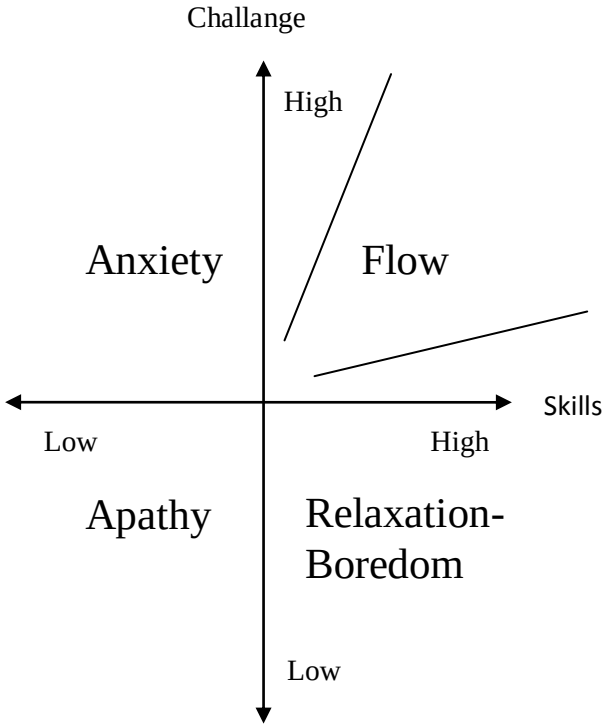

Figure 2.1: *Model of the flow state (Slightly modified, Csikszentmihalyi & Csikszentmihalyi, 1988, p. 261).*

2.3.1 Research on Flow in sport

Introducing flow in sport has showed similar, but also varying results. Flow is proposed as a state and a contribution to positive psychology. Until now, almost all researchers have related positive affects being "in the zone". The following section presents several concepts related to flow, however there are some implications.

Jackson (1992) investigated flow using both qualitative and quantitative methods among 16 national champion figure skaters, which seven of the athletes earned either World Champion or Olympic medals. The athletes were interviewed and asked to rate 11 items about their understanding of flow. Factors like positive pre-competitive plans, competitive affect, the physical readiness, positive mental attitude, maintain focus and partner unity needed to be in place to avoid disruption from being in flow. Doing mistakes, losing focus and less response from the audience, interrupted flow state. Further, athletes reported that uncontrollable factors of disturbance were partner unity and audience. Except for loss of self-consciousness, eight of the nine flow dimensions were strongly linked to athletes' subjective meaning of flow.

In a more comprehensive study by Jackson (1995) information about how to achieve the skill-challenges dimension was investigated. A total of 10 factors were presented with 26 lower dimensions describing specific how to attain or prevent flow. Such factors like the athlete (e.g., pre-competition and competitive plans and preparation, confidence, positive attitude) and the situation (e.g., climate, team play issues) were important to enter flow state. Factors like emotional stress, negative thinking, lacking of confidence and motivation prevented flow experience. According to Jackson and Roberts (1992) peak performances, perceived ability and mastery focus were linked to flow, suggesting that high perception of flow may be necessarily to reach peak performance in competitions, in contrast to those who only experience good performances. This finding is supported by Csikszentmihalyi (1990) and should be decently to know for athletes in this study. Wiggins and Freeman (2000) measured how the influence with facilitative and debilitative anxiety had on flow experiences in volleyball matches. Those with high facilitative anxiety scored higher on the feedback flow dimension and apprehended clearer feedback on how they performed, compared to the deliberative group. I addition, they reported more focus or concentration, and had less concern about what others thought about them during matches. Despite the individual differences in the athletes' stories, taken as whole, facilitative anxiety was more positive direct to performances and associated with the opportunity to enter flow state. The compared group indicated high debilitative anxiety and was less likely to experience flow.

In another study measuring flow in golf, showed that golfers with greater pre-round confidence readiness, positive focus, degree of calmness, lower average scores and low but feeling of pessimism, were more likely to experience flow. The t-test on gender, sport club or

league membership indicated no significant differences. Only average score, handicap and years golfing were significant positively related to flow (Catley & Duda, 1997). In Kowal and Fortier's (2000) study, still no gender differences were found between master swimmers. In line with the Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM, Vallerand, 1997) the perception of situational motivation (i.e., autonomy, competence and relatedness) related positively predicting flow. Positive outcomes are linked to self-determined form of motivation, which has been reported positively related to flow (Jackson & Roberts, 1992). Further, the perception of contextual motivation (i.e., autonomy, competence, relatedness) was unrelated predicting flow. However, the result indicated positive association between autonomy, competence and relatedness.

Deci and Ryan (1985) presented classification between self determined manners (i.e., self-determined intrinsic motivation, self-determined extrinsic motivation, and non-self-determined extrinsic motivation) and Kowal and Fortier (1999) investigated the connection to flow in line with HMIEM (Vallerand, 1997). Athletes who had self-determined intrinsic motivation (e.g., driven by their own interest towards the activity) and self-determined extrinsic motivation (e.g., engaging in the activity for own importance), were more likely to enter flow state. Two dimensions (i.e., time transformation, and self-consciousness) was less sensitive to situational motivation than other dimensions of flow which means that athletes have an equivocal perception of flow. It should be interesting to see if athletes in the present study have different perception relating motivation and passion to flow experience.

Andrea Mead-Lawrence, former Olympic champion in alpine skiing, describes in early age conscious awareness and responsibility as important. After some time of hardship in alpine skiing, she started to direct her energy and focus towards elements of her interest, to achieve flow. Elements such as setting goals and knowing her motions provided mental, spiritual and emotional experiences with a body and mind that's harmonized (Beacon, Fenby & Lawrence, 1998). Csikszentmihalyi (1990) describes the self is in harmony when experiencing flow, when all the senses is aimed towards one clear goal.

Jackson, Kimiecik, Ford, and Marsh (1998) investigated psychological (i.e. intrinsic/extrinsic motivation, trait anxiety, goal orientation, perceived ability) correlations with flow among master athletes. A negative correlation was found between low perceived ability and anxiety to almost all of the flow dimensions. Intrinsic motivation related positively to flow, and linked

strongest to the experience simulation subscale. Time transformation and action awareness merging failed to demonstrate correlations. Stavrou, Jackson, Zervas, and Karteroliotis (2007) looked at the correlation between apathy, anxiety, relaxation and flow among athletes from different sports (i.e., track and field, swimming, shooting, archery, cycling, canoeing, kayaking). Relaxations and flow had the most optimal state, contrary to apathy and flow which lead to least optimal state. Positive relations between emotional states of flow and level of performance were found to be related, but no correlation was revealed between the challenge of the game and athlete performance, suggesting that perceived skill which moderated correlated, play a more important role for the athletes perception in a competition. An intervention study with Mindful Sport Performance Enhancement program (MSPE) found that significant changes were made in the level of global flow state and unambiguous feedback, week by week. MSPE that is based on mindfulness training (e.g., sitting/walking meditation, yoga) were adapted into specific sport settings towards focus attention. In sum, the program increased flow state, which result in performance-enhancement (Kaufman, Glass & Arnkoff, 2009). In another study with marathon runners, the flow experience during races was associated with higher motivation for future running. However, race performance was not directly related to flow, but more importantly to still participate in the activity (Schüler & Brunner, 2009).

Past research found that flow is an extraordinary and abnormal experience and may occur when experiencing positive outcomes such as intrinsic motivation, task absorption, relaxation and high concentration. However, Partington, Partington, and Olivier (2009) searched the dark side of flow and interviewed big wave surfers. Participants showed both positive and negative experiences of flow. Positively, the confirmation of the nine flow dimension was conducted, especially the balance between challenge-skill, action awareness merging of the self and a higher amount of concentration. During a performance they noticed a feeling of being in control and a sort of time transformation occurred. However, negatively they gave an impression of been addicted and dependent, that surfing was a part of their daily drug. Some reported dysfunctional consequences and had problems to functional “normally” in society. First priority was surfing, and second came events, gaming, employment and family. Thus, it seems pertinent to also investigate the less positive side of the flow experience.

2.4 Aims of the study

Jackson et al. (1998) suggest that research is needed on other psychological factors compared with flow, because of clearer understanding of the concept. Thus, the aim of this study was to investigate the development and proposed link between motivation, passion and flow among Norwegian youth athletes.

