

**Inland Norway  
University**

Faculty of Elverum

**Steffen Håndlykken**

**Masters Thesis**

**Self-determined motivation in CrossFit**

**Masters in sports and physical education**

**2020**

# Content

Abstract .....	3
Sammendrag .....	4
Introduction .....	5
The CrossFit context .....	6
Self-determined motivation and research status .....	7
Research question, approach and significance of study .....	8
Review of the Literature .....	10
CrossFit research .....	10
Self-determination theory .....	12
Self-determined motivation: definition and research .....	14
Adherence and dropout .....	16
Methodology .....	21
Research approach and design .....	21
Participants .....	23
Data collection .....	24
Analysis .....	27
Ethics and trustworthiness .....	29
Findings .....	32
Social factors .....	33
Competence factors .....	38
Motivational elements .....	41
Discussion .....	46
Social factors .....	47
Competence factors .....	48
Motivational elements .....	50
The case of active exercisers .....	53
The case of competitive athletes .....	54
The case of dropouts .....	54
Limitations and future research .....	57
Practical applications .....	59
Conclusion .....	61

Bibliography.....	62
Appendix A .....	68
Interview guide for dropouts .....	68
Interview guide for active participants .....	70
Appendix B .....	72
Consent form .....	72
Appendix C .....	74
Search log .....	74

## Abstract

The scope of the present study was to explore underlying mechanisms of self-determined motivation in CrossFit to understand how autonomy, relatedness, and competence are met in active CrossFit participants, competitive athletes, and those who dropped out from CrossFit training. The participants were two active exercisers, two competitive athletes, and two dropouts. Their age ranged from 27 to 34 years old ( $M_{\text{age}} = 29,33$ ,  $SD = 3,72$ ), and CrossFit experience ranged from three months to eight years ( $M_{\text{experience}} = 40,33$  months,  $SD = 33,66$ ). Through thematic analysis on data collected with semi-constructed interviews, the researcher concluded that the psychological needs for autonomy, competence, and relatedness are met in varying degrees in CrossFit participants. Three main themes were identified as impactful on basic psychological needs in CrossFit participants; social factors, competence factors, and motivational elements. Social factors, competence factors and motivational elements appeared to have a key role in contributing towards participants' needs for autonomy, relatedness, and competence. In particular, the analysis revealed that motivational elements set a foundation upon which participants come to experience the social and competence factors of CrossFit and acquire more or less meaning on these, which then shapes some degree of satisfaction in participants' needs for autonomy, relatedness and competence, making each person's experience unique. The findings were informed by and interpreted in light of the theory of self-determination and exercise affect and positioned within the existing literature while practical implications for CrossFit box owners, trainers and trainees are offered.

## Sammendrag

Hensikten med studien var å utforske underliggende mekanismer for selvbestemt motivasjon i CrossFit for å forstå hvordan de psykologiske behovene for autonomi, relatedness og competence manifesteres i aktive CrossFit deltakere, konkurrerende utøvere og de som har valgt å slutte med CrossFit. Studiens deltagere var to aktive deltakere, to konkurrerende utøvere, og to som har sluttet. Alderen deres var mellom 27 til 34 år ( $M_{\text{alder}} = 29,33$ ,  $SD = 3,72$ ) og deres CrossFit erfaring var fra tre måneder til åtte år ( $M_{\text{erfaring}} = 40,33$  måneder,  $SD = 33,66$ ). Gjennom en tematisk analyse av dataene hentet gjennom semikonstruerte intervju, lærte forskeren at de psykologiske behovene blir dekket i ulik grad hos CrossFit deltakere. Det ble identifisert tre hovedtemaer innen CrossFit som påvirker de psykologiske behovene; sosiale faktorer, kompetansefaktorer, og motivasjonselementer. Sosiale- og kompetanse faktorer, med de respektive undertemaene, ser ut til å være nøkkelfaktorer som påvirker de psykologiske behovene. Motivasjonselementene utgjør basen hvor hver enkelt deltaker kommer til å oppleve de sosiale faktorene og kompetansefaktorene gjennom, og derav tilegne mer eller mindre mening fra disse, som deretter former til en viss grad av tilfredstillelse hver enkelt opplever for autonomi, competence og relatedness, som gjør at hver persons opplevelse unik. Funnene ble informert av, og tolket i lys av selvbestemmelsesteori og treningseffekt, og er plassert blant den eksiterende litteraturen. Praktiske implikasjoner for CrossFit boks-eiere, trenere og praktikanter er presentert.