2.4.1 Hypotheses

In light of empirical studies the following purpose of the present study was to investigate links between motivation, passion and flow in sport. In addition, we wanted to control for/investigate gender differences and development changes over a year period. In line with the *first* hypotheses, we expected that intrinsic motivation and HP would relate positively to flow. *Second,* extrinsic motivation and OP was hypothesized to relate negatively to flow. *Third*, we expected that motivation (i.e., intrinsic, extrinsic) and passion (i.e., harmonious, obsessive) were two different aspects of motivation. *Fourth,* investigating changes in intrinsic motivation from T1 to T2 we expected that elevated intrinsic motivation would lead to higher HP and higher frequency of flow. In the other hand, we expected that higher extrinsic motivation would lead to more OP and less flow. *Fifth*, the present study expects differences in motivation, passion and flow among genders. *Finally*, changes in intrinsic motivation would explain changes in flow.

3. Method

This was a quantitative study of Norwegian sport high school students, using a longitudinal design. The data came from a more extensive talent project (Pensgaard, McArdle, Standage, & Borgen, 2003). A large number of students from first to second grade participated and were asked to fill out demographic data and training history, before entering the questionnaires. The study was approved by Norwegian Olympic Committee and the Norwegian Confederation of Sports, the Data Inspectorate and the Regional Committee for Medical Research Ethics.

3.1 Participants

Participant were 95 students (male = 65; female = 30) from four different Norwegian sport high schools, competing in thirteen different sports (soccer, motocross, handball, golf, snowboard, hockey, alpine, biathlon, cross-country skiing, shooting, newschool, ski jump, Nordic combine). Student were aged between 16 to 19 years, average year of participant was 16.7 years (SD = 0.48 years) at data collection 1, and 17.7 years (SD = 0.48 years) at data collection 2. Performance level, goal setting and training hours was varying. During training and season period the measuring showed a weekly average from 11-15 training hours.

3.2 Instrument and measuring

The original versions of Sport Motivations Scale, Passion Scale and Dispositional Flow Scale-2 were translated into Norwegian. Qualified personnel were used to translate from English to Norwegian, and different personal to back translate. Comparing the two translations to the original scale, discussions and correcting were conducted before completing the final Norwegian translation correctly.

Sport Motivation Scale (SMS) was originally French, but was translated and validated to English (Pelletier et al., 1995) and Norwegian (Lemyre, Robert & Stray-Gundersen, 2007). SMS is divided into intrinsic motivation, extrinsic motivation and amotivation. These three dimensions representing Deci and Ryan (1985) self-determination continuum (SDC). Intrinsic motivation is divided into three subscales, intrinsic motivation to know things, intrinsic motivation to experience stimulation and intrinsic motivation to accomplish. Extrinsic motivation includes identified-, introjected- and external regulation. Amotivation is

considered with low autonomous, containing only one subscale. Each subscale contain four items with a 7-point Likert scale ranging from *does not correspond at all* (1) to *correspond exactly* (7) and in the midpoint *correspond moderately* (4). Participant was asked to write down one of the scales to the following 28 statements, based on why they participate in sport. Pelletier et al. (1995) reported satisfying validity and reliability, supported by several studies (Kingston, Horrocks, & Hanton, 2006; Li & Harmer, 1996; Lemyre, Robert & Stray-Gundersen, 2007; Martens & Webber, 2002; Vallerand & Losier, 1999). Pelletier et al. (1995) measured internal consistency, with alpha ranging from .74 to .80, where identification subscale was a little lower (.63). Other studies reported similar findings with the identification subscale (Kingston et al., 2006, Li & Harmer, 1996).

In the present study acceptable alphas ranging from .66 to .92 was demonstrated. From T1 lower alpha scores was reported; identification subscale, (.61), introjected subscale (.59) and extrinsic motivation (.67). Item number nine was removed from introjection T1, and Cronbach alpha increased to .66. Identification items were not removable. To measure intern consistency for the extrinsic motivation subscale, the identification subscale was removed, and increased to alpha with satisfied criterion at T1 (.71) and T2 (.78). Nunnaly and Bernsteins (1994) argued that a satisfying criterion for the alpha is over .70.

Passion Scale (PS) (Donahue et al., under review) refers to the participant's type of passion towards an activity (Vallerand et al., 2003; Vallerand, et al., 2006). PS is divided into two subscales, with seven items punctual described for harmonious- (HP) and obsessive passion (OP). A 5-point Likert scale ranging from *Do Not Agree At All* (1) to *Completely Agree* (5) was employed. For example, items includes "For me sport is a passion, that I still manage to control" (Harmonious passion subscale) and "I cannot live without sport" (Obsessive passion subscale). Earlier studies indicate satisfactory and adequate evidence for the reliability and validity of the scale. Sport and other activities measured (Amiot, Vallerand & Blanchard, 2006; Philippe et al., 2009; Ratelle, Vallerand, Mageau, Rousseau, & Provencher, 2004; Vallerand et al., 2003) Chronbach alpha between .70 to .83 and = .64 to .91, for HP and OP. The present study showed acceptable levels of reliability, with good alpha coefficient at T1 for HP (.83) and T2 (.87) and for OP T1 (.86) and T2 (.85). To be a passionate person, Vallerand et al. (2003) argued that a mean score ranging between four and seven is

necessarily. In the present study, a passionate person is defined when a mean score ranging between three and five, because of the shorter Likert scale.

Dispositional Flow Scale-2 (DFS-2) is design to measure experience of flow. The instrument describes characteristics of flow in general setting, which the respondent has experienced in a selected activity. In the following study a Norwegian translation of the DFS-2 was used (Vea, 2005). DFS-2 (Jackson & Eklund, 2002, 2004) includes 36 items and four statements for each of the nine flow dimensions, using a 5-point Likert scale ranging from *Never* (1) to *Always* (5). To answer the scale more precisely, lead-in statement such as: "When participating (name activity)…". Mean scores were used for each dimensions. I addition, DFS-2 also measures total amount of flow (global flow), using mean scores of all the dimensions, divided with nine. To understand the nine dimensions of flow, an example is presented beneath (Jackson & Csikszentmihalyi, 1999; Jackson & Eklund, 2004).

> **Challenges-Skill Balance:** "I am challenged, but I believe my skills will allow me to meet the challenge"
> **Action-Awareness Merging:** "I make the correct movement without thinking about trying to do so"
> **Clear Goals:** "I know clearly what I want to do"
> **Unambiguous Feedback:** "It is really clear to me how my performance is going"
> **Concentration on Task at Hand:** "My Attention is focused entirely on what I am doing"
> **Loss of self-consciousness:** "I focus freely on myself with no time for worrying of other aspect of life"
> **Sense of Control**: "I have a sense of control over what I am doing"
> **Transformation of Time:** "The way time passes seems to be different from normal"
> **Autotelic Experience:** "I really enjoy the experience"

Jackson and Eklund (2002) provided satisfactory reliability with alphas ranging from .78 to .91 for the DFS-2. In the current study, alpha ranged from .48 to .88. From the concentration subscale question, item fourteen was removed and alpha increased to .73 and .82 collection 1 and 2. The balance subscale was .67 first collections and .70, after removing item number one (see Table 4.2).

3.3 Procedures

Leaders of the four elite sport collages in Norway received written and oral information about the main projects procedure, where 216 first grade students participated. Participant under

eighteen completed a consent with parental acceptance include. Altogether five data collections were conducted. The first data collection – a pilot - was conducted autumn 2004. In 2004/5 two data collections were conducted involving first year students, followed by one data collection in 2005/6 and the last in 2006/7. This study involved data collection 3 (the second data collection involving first years students - from here on referred to as T1) and data collection 4 (data collected when the students finished their second year - from heron referred to as T2) A total of 95 participates completed the questionnaires at both T1 and T2 in this period.

Each high school was mailed the questionnaires and the contact person in each class was responsible for distributing the questionnaires in a classroom setting. The test battery took about 25-50 minutes to complete. After completing the questionnaires, the teachers collected the questionnaires and sent them back to the Norwegian School of Sport Science. A science assistant organized the data in a SPSS file.

The author of the present study was allowed to use parts of the questionnaires from the project manager and organized the data into a new SPSS file, using the scales described earlier. To analyze the data's content, subscales was made.

The data was analyzed in SPSS version 18.0. Initially 100 student answered T1 and T2, but five did not complete all test used in this project and was excluded from the analyses involving both collections. To investigate the development over one year, all data is necessarily. If there were one or two values missing on a test, the data would still be used. The missing value was replaced by an empty cell.