## Introduction

CrossFit is a way of exercising, a training method, as well as a sport which in recent years is becoming more and more popular. CrossFit entails constantly varied functional movements, executed at high intensity across broad time and modal domains (Glassman, 2002; CrossFit, 2019a). The sentence above offers a brief and precise description of the CrossFit training method as performed in CrossFit boxes across the world. CrossFit objectives and training guidelines emphasize well-rounded physical fitness through constantly varied functional movements, with a great focus on effective and safe technical execution of the exercise movements and good group management provided by the CrossFit trainers (CrossFit, 2019a; CrossFit, 2019b).

Recently, CrossFit attracted the attention of researchers who started exploring behavioural regulation, social, physical, and psychological factors in CrossFit training (Box, Feito, Brown & Petruzzello, 2019; Davies, Coleman, & Stellino, 2016; Simpson, Prewitt-White, Feito, Guisti, & Shuda, 2017; Fisher, Sales, Carlson, & Steele, 2016; Eather, Morgan, & Lubans, 2016; Köteles, Kollsete, & Kollsete, 2016). Considering the novelty of the activity and the limited time researchers have had to study how it can impact participants and the impact of the participants on the activity, gaps in our knowledge about CrossFit and psychological factors exist. To this day and to the researcher's knowledge, no study has taken an in depth look into what motivates active CrossFit participants and competitive athletes as well as what once motivated, but possibly stopped doing so, CrossFit dropouts.

The objective of the present study was to explore underlying mechanisms of self-determined motivation in participants who actively train CrossFit, those who dropped out from CrossFit training and those who compete in CrossFit events. The study sought to understand how self-determined motivation is manifested in CrossFit participants. Upon reviewing the existing literature on motivation in CrossFit, the present study delved into whether and how the CrossFit training method can satisfy one's needs for autonomy, competence, and relatedness as presented by Ryan and Deci's (2000) self-determination theory. To better understand the focal area, in the sections that follow, the researcher elaborates on what is the CrossFit training methodology, self-determined motivation, the status of the research field, as well as how this study contributes to the existing body of knowledge.

## The CrossFit context

Greg Glassman began assembling the CrossFit training methodology in 1997 and started publishing daily CrossFit workouts on the internet in 2001 (CrossFit, 2019c). Glassman (2002) further clarified the purpose of his training method and how it differed from existing sports and training methods. He presented the four principles of “World class fitness in 100 words” (Glassman, 2002) providing a precise description of the training method:

Eat meat and vegetables, nuts and seeds, some fruit, little starch and no sugar. Keep intake to levels that will support exercise but not body fat.

Practice and train major lifts: deadlift, clean, squat, press, clean and jerk and snatch. Similarly, master the basics of gymnastics: Pull-ups, dips, shout climbs, push-ups, sit-ups, presses to handstands, pirouettes, flips, splits, and holds. Bike, run, swim, row, etc. hard and fast.

Five or six days per week, mix these elements in as many combinations and patterns as creativity will allow. Routine is the enemy. Keep workouts short and intense.

Regularly learn and play new sports. (p. 1)

Glassman (2002) promoted CrossFit as a core strength and conditioning program, designed to elicit adaptational changes that are as broad as possible, and deliberately attempting to optimize physical capabilities in 10 different fitness domains; cardiovascular/respiratory endurance, stamina, strength, flexibility, power, speed coordination, agility, balance, and accuracy.

Adhering to Glassman’s (2002) conceptualisations, this is the CrossFit training method that is practised today in CrossFit gyms (called boxes in the CrossFit context) around the world. The workouts combine many of the movements described above, with hundreds of variations all together and combinations that allow safe and effective workouts to be completed within a group setting (Glassman, 2002). There are three recurring formats, and workouts include typically one of the following: (1) fixed time, (2) fixed workload, and (3) fixed repetition scheme. Fixed time signifies that the individual has to complete as much of the workload as possible in a fixed time. Fixed workload means that the individual has to complete a given amount of repetitions of a group of exercises as fast as possible. Last but not least, in the fixed

repetition scheme the individual has to complete a set number of rounds and repetitions as fast as possible (Sibley, 2012)

Since its inception, CrossFit also developed into a sport, where one can compete in the CrossFit Games for the title of ‘The fittest on earth’. It has been described as a game, competition or activity needing physical effort and skill that is played or done according to rules, for enjoyment and/or as a job (Sport, 2020). The CrossFit Games started in 2007 to answer the question of ‘Who is the fittest man and woman on earth?’ (CrossFit, 2019c).

Several unique characteristics define the CrossFit Games, with the competition consisting of different events and tests every year, and the events not being announced before the competition starts (CrossFit, 2019c).

It is important to distinguish CrossFit as a sport from the CrossFit training method. Although the workouts look similar, in the sport of CrossFit the intention shifts from enhancing one’s health and fitness level when CrossFit training to winning through competing for the title of being the fittest man or woman on earth (CrossFit, 2019c). Glassman (2004) made strong references to the wide range of physical demands and the physiological proficiencies one needs to succeed in CrossFit. Nonetheless, any psychological competences or demands for succeeding in CrossFit were not discussed in the CrossFit literature by its founder and little is known to this day as not enough attention has been given to psychological factors in CrossFit research. Still, based on knowledge we have from other sports and training methods, one can easily speculate how the heightened physical demands and physiological proficiencies of CrossFit can place psychological demands and require psychological skills, in order to be met.

## Self-determined motivation and research status

With CrossFit being both a training methodology for regular everyday gym goers and a sport with professional athletes, it attracted some researchers’ attention on exploring motivation and motivational factors, while the underlying mechanisms of self-determined motivation (a sub theory of self-determination theory) have not been explored in depth yet. According to Ryan and Deci (2000), motivation concerns one’s energy, direction, persistence and equifinality (all aspects of motivation and intention) as well as the forces that move a person to act. To better understand what stands behind an individual’s motivation, researchers explored a number of motivational factors in CrossFit, such as one’s need for autonomy, relatedness, competence (Davies et al., 2016), enjoyment and challenge (Fisher et al., 2016) as well as one’s perceived

barriers to exercise (feeling good but disappointed, scheduling issues, trouble in prioritizing exercise, and exercising with/for someone else) (Larson, McFadden, McHough, Berry, & Rodgers, 2018). Self-Determination Theory (Ryan & Deci, 2000) has been applied widely in studies of motivation in sport and exercise settings as well as in studies particularly looking into CrossFit. However, researchers have still to investigate the concept of self-determined motivation in CrossFit.

Self-determined motivation is an approach to human motivation and personality, as an organismic metatheory under self-determination theory and highlights the importance of humans evolving inner resources for personality development and behavioural self-regulation (Ryan & Deci, 2000). Self-determined motivation is suggested to serve a person in understanding the basic psychological needs for autonomy, competence, and relatedness, which form the basis for self-motivation and personality integration (Ryan & Deci, 2000). When it comes to how CrossFit motivates individuals through need satisfaction, we don't know how the needs of autonomy, competence and relatedness are satisfied or remain unsatisfied. In certain cases, this knowledge could help us better motivate the individual to train, to compete as well as to understand why some quit CrossFit when the needs are not properly met. The present study aimed to add this knowledge via the use of qualitative research approach.

## Research question, approach and significance of study

With the scope of the present study being to explore the underlying mechanisms of self-determined motivation in light of the three basic psychological needs in CrossFit, the research question asked: "How motivational factors, such as one's need for autonomy, competence, and relatedness are met for CrossFit participants regularly adhering to the training method and those competing in CrossFit competition events or were not met for CrossFit participants who dropped out?" The research question frames the present study in exploring cases of participants who systematically train CrossFit, compete in CrossFit, but also individuals who dropped out of CrossFit.

As the current study aimed to enhance understanding on elements of self-determined motivation across CrossFit participants, the qualitative research approach was chosen as most suitable methodological approach by giving the researcher an opportunity to go in depth with the chosen topic (Smith & Sparks, 2016). The Self-Determination Theory (SDT) (Ryan &

Deci, 2000) informed the present study, providing the researcher with a rich background of evidence and explanations (Creswell, 2014) on behaviours and attitudes related to a person's motivation, which were taken into consideration for understanding the data gathered and for making meaningful interpretations of it.

Gaining knowledge on how motivational factors may influence CrossFit participants differently can be of value for CrossFit coaches and box-owners, in helping them understand how to motivate their clients to adhere to the training program and to achieve better results from CrossFit training. It can also be valuable for CrossFit participants themselves, as it can offer them an insider view and enriched understanding on how their motivation works when doing CrossFit, which in turn can then influence their approach to training in ways that will keep them active.