3.4 Data Analyses

Reliability analyses (Cronbachs alpha) were used to measure internal consistency on all variables. Pearson correlation was used to measure relationships between motivation, passion and flow. MANOVA was used to measure gender differences. Paired sample t-tests were used to test the development changes from T1 to T2 with motivation, passion and flow. Several regression analyses were conducted to predict changes of flow. Inspection of the normality (Shapiro wilk) indicated good fit of all variables. To test the *fourth* and the *final* hypotheses, standardized residuals were made.

4. Results

4.1 Descriptive results

In table 4.1 and 4.2 mean, standard deviation and alpha scores are represented for T1 and T2. Alpha score were ranging from .61 to .92. From T1 females decreased in intrinsic motivation, to know things, experience stimulation, flow balance, autotelic and increased amotivation at T2. Males decreased in OP and flow goal at T2. At T1 95 percent of the participants were passionate and 86 percent at T2, with a respectively decrease in OP. Separately, females decreased from 93 percent (T1) to 87 percent (T2) and males from 97 percent (T1) to 88 percent (T2).

Table 4.1*: Descriptive statistics: Mean, standard deviation and Cronbach alpha T1 and T2 for SMS and Passion variables.*

					Gender			
		N=95			N=30 Female		N=65 Male	
		M	**SD**	**α**	**M**	**SD**	**M**	**SD**
SMS	Intrinsic motivation (T1)	5.51	1.03	.90	5.53	1.09	5.50	1.01
	Intrinsic motvation (T2)	5.35	1.07	.92	5.16*	1.11	5.44	1.04
	To know things (T1)	5.43	1.16	.86	5.54	1.16	5.38	1.16
	To know things (T2)	5.18	1.19	.82	5.11*	1.22	5.22	1.18
	Experince stimulation (T1)	5.59	1.09	.79	5.49	1.24	5.63	1.02
	Experince stimulation (T2)	5.46	1.08	.82	5.05**	1.18	5.65	.98
	To accomplish (T1)	5.53	1.12	.84	5.57	1.04	5.51	1.17
	To accomplish (T2)	5.42	1.19	.89	5.31	1.16	5.47	1.21
	Extrinsic motivation (T1)	4.15	.86	.71	3.84	.83	4.30	.84
	Extrinsic motivation (T2)	4.06	1.00	.78	3.83	1.04	4.16	.98
	Identification (T1)	4.50	1.01	.61	4.33	1.08	4.58	.97
	Identification (T2)	4.41	1.16	.77	4.29	1.22	4.47	1.13
	Introjection (T1)	4.15	1.06	.66	4.06	.89	4.20	1.14
	Introjection (T2)	4.07	1.21	.72	3.73	1.23	4.23	1.17
	External regulation (T1)	3.80	1.23	.74	3.14	1.17	4.11	1.14
	External regulation (T2)	3.69	1.25	.75	3.47	1.23	3.79	1.25
	Amotivation (T1)	2.28	1.22	.76	1.90	.83	2.45	1.34
	Amotivation (T2)	2.41	1.29	.84	2.33*	1.18	2.46	1.35
PS	Harmonious passion (T1)	4.35	.59	.83	4.28	.65	4.38	.57
	Harmonious passion (T2)	4.17	.70	.87	4.14	.58	4.18	.75
	Obsessive passion (T1)	3.80	.78	.86	3.60	.83	3.89	.74
	Obsessive passion (T2)	3.53	.90	.85	3.32*	.81	3.63*	.93

Note. $N = 95$, ** $p < .01$, * $p < .05$, SMS; Sport Motivation Scale, PS; Passion Scale, T1; Time 1, T2; Time 2.

***Table 4.2**: Descriptive statistics: Mean, standard deviation and Cronbach alpha T1 and T2 for Flow variables.*

					Gender			
		N=95			N=30 Female		N=65 Male	
		M	SD	α	M	SD	M	SD
DFS-2	Global flow (T1)	3.79	.39	.79	3.68	.38	3.84	.39
	Global flow (T2)	3.76	.45	.87	3.60	.37	3.83	.46
	Balance (T1)	3.87	.48	.70	3.81	.55	3.90	.44
	Balance (T2)	3.83	.66	.87	3.60*	.62	3.94	.66
	Merging (T1)	3.62	.54	.71	3.50	.61	3.67	.50
	Merging (T2)	3.68	.57	.79	3.52	.50	3.75	.59
	Goal (T1)	4.12	.59	.76	4.02	.69	4.16	.54
	Goal (T2)	3.96	.67	.84	3.92	.58	3.98*	.70
	Feedback (T1)	3.89	.56	.76	3.78	.59	3.95	.54
	Feedback (T2)	3.86	.61	.85	3.74	.60	3.92	.61
	Concentration (T1)	3.72	.54	.73	3.78	.61	3.69	.51
	Concentration (T2)	3.71	.53	.82	3.68	.49	3.73	.54
	Control (T1)	3.86	.60	.85	3.67	.56	3.95	.59
	Control (T2)	3.80	.55	.80	3.67	.52	3.87	.56
	Consciousness (T1)	3.18	.89	.81	3.03	.85	3.25	.90
	Consciousness (T2)	3.27	.79	.79	3.00	.79	3.39	.77
	Time transformation (T1)	3.61	.80	.88	3.30	.78	3.74	.78
	Time transformation (T2)	3.64	.75	.84	3.38	.62	3.76	.78
	Autotelic (T1)	4.21	.63	.83	4.20	.58	4.21	.66
	Autotelic (T2)	4.09	.62	.83	3.91**	.63	4.18	.60

Note. $N = 95$, ** $p < .01$, * $p < .05$, DFS-2; Dispositional Flow Scale-2, T1; Time 1, T2; Time 2.

4.2 Relationship between Self-Determined Motivation, Passion and Flow.

In accordance with the *first* hypotheses intrinsic motivation subscales (i.e., to know things, experience stimulation, and to accomplish) and HP were positively related to each other and also almost to all flow dimensions, including global flow T1 (see table 4.3). Intrinsic motivation subscales correlated positively to six flow dimensions, except for experience stimulation that positively correlated with seven and HP which positively correlated with eight flow dimensions.

Second, at T1 identification subscale and OP related positively to each other and to flow. Contrary to what we expected, OP correlated significantly with flow (four dimensions), although HP showed stronger correlation to flow dimensions and global flow than OP. OP was positively related to all extrinsic motivation subscales and HP. Identification subscales correlated positively to intrinsic motivation and three flow dimensions.

At T2 intrinsic motivation subscales positively correlated with eight flow dimensions, except for intrinsic motivation towards accomplishment that correlated positively with seven (see table 4.4). However, all extrinsic motivation subscales correlated positively to all intrinsic motivation subscales. HP correlated positively to six flow dimensions and OP. OP positively correlated with all extrinsic motivation subscales and five flow dimensions including global flow. OP correlated positively a little higher with identification subscale than HP. Identification subscale positively correlated with five flow dimensions and stronger with all intrinsic motivation subscales at T2.

4.3 Is intrinsic/extrinsic motivation and harmonious/obsessive passion the same?

To test the *third* hypothesis, Pearson correlations analyses (see table 4.3 & 4.4) showed a positive significant relation between the intrinsic motivation and HP subscale at T1 (.63) and T2 (.56). Further, the extrinsic motivation and OP subscale positively correlated at T1 (.47) and T2 (.54). This shows that the concepts are related, but not identical.

***Table 4.3**: Pearson correlation involving all subscales at time 1.*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Intrinsic motivation	-																				
2. To know things	**.93****	-																			
3. Experince stimulation	**.89****	**.73****	-																		
4. To accomplish	**.92****	**.80****	**.73****	-																	
5. Extrinsic motivation	**.35****	**.30****	**.36****	**.29****	-																
6. Identification	**.47****	**.45****	**.47****	**.37****	**.68****	-															
7. Introjection	.19	.16	.19	.18	**.79****	**.29****	-														
8. External regulation	.17	.11	.20*	.16	**.85****	**.36****	**.56****	-													
9. Amotivation	**-.26***	-.17	-.29**	-.25*	**.27****	.05	**.29****	**.28****	-												
10. Harmonious passion	**.63****	**.55****	**.64****	**.54****	**.33****	**.44****	.15	.19	**-.30****	-											
11. Obsessive passion	**.41****	**.34****	**.48****	**.32****	**.47****	**.31****	**.43****	**.36****	.10	**.59****	-										
12. Global flow	**.49****	**.38****	**.52****	**.46****	.20	**.26***	.11	.10	**-.34****	**.55****	**.35****	-									
13. Balance	**.46****	**.30****	**.51****	**.45****	**.21***	**.22***	.15	.14	**-.36****	**.40****	.18	**.78****	-								
14. Merging	.09	.03	.15	.06	.15	**.21***	.03	.11	-.11	**.27****	.03	**.56****	**.50****	-							
15. Goal	**.48****	**.40****	**.51****	**.43****	.02	.12	.01	-.07	**-.47****	**.46****	.20	**.72****	**.60****	**.32****	-						
16. Feedback	**.36****	**.26***	**.36****	**.37****	.09	.17	.05	.01	**-.31****	**.41****	**.21***	**.68****	**.57****	**.43****	**.63****	-					
17. Concentration	**.42****	**.37****	**.33****	**.45****	.06	.05	.13	-.03	**-.26***	**.38****	.19	**.64****	**.45****	**.22***	**.43****	**.48****	-				
18. Control	**.31****	**.22***	**.33****	**.31****	.12	.10	.07	.11	**-.25***	**.24***	.13	**.72****	**.68****	**.51****	**.51****	**.44****	**.44****	-			
19. Consciousness	-.01	-.03	.04	-.03	.18	.14	.05	.22*	.06	.18	**.22***	**.44****	.14	.11	.03	.13	.16	.10	-		
20. Time	**.22***	.16	**.30****	.16	.19	.20	.12	.13	-.02	**.33****	**.42****	**.53****	**.20***	.11	.15	.04	**.22***	**.23***	**.38****	-	
21. Autotelic	**.64****	**.57****	**.57****	**.62****	.05	**.24***	.02	-.12	**-.42****	**.53****	**.28****	**.71****	**.61****	**.26***	**.69****	**.49****	**.45****	**.46****	.01	**.30****	-

Note. $N = 95$, ** $p < .01$, * $p < .05$.

***Table 4.4**: Pearson correlation involving all subscales at time 2.*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Intrinsic motivation	-																				
2. To know things	**.93****	-																			
3. Experince stimulation	**.91****	**.76****	-																		
4. To accomplish	**.94****	**.80****	**.79****	-																	
5. Extrinsic motivation	**.51****	**.51****	**.39****	**.51****	-																
6. Identification	**.57****	**.59****	**.45****	**.53****	**.82****	-															
7. Introjection	**.39****	**.39****	**.30****	**.39****	**.84****	**.54****	-														
8. External regulation	**.32****	**.30****	**.24***	**.35****	**.85****	**.54****	**.56****	-													
9. Amotivation	**-.47****	**-.41****	**-.50****	**-.39****	.05	-.13	.09	.15	-												
10. Harmonious passion	**.56****	**.50****	**.56****	**.50****	**.29****	**.31****	**.26***	.17	**-.43****	-											
11. Obsessive passion	**.50****	**.47****	**.48****	**.44****	**.54****	**.37****	**.61****	**.37****	**-.23***	**.69****	-										
12. Global flow	**.55****	**.46****	**.58****	**.50****	**.25***	**.31****	.19	.13	**-.42****	**.37****	**.26***	-									
13. Balance	**.52****	**.44****	**.53****	**.47****	.20	**.26***	.10	.13	**-.45****	**.35****	**.24***	**.87****	-								
14. Merging	**.37****	**.31****	**.40****	**.33****	.18	**.21***	.08	.15	**-.23***	**.26****	.10	**.74****	**.71****	-							
15. Goal	**.50****	**.38****	**.56****	**.45****	.14	**.23***	.07	.05	**-.54****	**.41****	**.26***	**.77****	**.65****	**.46****	-						
16. Feedback	**.40****	**.31****	**.44****	**.36****	.15	.16	.16	.07	**-.46****	**.38****	**.26****	**.77****	**.63****	**.51****	**.76****	-					
17. Concentration	**.38****	**.33****	**.37****	**.36****	.20	.18	.18	.13	**-.26***	**.36****	**.29****	**.69****	**.57****	**.49****	**.49****	.48**	-				
18. Control	**.25***	**.21***	**.30****	**.21***	.07	.07	.05	.05	**-.28****	.16	.04	**.79****	**.77****	**.68****	**.60****	.63**	**.54****	-			
19. Consciousness	.19	**.22***	.13	.17	**.27****	**.29****	**.22***	.17	.07	-.06	.03	**.48****	**.31****	**.34****	.12	.16	**.20***	**.35****	-		
20. Time	**.22***	.16	**.27****	.20	.10	.13	.10	.03	-.16	.14	.06	**.56****	**.36****	**.26****	**.27****	**.27****	**.35****	**.21***	**.23***	-	
21. Autotelic	**.69****	**.55****	**.74****	**.64****	**.25***	**.35****	**.21***	.06	**-.445****	**.43****	**.38****	**.73****	**.63****	**.40****	**.65****	**.58****	**.41****	**.41****	.14	**.47****	-

Note. $N = 95$, ** $p < .01$, * $p < .05$.

4.4 Relationship among the concepts development

To test the *fourth* hypotheses, T2 was set as dependent variable and T1 as independent variable and saved as standardized residuals. Further, the standard residuals were used to analyze development. Pearson correlation test showed that changes in intrinsic motivation were significant and positively related to the changes in HP and the changes in global flow (see table 4.5). Changes in identification showed a positive correlation to changes in intrinsic motivation and changes in flow. Further, changes in OP were positively and significant related to all the changes in extrinsic motivation subscales. Table 4.5 indicates that if there is a positive correlation between two variables changes, they will most likely follow the same pattern.

***Table 4.5**: Pearson correlation matrix on development between motivation, passion and flow.*

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Δ Intrinsic motivation	-							
2. Δ Identified regulation	**.47****	-						
3. Δ Introjected regulation	**.57****	**.56****	-					
4. Δ External regulation	**.30****	**.55****	**.45****	-				
5. Δ Amotivation	**-.39****	-.02	.06	.14	-			
6. Δ Harmonious passion	**.48****	.17	**.24***	.11	**-.39****	-		
7. Δ Obsessive passion	**.52****	**.33****	**.43****	**.26***	**-.29****	**.72****	-	
8. Δ Global flow	**.43****	**.28****	.17	.09	**-.34****	**.27****	.20	-

Note. $N = 95$, ** $p < .01$, *$p < .05$.

4.5 Gender differences T1 and T2

To test the *fifth* hypotheses, MANOVA was used with gender as independent variable and SMS subscales as dependent variables. The results revealed a significant difference with Pillai`s Trace = .086; $F(3, 91) = 2.85$ $p < 0.05$ higher score for males on extrinsic motivation $F(1, 93) = 6.00$, $p < .05$ and amotivation $F(1, 93) = 4.40$, $p < .05$ at T1. At T2 no significant gender differences was found in motivation variables. A second MANOVA with gender as independent variable and PS subscales as dependent variables, resulted in no gender differences between HP and OP at both T1 and T2. A third MANOVA was conducted with gender as independent variable and seven of the correlated DFS-2 subscales (i.e., balance, goal, feedback, concentration, control, time, autotelic) as dependent variable. The results revealed Pillai`s Trace = .20; $F(7, 87) = 3.18$, $p < 0.01$ higher score for males on control $F(1,$

93) = 4.97, $p < .05$ and time $F(1, 93) = 6.62$, $p < .05$ at T1. The results from T2 showed no significant differences.

Furthermore, paired sample t-test was used to measured development differences among female and male athletes (see table 4.6). The results revealed that female athletes significantly decreased their score in two intrinsic motivation subscales (i.e., to know things, and experience stimulation), intrinsic motivation, OP, two flow dimensions (i.e., balance, and autotelic) and increased amotivation to match the score of the male athletes. On the other hand, male athletes significantly decreased OP and the flow goal dimension. External regulation ($p = .063$) and HP ($p = .075$) was non-significant, but approaching.