## Review of the Literature

In answering the research questions, the existing body of knowledge was reviewed to gain deeper understanding on motivational needs and how these come into play for CrossFit participants. In reviewing the existing literature on CrossFit training and psychology, several searches were done in SportsDiscus, ScienceDirect and Google Scholar using as keywords, (See search log in appendix) CrossFit, high intensity interval training, psychology, motivation, self-determination theory, and self-determined motivation. The databases' thesauruses were used to find alternative keywords to increase coverage throughout the literature. Through these searches, numerous articles were found studying different aspects of the CrossFit training method and CrossFit as a sport. However, not all articles were relevant to the topic of the present study. After reading the abstracts and eliminating many of them, ten were deemed relevant for further processing. Following, only six of the ten were identified to have specific relevance to the topic studied here and are scrutinized below. In addition to database searches, the reference lists of the relevant articles were also used to seek literature that was possibly not found in database searches.

### CrossFit research

Among the CrossFit studies reviewed here, there were certain similarities in the themes they studied. The main themes explored were motivation, psychological needs and behavioural regulation (Box et al., 2019; Davies et al., 2016; Simpson et al., 2017; Fisher et al., 2016), along with social, physical, and psychological factors (Eather et al., 2016; Köteles et al., 2016), which enhance our knowledge and understanding of extrinsic and intrinsic motivational factors.

Box et al., (2019) employed a quantitative approach looking at differences between active individuals in five different training domains and whether these domains had different effects on motivation and behavioural regulation. A total of 403 participants (CrossFit,  $n = 89$ ; Group exercise,  $n = 59$ ; Aerobic training,  $n = 97$ ; Resistance training,  $n = 127$ ; Sport,  $n = 31$ ), completed an online survey. When comparing motivational results, CrossFit was found to provide higher motivation across the self-determined motivation continuum (see Figure 1) (Box et al., 2019). Similarly, Davies et al., (2016) looked at relationships between basic psychological needs satisfaction (autonomy, relatedness, competence) and behaviour regulation (self-directed exercise training) through a quantitative study ( $n = 206$ ) with

participants attending CrossFit either three ( $n = 91$ ) or five ( $n = 78$ ) times per week. The findings suggest that participants who attended CrossFit more frequently were found to have significantly higher levels of basic need satisfaction across all three needs (Davies et al., 2016), resulting in stronger self-determined regulation towards exercise.

Fisher et al., (2016) employed a quantitative approach, comparing motivational factors between CrossFit participants and three other exercise modalities. They had a total of 314 participants (CrossFit,  $n = 68$ ; Group exercise,  $n = 55$ ; Alone,  $n = 125$ ; Personal trainer,  $n = 66$ ) completed a questionnaire. The results showed that CrossFit participants ranked higher on intrinsic motivation (e.g. enjoyment and challenge), while the other modalities ranked higher on extrinsic motivation (e.g. positive health, health pressure, and ill health avoidance). Compared to Box et al., (2019) where CrossFit ranked higher across the self-determined motivation continuum (see Figure 1), both for extrinsic and intrinsic motivation, the data from Fisher et al., (2016) showed CrossFit participants only ranking higher on the right side of the continuum, i.e., being more self-determined/intrinsically motivated. With CrossFit participants ranking higher on intrinsic motivation with enjoyment and challenge being the two main indicators, Fisher et al., (2016) indicated that this is supporting the underpinning nature of CrossFit as a sport. In their discussion, Box et al., (2019) consider that the difference between CrossFit and other exercise domains comes from the encompassing nature of CrossFit training, which may fulfil motives for participation more broadly than other exercise domains do. Box et al., (2019) pointed out the need for further investigation on why some individuals drop out while others adhere to regular physical activity programs.

Simpson et al., (2017) employed the qualitative approach to explore factors that encouraged individuals with more than three months of CrossFit experience to adopt this exercise program. They conducted a total of 17 semi-structured interviews with individuals over 25 years of age with more than three months of CrossFit training experience. Their analysis revealed a few overarching themes that described the adoption of CrossFit as a process of certain psychological adjustments. First, individuals who adopt CrossFit as a training modality go through a difficult adjustment period. In this period, they need to overcome self-doubt, perceived barriers, and past perceptions they hold about their fitness. Those who go through this period successfully without dropping out, they often gained self-efficacy, a sense of control over their exercise habits, as well as new positive attitudes about their physical and mental capabilities. Nonetheless, Simpson et al.'s (2017) findings were somewhat contradictory to those from Eather et al., (2016) who reported that CrossFit training did not