***Table 4.6**: Development differences among gender time 1 and time 2.*

		M (SD)	t	df
Females	Intrinsic motivation (T1)	5.53 (1.09)	2.41*	29
	Intrinsic motivation (T2)	5.16 (1.11)		
	To know things (T1)	5.54 (1.16)	2.73*	29
	To know things (T2)	5.11 (1.22)		
	Experience stimulation (T1)	5.49 (1.24)	2.82**	29
	Experience stimulation (T2)	5.05 (1.18)		
	Amotivation (T1)	1.90 (.83)	-2.15*	29
	Amotivation (T2)	2.33 (1.18)		
	Obsessive passion (T1)	3.60 (.83)	2.37*	29
	Obsessive passion (T2)	3.32 (.81)		
	Flow balance (T1)	3.81 (.55)	2.34*	29
	Flow balance (T2)	3.60 (.62)		
	Autotelic (T1)	4.20 (.58)	2.79**	29
	Autotelic (T2)	3.91 (.63)		
Males	External regulation (T1)	4.11 (1.14)	1.90^{ns}	64
	External regulation (T2)	3.79 (1.25)		
	Harmonious passion (T1)	4.38 (.57)	1.81^{ns}	64
	Harmonious passion (T2)	4.18 (.75)		
	Obsessive passion (T1)	3.89 (.74)	2.26*	64
	Obsessive passion (T2)	3.63 (.93)		
	Flow goal (T1)	4.16 (.54)	2.12*	64
	Flow goal (T2)	3.98 (.70)		

Note. * $p < .05$, ** $p < .01$, *ns* = Not statistically significant.

4.6 Does motivation and passion emphasize flow?

To test the *final* hypotheses a series of hierarchical regression analyses involving motivation, passion and flow using the "enter"- method, outlined by Aiken and West (1991) was conducted. T2 variables were set as dependent variables, T1 as independent variable and saved as standardized residuals. Further, the standard residuals were used to analyze

development changes. In model 1 motivation significantly explained 20.2% of the variance in flow. Intrinsic motivation was the only significant predictor.

***Table 4.7**: Regression analyses predicting changes in flow from changes in motivation.*

Variables	**β**	***t***	***F***	**Adjusted R^2**
Model 1				
Δ Intrinsic motivation	.33	2.45*		
Δ Identification	.20	1.63		
Δ Introjected	-.09	-.70		
Δ External regulation	-.05	-.45		
Δ Amotivation	-.19	-1.75		
			5.761**	.254

Note. ** $p < .01$, * $p < .05$.

In model 2 the regression analyzes with passion were non-significant. HP and OP explained only 5.2% of the changes in flow.

***Table 4.8**: Regression analyses predicting changes in flow from changes in passion.*

Variables	**β**	***t***	***F***	**Adjusted R^2**
Model 2				
Δ Harmonious passion	.26	1.81		
Δ Obsessive passion	.01	.08		
			3.60*	.052

Note. * $p < .05$.

When all variables were included in the regression, intrinsic motivation came out as the only significant predictor (see table 4.9).

***Table 4.9**: Regression analyses predicting changes in flow from changes in passion and motivation.*

Variables	**β**	***t***	***F***	**Adjusted R^2**
Model 3				
Δ Intrinsic motivation	.32	2.28*		
Δ Identification	.21	1.70		
Δ Introjected	-.06	-.46		
Δ External regulation	-.04	-.37		
Δ Amotivation	-.19	-1.67		
Δ Harmonious passion	.13	.90		
Δ Obsessive passion	-.15	-1.00		
			4.24**	.194

Note. ** $p < .01$, * $p < .05$.

5. Discussion

The main purpose of the present study was to investigate the proposed relationships between self-determined motivation, passion and flow among Norwegian youth athletes. Past of the process to understanding flow the results demonstrated positive links between intrinsic motivation, HP and flow. Contrary to the hypotheses, the data indicated also that identified regulation and OP relates to flow. Extrinsic motivation related only to OP, which in turn positively explained the development changes. Further, regarding gender differences, male athletes scored higher on amotivation, extrinsic motivation, and two flow dimensions at T1. T2 revealed no significant differences. Intrinsic motivation was the strongest contributor to explain the development changes of flow.

5.1 Relationship between motivation, passion and flow.

A high perception of intrinsic motivation and HP seems to be an important factor to experience flow. Even though, intrinsic motivation failed to correlate with some dimensions (i.e., action awareness merging, time transformation) at T1, past research support these findings (Jackson, et al., 1998). Loss of self-consciousness and time transformation fail to correlate at T2 which is also supported elsewhere (Jackson, 1992; Jackson, et al., 1998). This non-relationship may be explained by not thinking of the dimensions during participation or get a wrong impression of the flow components. However, we suggest that overall characterization of flow relates to intrinsic motivation which is one important predictor to enter flow state.

According to Pelletier et al. (1995) flow is probably connected to the experience stimulation subscale (e.g., the sensation in an activity) and relates less with the other motivational constructs. This present study however, indicates moderate correlations to flow between all intrinsic motivation subscales. We suggest that youth athletes who want and need to participate in an activity for their own needs and to learn, is as much relevant to the experience of flow as the sensation. In line with earlier research (Philippe et al., 2009; Vallerand et al., 2003), HP has showed positive correlations to flow, meaning that the activity is important for the athlete and contribute of being a part of the person's identity. Athletes with high HP may believe in their capabilities which may facilitative the flow experience.

The findings regarding extrinsic motivation and OP and the negative linked to flow was not for instance. Contrary to past research (Philippe et al., 2009; Vallerand et al., 2003) OP related to flow at T1 and T2. Although the OP/flow relation is unusual, it is not unique. Wang et al. (2008) likewise the present study, measuring flow with all nine dimensions, arguing that when a high correlation appears between HP/OP, than flow experience is more likely to occur. On the other hand a negative relation between HP/OP, resulted in higher correlation between HP/Flow, and negative to OP/Flow. Our data indicated that HP/OP correlated highly and may explain why OP related positively to Flow.

Vallerand et al. (2003) in their study measured flow with only three subscales (i.e., challenges-skill balance, loss of self-consciousness and sense of control) and Philippe et al. (2009) used two subscales (i.e., challenges-skill balance and sense of control) and found no correlation between OP/flow. In the present study a weak positive correlation between challenge-skill subscale and OP was found at T2. This dimension is argued to be "the golden rule" and most important to experience flow. When an imbalance between challenges-skill occurs then athletes are more exposed to anxiety, apathy and boredom (Csikszentmihalyi, 1990; Jackson & Csikszentmihalyi, 1999).

At both T1 and T2 the subscales feedback and autotelic related positively to OP. Even though obsessive passionate athletes who have a controlled internalization and are addicted to the activity (Vallerand et al., 2003), probably are less likely to experiencing flow. OP shares some similar characteristics such as being in a state of feeling in control and involvement as for the autotelic dimension (Csikszentmihalyi, 1975, 2000) and response on how you perform as for the feedback dimension.

The relations between OP/flow may have an association to the findings of Partington et al. (2009). They suggest a dark side of flow, where characteristics such as addiction to the activity, feeling of control and dysfunctional when trying to interact "normally" in society. This finding reflects OP characteristics. The present study propose that harmonious passionate people are more likely to experience flow, since engaging in the activity without having high relations to flow dimensions, especially for the skill-challenge dimension, makes it less likely and relevant for the flow state to occur being obsessive passionate.

5.2 Two of the same constructs?

According to the *third* hypotheses motivation and passion are two different aspects of motivation. In order to consider intrinsic motivation/HP and extrinsic motivation/OP to be the same construct, the correlation analyses should hold a higher amount of strength (closely to 1). In line with The Dualistic Model of Passion (Vallerand et al., 2003) a passionate person love spending time and energy towards an activity that they identifying him or herself with. On the other hand intrinsic motivation deals with the interest and liking the activity without being internalized into the persons own identity (Deci & Ryan, 1985). However, an intrinsically motivated person needs a path of developing passion towards an activity. According to Vallerand and Miquelon (2008), they introduced a three-step process to become a passionate person, (a) selecting an activity, (b) evaluate the interest, and (c) internalized it into your own identity. In line with this data collection and several empirical studies almost all of these youth athletes are characterized as passionate towards their activity, because they have already been through the three step model. Conversely, difficulties occur when arguing that extrinsic motivation develop OP. While, extrinsic motivation deal with lack of interest and rather obtain something outside the activity (Deci & Ryan, 1985, 2000). An obsessive passionate person being totally involved, leading to a more controlled internalization and problems with other aspect of life (Vallerand et al., 2003). Moreover, we suggest that obsessive passionate athletes develop extrinsic motivation over time after experiencing less adaptive- or maladaptive outcome (e.g., less achievement, aggression, relationship conflicts, addiction)

In line with CET and The Dualistic Model of Passion, intrinsic motivation and HP did share some similarities. These are liking the activity and freely accept to engage without feeling of addiction which have the advantage of adaptive outcomes (e.g., enjoyment, positive affect, high quality coach-athlete relationship). Similarities across extrinsic motivation and OP may be the curtain involvement of internalizations, such as for identified- and introjected regulation subscale (Deci & Ryan, 2000; Vallerand et al, 2003). Passion maybe criticized by being the same as motivation, but Vallerand et al. (2003) argued that there is a difference between the two motivational constructs, that passion deals with an internalization into the person own identity, which in turn intrinsic motivation is more associated with enjoyment and pleasure for several activities, which hold a sort of interest over short time.