result in significant intervention effects on one's mental health or on mediators like perceived body fat, strength and appearance or general physical self-concept. Eather et al., (2016) did an assessor-blinded randomized controlled trial with a total of 96 participants through an 8-week CrossFit intervention. Despite not seeing any intervention results in the full sample, Eather et al.'s (2016), participants categorised as 'at risk' for psychological distress, did show significant improvements in their self-esteem, perceived body fat, perceived appearance, and physical self-concept, which improvements agree with the results of Simpson et al., (2017). Eather et al., (2016) suggested that future research should investigate the long-term effect of CrossFit training in adolescents, which might be indicative for the participants in Eather et al.'s (2016) study as not having gone through the adjustment period identified by Simpson and colleagues (2017).

Köteles et al., (2016) investigated the relationships between characteristics of CrossFit training and the indicators of well-being, self-esteem, body awareness, satisfaction with body image, and perceived body competence. In their cross-sectional questionnaire study, Köteles et al., (2016) had a total of 186 participants attending CrossFit between three and eight times per week complete six online surveys. Although their data showed that CrossFit training was not connected with higher levels of psychological functioning (well-being, affect, body awareness, and self-esteem) and satisfaction with body image, the most often reported motives for CrossFit training were improving fitness and health (Köteles et al., 2016).

In summary, while some of these findings show potential on how basic needs are impacted, and possibly impact those who participate in CrossFit training, there is still controversy and lack of understanding on how CrossFit training impacts psychological parameters of participants and of course why some engage with CrossFit systematically while others drop out (Box et al., 2019; Simpson et al., 2017).

## Self-determination theory

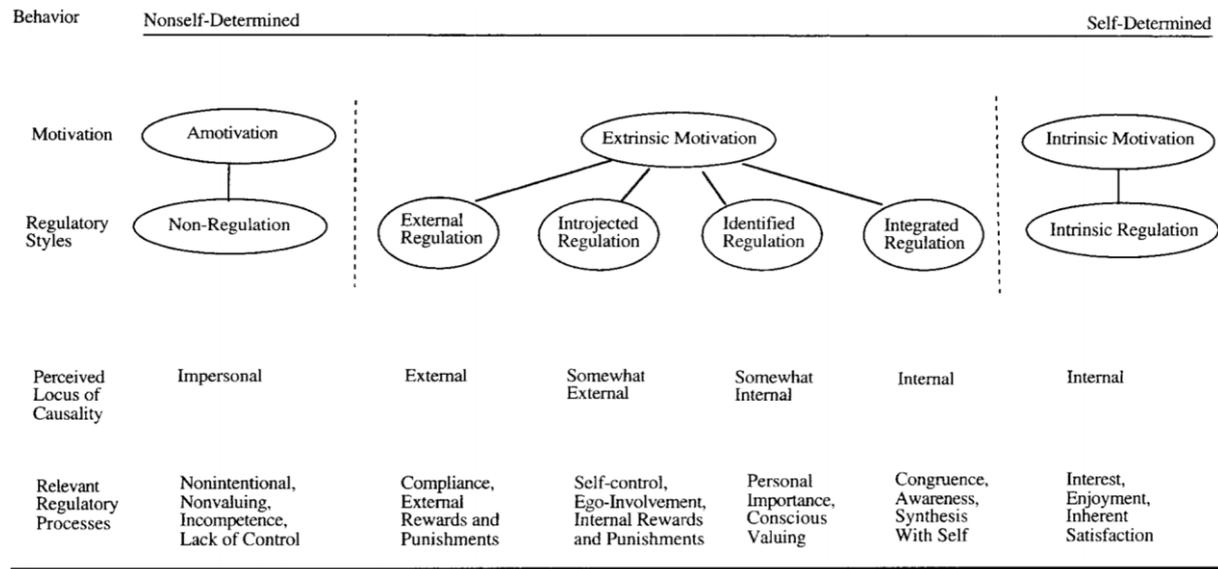
Self-determination theory is a theory of human behaviour and personal development (Ryan & Deci, 2017). Within the SDT, a human being is described as capable to be productive and engaged or, passive and alienated, as a result of the social conditions humans find themselves in, where they need to develop and function (Ryan & Deci, 2000). The SDT has been used widely by researchers investigating people's inherent growth tendencies and innate psychological needs, which are the basis for their self-motivation and integration of their

personality, together with the conditions that foster these positive processes (Ryan & Deci, 2000). Ryan and Deci (2017) presented the three basic psychological needs as, (1) autonomy, which in short is the need of individuals to experience self-endorsement and ownership of their actions, (2) competence, which is about feeling effective in one's interactions with social environment, and (3) relatedness, which refers to experiencing both others as responsive and sensitive, as well as oneself as capable to respond to and be sensitive to others. Vazou-Ekkekakis and Ekkekakis (2009) found that autonomy enhanced intrinsic motivation in exercise participants in the autonomous condition when compared to those in the controlled conditions. The autonomous conditions gave significantly higher scores in interest, enjoyment and perceived choice to participants than the controlled conditions did, which finding indicated a higher intrinsic motivation in autonomous exercise conditions (Vazou-Ekkekakis & Ekkekakis, 2009).

Within the framework of basic psychological needs, Ryan and Deci (2000) focused on supplying a more differentiated approach to motivation, by asking what kind of motivation is exhibited at any given time. They succeeded in identifying several distinct types of motivation; each type having specifiable consequences for learning, performance, personal experience, and wellbeing. They identified three main types of motivation, that of amotivation, external motivation and intrinsic motivation, which they placed on a continuum ranging from nonself-determined motivation to high self-determined motivation (Ryan & Deci, 2000). The categories of motivation are reviewed closer under self-determined motivation.

## Self-determined motivation: definition and research

Ryan and Deci (2000) developed an organismic integration theory, which is a sub-theory of SDT. This theory presents the continuum of self-determined motivation.



**Figure 1.** The self-determination Continuum (Ryan & Deci, 2000, p.72).

Looking at the continuum portrayed in Figure 1, at the far left amotivation is situated.

Amotivation is the state of lacking the intention to act. When people are in this state, they tend to either not do the action, or act without any intent. Amotivation is often resulting from not valuing the activity (Deci & Ryan, 2000) or individuals not feeling competent to perform the task (Bandura, 1986). On the far right of the continuum stands the most self-determined category of motivation, intrinsic motivation. In this state of motivation, a person finds value in the activity itself, and not the results the activity leads to; the person is interested, feels enjoyment and inherent satisfaction (Ryan & Deci, 2000). “No single phenomenon reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore and to learn” (Ryan & Deci, 2000, p. 70). This description shows the potential power on intrinsic motivation, where one seeks out challenges to learn more and develop as a person.

Ryan and Deci (2000) described intrinsic motivation as an inclination towards assimilation, mastery and spontaneous interest, as well as an exploration which is essential for cognitive and social development. Between amotivation and intrinsic motivation on the continuum there is extrinsic motivation. The extrinsically motivated behaviours are separated into four types,

that of external regulation, introjected regulation, identified regulation, and integrated regulation (Ryan & Deci, 2000). These are more or less self-determined or autonomous, starting with external regulated motivation being the least autonomous, where behaviours are performed to satisfy an external demand (Ryan & Deci, 2000). The next one is introjected regulation, where behaviours are relatively controlled, and executed to avoid guilt or anxiety, or to attain egocentric enhancements such as pride. Introjection involves taking in a regulation, but not fully accepting it as one's own regulation (Ryan & Deci, 2000). Identified regulation is one of the more self-determined, or autonomous forms of extrinsic motivation. Identification reflects one's consciously valued behavioural goal or regulation, making the action accepted or owned as personally important (Ryan & Deci, 2000). The most autonomous, self-determined form of extrinsic motivation is integrated regulation. This occurs when a behaviour is fully assimilated to the self, meaning that the behaviour has been evaluated and brought into congruence with one's other values and needs. Although this form shares many similarities with intrinsic motivation, it is still considered extrinsic motivation because the individual aims to attain separable outcomes from the behaviour rather than only attaining for inherent enjoyment (Ryan & Deci, 2000).