The following present study support The Dualistic Model of Passion and find it encouraging to note, that motivation and passion are two separate aspects of motivation.

5.3 Development relationship

Testing the *fourth* hypothesis, positive development correlations were found between intrinsic motivation, HP and global flow. If, in case intrinsic motivation increases the other two variables follows. An athlete showing interest in an activity, having an autonomous internalization and self-determined behavior, is more likely to experience flow state. In addition, the identification subscale (i.e. extrinsic motivation subscale) did also relate to flow. Changes from OP were unrelated to flow, but positive related to all extrinsic motivation variables.

In line with CET (Deci & Ryan, 1985) on a general basis, an increase of competence and autonomy leads to higher self-determined behavior and intrinsic motivation. Feedback from coaches, parents and others may have an important influence. Allowing an athlete to decide and give positive oral feedback through training and competition, may increase intrinsic motivation, which respectively can adapt higher HP and flow. Amorose and Horn (2001) argued that instructional leadership style is one important factor to increase intrinsic motivation. Even though, the apprehension differs from person to person, the perception of how athletes perceive the information seem to be cardinal. Perceiving positive feedback as informative argues to increase competence and self-determination and nevertheless negative and controlled feedback decrease (Deci & Ryan, 1985). More deeply, coaches may apply controlled strategies differently which may lead to well-being, self-regulation and higher intrinsic motivation (Bartholomew, Ntoumanis & Thøgersen-Ntoumani, 2009). Taking to consideration, coaches within the Norwegian sport high schools and in the local clubs play an important role, contributing to behavior which can result in adaptive, less adaptive- or maladaptive outcome. A unique coach-athlete relationship built on support, trust, respect and self-determination may result in adaptive outcomes. Contrary, if intrinsic motivation and HP decreases respectively, maladaptive outcome such as, aggression, bad coach-athlete relationship, less flow experience and negative emotions may occur (e.g., Donahue et al., 2009; Mageau et al., 2005).

Further, this study reports a positive link between the changes of identified regulation, intrinsic motivation and flow, contrary to OP which unrelated to flow. The identification

subscale relates closest to self-determination and is characterized with participation in an activity that is less attractive, but freely accepted by own decision (Deci & Ryan, 1985), that may explain the positive relationship to flow. However, the other two extrinsic motivation variables were found unrelated to flow. Despite these findings our results account for a positive relation between extrinsic motivation subscales and OP. In sum, we argue that over time higher introjected- and external regulation would lead to higher OP and less flow.

Interestingly, the present study found a positive relationship between the changes in intrinsic motivation, extrinsic motivation subscales and OP. It is reasonable to assume that these athletes start to think about their leisure time and probably realize that other aspects of life (e.g., education, spending time with friends and lover, traveling) start to feel more important than sport. In addition, if training and competition produce no or less improvement of own capacity, high expectations and unrealistic goals may decompose with less competence and goal achievements. In tune lead to maladaptive behavior and less enjoyment in sport. Understanding the remaining relationship between OP and intrinsic motivation, may mirrored this findings. Athletes that is characterized as harmoniously- and obsessively passionate is both more likely to be mastery- and performance-approach goals focused, which can lead positively to sport performances and sport vitality (Li, 2010). However, obsessive passionate people are more likely to use performance avoidance goals (Vallerand et al., 2008, study 2) which may reflect the population in this study. Further, it is important to underline that OP football players according to Vallerand et al. (2003, study 2) were more likely to continue participate in their sport at the end of the season, than athletes scoring high on HP. The presented findings may affect athletes' participation in sport, however it should be reconsidered when arguing for the positive relation between OP and intrinsic motivation.

The relationship between intrinsic- and extrinsic motivation, probably occur because the athlete studies at a private high school, where some receive financial support or scholarships. Researchers struggle to argue the influence scholarship affect motivation. Amorose and Horn (2000) report perceiving full scholarship would increase intrinsic motivation, while Deci and Ryan (1985) found significant decrease in intrinsic motivation. The perception of removing athletes' scholarship resulted in decreased intrinsic motivation to accomplish things and intrinsic motivation to experience stimulation, while the occurrence perceiving scholarship for non-scholarship athletes was reported to decrease the same two subscales and increase

external regulation (Medic, Mack, Wilson & Starkes, 2007). However, an investigation when scholarship was infrequently perceived enhance intrinsic motivation (Ryan, 1977, 1980). In contrast, Kingston et al. (2006) argued that the least form of self-determined motivation (i.e., introjected-, and external regulation) may undermine intrinsic motivation perceiving scholarship, compared to the non-scholarship group. Thus, this may lead to a shift of locus of causality from internal to external (Pelletier et al., 1995). Taken as a whole, we argue that if intrinsic motivation decreases when perceiving scholarship, this may be one factor that contributes to the positive relationship between intrinsic motivation and extrinsic motivation.

5.4 Gender development

Significant differences were found between genders only at T1, with higher score for males on the extrinsic motivation, amotivation and two flow dimensions (i.e., control, and time). However, these findings guided the interest towards the *fourth* hypotheses trying to understand more specifically the development changes within females and males measured separately. As presented (see table 4.6) female athletes decreased in two subscales of intrinsic motivation along with OP and two flow dimensions. Amotivation increased to the level of males. Even though global flow was not decreasing significantly, challenge-skill balance and autotelic did. This is considered to reduce the chance to experience flow.

Consequently as a result, females increased amotivation which in other studies have shown to be closely related to burnout (Cresswell & Eklund, 2005). Despite this symptom, male athletes maintained their amotivation at the same level and should be argued with a less possibility to burnout compared to females. For several reasons (e.g., injuries, exclusion from teams, climate, coach) female athletes may have problem motivating themselves when participating in sport. Coaches involvement can in many ways affect behavior and the perception of females with more ego-involving behavior, which in turn, developing intention of dropout and less self-determined motivation (Sarrazin, Vallerand, Guillet, Pelletier & Cury, 2002), causing an ego-climate which may lead to maladaptive behavior such as less focus attention and self-esteem (Vansteenkiste, Matos, Lens & Soenen, 2007). Females are also reported to be more sensitive to positive feedback which may decrease their feeling of competence and self-determination (Deci, Cascio & Krusell, 1975). In general, athletes may start to participate in sport for mainly intrinsically reasons, if this feeling disappears, possible dropout from the sport high school or sport generally. Furthermore, the increased of

amotivation may occur due to high expectations and demands to themselves. The sport school concentrates on selecting top level athletes which have the potential to be the best in their sport. The high ambitions may affect females at the end of the second school year, with less goal achievement, follow ups and with negative or no feedback from coaches.

On the other hand, male athletes were more stabile during the one year period. OP significantly decreased for both genders, resulting in athletes with less OP towards the sport. Still both genders were high on HP. Vallerand et al. (2003) composed that a passionate person should have a value above 4 on a 7-point Likert scale. In this study a value under 3 is defined as a non-passionate person (measured HP and OP together), because the scale was measured with a 5-point Likert scale. It is encouraging to note that these result can be explain by a less addiction and maladaptive behavior towards sport. According to The Dualistic Model of Passion (Vallerand et al., 2003) an obsessive passionate person characterizes with a controlled internalization with inter or/and intrapersonal pressure caused by circumstances. However, this is more or less *not* the instance for the non-obsessive passion athletes presented in this study. The goal dimension of flow decreased significantly along with OP. HP and external regulation decreased, but not significantly. Furthermore, the main purpose of the present study was to investigate if athletes' intrinsic motivation works as a main predictor to explain flow experience.