There is a large volume of research evidence showing that the satisfaction of one or more of the psychological needs proposed by SDT can be an important predictor of many indices of one's behavioural investment and psychological wellbeing, such as sport engagement, vitality, self-esteem and physical health (Gillison, Standage & Skevington, 2006; Hein & Hagger, 2007; Losier & Vallerand, 1994; Ntoumanis & Mallett, 2014; Standage & Gillison, 2007; Inoue, Wegner, Jordan, & Funk, 2015). The satisfaction of these three psychological needs is also expected to lead to a higher quality of motivation (Ntoumanis & Mallett, 2014), which was found in the study of Inoue et al., (2015) who reported that participants with higher levels of self-determined motivation towards running had more positive attitudes towards a healthy lifestyle. This finding is consistent with other studies looking at the association between self-determined motivation towards sport-related activities (Gillison et al., 2006; Hein & Hagger, 2007; Standage & Gillison, 2007). Losier and Vallerand (1994) early on presented similar results, where they reported higher levels of self-determined motivation influencing the perception of competence, which then can positively influence one's attitudes toward exercise. In particular, they found the strongest influence being the other way around, where perceived competence positively influenced a person's motivation, making it more self-determined (Losier & Vallerand, 1994).

Thøgersen-Ntoumani and Ntoumanis (2006) found that participants in a maintenance stage in their exercise program had a more self-determined motivation than participants in the phase of taking action in their exercise program, i.e., they just started. This can be a result of the participant either being through the difficult adjustment period presented by Simpson et al., (2017), or not yet. The difference lays in that those maintaining their exercise program having more intrinsic motivation than introjected regulation, while those who just started having it the other way around (Thøgersen-Ntoumani & Ntoumanis 2006). Participants in the phase of taking action are about to overcome barriers they hold about themselves and their fitness (Simpson et al., 2017). They have to work with their integrated regulations, which means they have evaluated and brought their regulations into congruence with one's values and needs (Deci & Ryan, 2000).

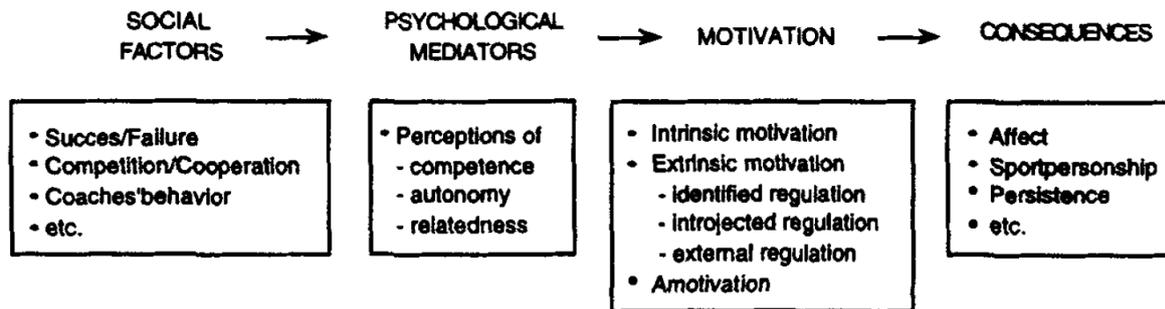
Regarding how the three psychological needs, presented by Deci and Ryan (2000), influence an individual's motivation, Mcdonough and Crocker (2007) found that the satisfaction of all three contributed significantly and uniquely to the prediction of one's motivation. They also found that the relationship between autonomy and self-determined motivation was slightly weaker than associations between motivation and the needs of competence or relatedness. Interestingly, even though their findings showed that competence was related to physical activity, physical activity levels were not predicted by self-determined motivation.

### Adherence and dropout

Adherence is the act of continued participation in a given activity or sport, with dropout being the act of stopping the participation. In the literature reviewed here, it is explored both how self-determined motivation and the motivation sequence are relevant to adherence and dropout behaviours. This will provide a thorough understanding of factors can affect adherence within the theoretical framework of SDT.

According to the SDT (Ryan & Deci, 2000), satisfaction of the three basic psychological needs should result in self-determined motivation in an intrinsic or extrinsic fashion. The satisfaction or dissatisfaction of one or more of the three psychological needs would then either result in persistence or adherence to a sport or exercise program, or result in dropout (Calvo, Cervellò, Jimènez, Iglesias, & Murcia, 2010; Pelletier, Fortier, Vallerand, & Brière, 2001; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002; Rogèrio & Josè, 2011). Vallerand and Losier (1999) proposed a sequence based on Ryan and Deci's (2000) organismic integration theory to integrate the research on intrinsic and extrinsic motivation (Figure 2)

showing how the types of motivation subsequently will lead to either positive or negative consequences for the individual.