5.5 Explaining flow

Highly intrinsically motivated athletes are more likely to experience flow. The regression analyses showed a total of 19.4 percent of all the motivation- and passion subscales explaining flow experience (see table 4.9). Evidentially, intrinsic motivation was only significant and proposed to be the predictor of flow. This can explain why the two extrinsic motivation subscales (i.e., introjected-, and external regulation) and amotivation failed explaining changes in flow. Based on this study it seems that athletes who have the intension of win trophies, money rewards or obtain something outside the activity preventing the opportunity to experience flow when they participate in sport, including those with lack of effort and less interest. Identification variable correlated with intrinsic motivation subscales, but was not assembled together as an autonomous motivation (i.e., intrinsic motivation subscales and identified regulation). Again according to CET the relationship between intrinsic motivation and identification is likely to occur (Deci & Ryan, 1985). Further, athletes

with great performances and goal achievement showed higher intrinsic motivation, and in turn, experienced flow more often (Stavrou, 2008). Thus, it would appear as an explanation that highly intrinsically athletes achieved their goals in training and competition with a feeling of autonomy and competence, compared to athletes with fewer achievements. In addition, several factors like elevated confidence, maintaining constructive thoughts, appropriate focus, optimal precompetitive arousal seems to be important to experience flow (Russell, 2001). As a consequence of experiencing flow, Jackson and Robert (1992) argued that flow is related to highly mastery oriented athletes, which have the advantage of experiencing optimal peak performances.

In light of CET increased autonomy and competence adapts a more self-determined behavior which may result in higher intrinsic motivation. An athlete with less autonomy and competence is more exposed to experience anxiety and apathy, which may result in less self-determination and intrinsic motivation. Flow was first characterized as an autotelic experience, which is argued to be an intrinsically rewarded experience for the mind (Csikszentmihalyi, 1975). In addition, the importance of being a skillful athlete produces more positive experiences with a feeling of enjoyment, sensation, satisfaction and fulfillment in sport, which is the same for intrinsic motivation. Further, flow is described as an unusual state and is so unique that probably athletes would try to enter the state again, after earlier experiences. From the vantage point of flow, it is important to reach goals, and still have challenges balanced with capabilities. However, it is important to underscore that intrinsic motivation is not determine to be the only predictor of flow. Thus, it would be argued that several measures over time of period showing the same result can give us a better understanding and robust evidence of the explanation of flow. In addition, employ more predictors which have conducted positively links to flow assembled with intrinsic motivation. For instance adapt variables such as self-concept, psychological skills and strategies which has been highly associated (Jackson, Thomas, Marsh & Smethurst, 2001)

When including only HP and OP in the regression analyzes, passion explained 5.2 percent of flow (see table 4.8). However, passion is still associated with flow, especially HP (Philippe et al., 2009; Vallerand et al., 2003; Wang et al., 2008). The non explainable phenomenon of passion being a contributor to flow, may occur because athletes do not identify them self with the sport when they are experiencing flow, but rather with characteristics of intrinsic

motivation. HP may be a mediated factor to flow experience, since the correlations among dimension positively correlated. On the other hand we propose that the experience itself is more about the nine description of flow closely related to intrinsic motivation, than to passion.

5.6 Methodological considerations

While it could be argued that passion and self-determined motivation are very similar constructs and even more or less the same, the correlation analyses suggests that they, in fact, are *not* the same. Thus, although they correlate in a systematic manner (intrinsic motivation with harmonious passion and extrinsic motivation with obsessive passion), they seems to be two separate and independent constructs. In this study passion was measured with a 5-point Likert scale, instead of the original 7-point Likert scale. With a wider Likert scale one would expect to get a greater variance. However, whether this would change the results or not, is difficult to say.

Since this data collection was conducted, a revised SMS (SMS-6) has also been developed with one more subscale (i.e., integrated regulation). This scale distinguishes better from intrinsic motivation than identified regulation (Malletta et al., 2007). When we fist included indentified regulation with intrinsic motivation, the percent explaining changes in flow was even lower and was removed. Furthermore, it is argued to reconsider items of identified regulation for a more precise understanding of extrinsic form of motivation.

Although, there is also an older version of DFS, the new and revised DFS-2 was applied in this study (Jackson & Eklund, 2004). The scales was developed based on athlete perceptions and studies conducted in several other areas with flow (Csikszentmihalyi, 1990; Jackson, 1992; 1995). Even though each dimension has their own characteristics of flow, this study failed to correlate some of the dimensions. Controversy to DFS-2, Short Flow Scale (SFS) was developed to measure the nine characteristics of flow with one item for each dimension, that summarizing the DFS-2. To approach the SFS, a construct validation of within-network and between-network studies (e.g., intrinsic motivation, well-being) was used, to get acceptable understanding of the constructs (Jackson, Martin & Eklund, 2008). Since the SFS was not developed at the time of data collection, it would be interesting to see if future studies show the relation between intrinsic motivation and HP more closely to all flow dimensions.

The longitudinal design of this study is one of its major strengths. Providing more than one data point in time provides us with the ability to monitor how psychological constructs may change over time. Including athletes from thirteen sports, with both individual and team also strengthen this study and although we cannot speak about cause and effect we are able to display some of the processes that occur.

Limitation and future directions

Some limitations of the present study need to be mentioned. *First*, the number of participant is 95, with more males than female athletes. Future studies should have a higher amount of participants with good quality of the follow ups during the data collection, to reduce dropouts. *Second*, the instruments for both motivation and flow are now revised into SMS-6 and SFS, and should be further investigated among youth athletes, including a 7-point Likert scale for passion. However, it is important to underline that SFS is only measured with one item on each dimension, which may make it difficult to capture the flow dimensions. *Third*, intrinsic motivation was the strongest predictor that explained changes in flow. However, the unexplained percentage, which is not accounted for, needs further investigation with more factors that can influence the flow experience, such as high quality coach-athlete relationship, performance climate, self-regulation, well-being, self-concept, psychological skills and strategies. Hence, the variables need to be measured several times over a period, to demonstrate robust changes in flow. *Fourth*, there was no control group applied in the study. From the control group, participant in regularly high schools from same area should be included, to control for differences. *Fifth*, the data analyses only tested differences regarding gender, thus it would be interesting to investigate if there were any differences between team- and individual sports in motivation, passion and flow. Future studies should involve experimental design to investigate causal effect with athletes in different age groups, level of performance and also include other elite sport high schools.

Conclusion

The present study attempted to examine flow experiences and the role of determinants of flow such as motivation and passion among Norwegian youth athletes. The participants revealed strong and positive relations between intrinsic motivation, HP and flow. This is in line with other empirical studies, and may lead into a healthy lifestyle with less conflict and more adaptive behaviors towards sport. OP and identified regulation (i.e., extrinsic motivation subscale) were also associated positively to flow, albeit with only a weak significant relation between OP and some dimensions- and global flow. However, some unexpected findings did occur with positive relations between all intrinsic motivation- and extrinsic motivation subscales at the second data collection (T2), thus, it was reasonable that the results showed positively relations on the development changes. Although, both gender decreased their OP and also scored lower on some flow dimensions, female athletes had a significant decreation of intrinsic motivation and an increased amotivation (to the same level as male athletes). This finding may indicate that female athletes are more prone to develop maladaptive behavior, dropout and less enjoyment in sport, even though no gender differences were found at T2 on all variables.

The results indicate that different degrees of self-determined motivation and passion are indeed two different aspect of motivation and should be considered to be treated that way. However, the most promising significant evidence in the present study was the changes in intrinsic motivation predicting the changes in flow experience.

From the applied perspective, athletes need to be nurtured in surroundings that foster self-determined behavior during practice and competition, which over time coaches, parents, other athletes and supporting staff can influence. This may leave them with positive experiences such as flow and more years of sport participation, becoming experts with high level of performances, - or “just” enjoyment!

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Tables

Figures

Abbreviations

To retrieve understanding of the abbreviations used in this study consider this notes as helpful.

HP	Harmonious Passion
OP	Obsessive Passion
CET	Cognitive Evaluation Theory
SDT	Self-Determination Theory
T1	Time 1
T2	Time 2

Appendix 1: Sport Motivation Scale

L.

Hvorfor driver du med idrett?

Angi på skalaen 1-7 for hvert spørsmål hva som stemmer for deg!

	Stemmer ikke i det hele tatt		Passer delvis			Stemmer helt	
1. På grunn av den gleden jeg føler ved å gjøre noe spennende	1	2	3	4	5	6	7
2. På grunn av gleden det gir meg å lære mer om idrett	1	2	3	4	5	6	7
3. Jeg pleide å ha gode grunner for å drive med idrett, men nå spør jeg meg selv om jeg skal fortsette	1	2	3	4	5	6	7
4. For gleden av å lære nye trenings teknikker	1	2	3	4	5	6	7
5. Jeg vet ikke lenger; jeg har inntrykk av jeg ikke er god nok til å ha suksess i idrett	1	2	3	4	5	6	7
6. Fordi det gjør at jeg blir vel ansett av folk jeg kjenner.	1	2	3	4	5	6	7
7. Fordi det, etter min mening, er en av de beste måtene å møte folk på	1	2	3	4	5	6	7
8. Fordi jeg føler stor tilfredsstillelse når jeg mestrer vanskelige tekniske øvelser	1	2	3	4	5	6	7
9. Fordi det er helt nødvendig å drive med idrett hvis en ønsker å være i form	1	2	3	4	5	6	7
10.På grunn av prestisjen det er å være en idrettsutøver	1	2	3	4	5	6	7
11.Fordi det er en av de beste måtene å utvikle andre sider av meg selv	1	2	3	4	5	6	7
12.For gleden jeg får av å forbedre noe av det jeg ikke er så god på	1	2	3	4	5	6	7
13.For spenningen jeg kjenner når jeg er skikkelig involvert i idretten min	1	2	3	4	5	6	7
14.Fordi jeg må drive med idrett for å være fornøyd med meg selv	1	2	3	4	5	6	7
15.For tilfredsstillelsen jeg kjenner når jeg perfeksjonerer ferdighetene mine	1	2	3	4	5	6	7
16. Fordi folk jeg omgåes mener det er viktig å være i god form	1	2	3	4	5	6	7
17. Fordi det er en god måte å lære mange ting som kan bli nyttig for meg senere i livet	1	2	3	4	5	6	7
18. For den sterke følelsen jeg kjenner når jeg driver med den idretten jeg liker	1	2	3	4	5	6	7
19. Jeg er ikke sikker lenger; jeg tror ikke at det å drive med idrett egentlig er noe for meg	1	2	3	4	5	6	7
20. For gleden det gir meg når jeg får til litt vanskelige øvelser	1	2	3	4	5	6	7
21. Fordi jeg ville få dårlig samvittighet hvis jeg ikke tok meg tid til å trene	1	2	3	4	5	6	7
22. For å vise andre hvor god jeg er i idretten min	1	2	3	4	5	6	7

23. For gleden jeg føler når jeg lærer nye øvelser som jeg aldri har gjort før	1	2	3	4	5	6	7
24. Fordi det er en av de beste måtene å holde kontakten med vennene mine på	1	2	3	4	5	6	7
25. Fordi jeg liker følelsen av å være totalt oppslukt av idretten	1	2	3	4	5	6	7
26. Fordi jeg må drive med idrett på regelmessig basis	1	2	3	4	5	6	7
27. For gleden det gir å oppdage nye teknikker og strategier	1	2	3	4	5	6	7
28. Jeg spør ofte meg selv hvorfor jeg ikke ser ut til å nå de målene jeg setter for meg selv	1	2	3	4	5	6	7

Appendix 2: Passion Scale

N. Hvordan føler du i forhold til idrett?

		Helt uenig	Litt uenig	Nøytral	Litt enig	Helt enig
1.	Idretten gir meg mange varierte erfaringer	☐	☐	☐	☐	☐
2.	Jeg kan ikke leve uten idrett	☐	☐	☐	☐	☐
3.	Idrett gir meg minneverdige opplevelser	☐	☐	☐	☐	☐
4.	Det er vanskelig å forestille livet mitt uten idrett	☐	☐	☐	☐	☐
5.	Idrett passer til de andre aktivitetene i livet mitt	☐	☐	☐	☐	☐
6.	For meg er idrett en lidenskap, som jeg fremdeles klarer å kontrollere	☐	☐	☐	☐	☐
7.	Jeg er totalt oppslukt av idrett	☐	☐	☐	☐	☐
8.	Nye opplevelser (gjennom min idrett) gjør at jeg setter enda mer pris på idretten	☐	☐	☐	☐	☐
9.	Lysten er så sterk at jeg bare må drive med idrett	☐	☐	☐	☐	☐
10.	Idretten reflekterer (fremviser) kvaliteter som jeg liker om meg selv	☐	☐	☐	☐	☐
11.	Jeg er følelsemessig avhengig av idrett	☐	☐	☐	☐	☐
12.	Jeg opplever at det er vanskelig å kontrollere mitt behov til å drive med idrett	☐	☐	☐	☐	☐
13.	Jeg har nesten en trang for å drive med idrett	☐	☐	☐	☐	☐
14.	Humøret mitt er avhengig av muligheten til å drive med idrett	☐	☐	☐	☐	☐

Appendix 3: Dispositional Flow Scale-2

O.

Vær vennlig og besvar følgende spørsmål og relater dem til dine opplevelser innenfor din idrett. Det kan hende du opplever disse karakteristikkene noen ganger, hele tiden, eller aldri. Det finnes ingen riktige eller gale svar. Tenk over hvor ofte du opplever hver enkelt karakteristikk når du utøver idretten din, og sett en ring rundt nummeret som er mest likt din opplevelse.

Aldri	Sjelden	Noen Ganger	Ofte	Alltid
1	2	3	4	5

VÆR VENNLIG Å SETT RING RUNDT SVARET

1:Jeg står overfor en utfordring, men har tro på at ferdighetene mine gjør meg i stand til å møte utfordringen

1 2 3 4 5

2: Jeg gjør de riktige bevegelsene uten at jeg behøver å tenke på det

1 2 3 4 5

3: Jeg vet tydelig hva jeg ønsker å gjøre

1 2 3 4 5

4: Jeg har veldig klart for meg hvordan jeg presterer

1 2 3 4 5

5: Oppmerksomheten min er fullstendig fokusert på det jeg gjør

1 2 3 4 5

6: Jeg har en følelse av kontroll over det jeg gjør

1 2 3 4 5

7: Jeg er ikke bekymret over hva andre måtte tenke om meg

1 2 3 4 5

8: Oppfattelsen av tid synes å endres (enten at tiden går saktere eller fortere).

1 2 3 4 5

9: Jeg liker virkelig opplevelsen

1 2 3 4 5

10: Evnene mine matcher den store utfordringen som er i denne situasjonen.

1 2 3 4 5

11: Ting bare skjer helt automatisk.

1 2 3 4 5

12: Jeg har en sterk følelse av hva jeg ønsker å gjøre

1 2 3 4 5

13: Jeg er bevisst på hvor godt jeg presterer

1 2 3 4 5

14: Det krever ingen innsats å holde fokus på det som skjer

1 2 3 4 5

15: Jeg føler at jeg har kontroll på det jeg gjør

1 2 3 4 5

16: Jeg bekymrer meg ikke over hvordan andre måtte evaluere meg

1 2 3 4 5

17: Opplevelsen av tid virker forskjellig fra det som er vanlig

1	2	3	4	5

18: Jeg elsker følelsen aktiviteten gir meg, og ønsker å oppleve den igjen

1	2	3	4	5

19: jeg føler meg kompetent nok til å møte de høye kravene situasjonen stiller

1	2	3	4	5

20: Jeg utøver aktiviteten automatisk, uten å tenke for mye

1	2	3	4	5

21: Jeg vet hva jeg ønsker å oppnå

1	2	3	4	5

22: Jeg har en god formening om hvor godt jeg presterer når jeg utfører aktiviteten.

1	2	3	4	5

23: Jeg er fullstendig konsentrert

1	2	3	4	5

24: Jeg har følelsen av å ha fullstendig kontroll

1	2	3	4	5

25: Jeg bryr meg ikke noe om hvordan jeg tar meg ut for andre.

1	2	3	4	5

26: Det føles som tiden går fort

1	2	3	4	5

27: Opplevelsen gir meg en kjempegod følelse

1	2	3	4	5

28: Kravene som stilles, og ferdighetene mine til å møte dem, er på et like høyt nivå

1	2	3	4	5

29: Jeg gjør ting spontant og automatisk, uten at jeg behøver å tenke

1	2	3	4	5

30: Mine mål er tydelig definerte

1	2	3	4	5

31: Måten jeg utøver aktiviteten på forteller meg hvor godt jeg presterer

1	2	3	4	5

32: Jeg er fullstendig fokusert på oppgaven jeg står overfor

1	2	3	4	5

33: Jeg føler jeg har full kroppskontroll

1	2	3	4	5

34: Jeg er ikke redd for hva andre måtte tenke om meg

1	2	3	4	5

35: Jeg mister min vanlige oppfattelse av tid.

1	2	3	4	5

36: Opplevelsen er ekstremt givende

1	2	3	4	5