**Figure 2.** The proposed motivational sequence (Vallerand & Losier, 1999, p. 145).

Starting with the early work of Pelletier et al., (2001), they conducted a prospective study spanning over two competitive seasons, hypothesising that athletes with intrinsic motivation and identified regulation would link positively to persistence, introjected regulation would link positively to persistence short term, but negatively over a longer time period, and that external regulation and amotivation would link negatively to persistence and predict dropout. Their hypothesis was supported, as data analysis revealed that the more self-determined the motivation of an athlete is over time, the stronger the association with persistence or adherence (Pelletier et al., 2001). Following the same pattern, the less self-determined the motivation of an athlete is over time, the weaker the association is to persistence or adherence, and stronger to dropout.

Sarrazin et al., (2002), similarity to Pelletier et al., (2001), found that athletes with lower levels of intrinsic motivation and higher levels of amotivation associated with dropout, and that athletes with higher levels of intrinsic motivation and lower levels of amotivation associated with persistence and adherence. However, their analysis showed that the various types of extrinsic motivation were neither predictive of intentions to dropout, nor related to the actual behaviour (Sarrazin et al., 2002). Later studies by Calvo et al., (2010) and Rogèrio and Josè (2011) used the SDT to investigate associations between motivation and persistence or adherence, and dropout. The results of both studies indicate that the level at which the basic psychological needs are met or not, can influence the level of self-determined motivation and by that lead to some behaviour towards adherence or dropout. Rogèrio and Josè (2011) explained that if the social factors in the training or sporting environment are perceived as supportive of participants' psychological needs, they will have a positive impact on their motivation, being high and intrinsic; whereas, if the social environments are perceived as

drivers of low autonomy, competence and relatedness, will likely lead participants' motivation to be more extrinsic, and if not corrected, will lead towards amotivation.

Ekkekakis (2003) found five trends in affective responses to exercise. First, there is a positive affective response during, and for a short time after short lasting physical activity of mild intensity. Secondly, moderately vigorous exercise responses are subject to individual differences, where some experience positive changes and some experiencing negative changes. Thirdly, immediately following moderately vigorous exercise the responses of exercisers are almost uniformly positive, regardless of response changes during exercise. This phenomenon is reported to be robust and eradicates any divergent trends that occurred during exercise. Fourth, when the intensity of the exercise approaches the individual's functional limits during strenuous exercise, the affective response unifies into a negative trend. Fifth and last, the affective response immediately following strenuous exercise is homogenously positive.

When Ekkekakis, Hall, and Petruzzello (2008) studied exercise intensity and the affective response following physical activity, their hypothesis was that if the intensity exceeded the individuals ventilatory threshold, the affective response would decline and possibly have an effect on adherence. When looking at the affective response during the activity with the intensity reaching above the individuals ventilatory threshold, they saw a significant decline in most of their participants, with no changes up until that point. The affective response had a positive change immediately following the intense activity. These findings were in line with what Ekkekakis (2003) reported on affective responses to exercise, that the affective responses declined at and above the individuals ventilatory capability but changed to a positive response following the activity. As the nature of CrossFit training is to exercise at a high intensity (Glassman, 2002) one could assume that this intensity could potentially have a negative impact on some individuals' affective response and consequently adherence, yet should not have such influence on majority of people as affective valence immediately following intense exercise was found to be homogeneous positive (Ekkekakis, 2003; Ekkekakis et al., 2008).

Guzman and Kingston (2012) did a motivational analysis on sport dropouts. They aimed to analyse the predictive ability of an SDT-based model describing competitive sport dropout and variance from age and gender. Their results supported the hypothesis in that SDT, with self-determined motivation being one of the key elements, can be used to predict sport dropout. The underlying mechanisms of self-determined motivation were found to be the

participant's needs for autonomy, competence, and relatedness. This implies that if an exercise program, like CrossFit in present study, successfully fulfils these needs for a participant, it may predict whether this participant will adhere to the program or drop out in the case of needs not being fulfilled. This is also in line with the research presented above (Pelletier et al., 2001; Sarrazin et al., 2002; Rogério & Josè, 2011; Calvo et al., 2010; Vallerand & Losier, 1999), where the fulfilment of or lack thereof the three SDT basic psychological needs, will either lead an athlete's or exercise participant's motivation to be self-determined (i.e., high and intrinsic), not self-determined (low and extrinsic) or amotivated.

Recently, Larson et al., (2018) explored motivational contributions to exercise dropout. They based their study on the body of research focusing on exercisers perceived barriers to keep exercising. Through their study they found four recurring themes contributing to exercisers dropping out: (1) feeling good but disappointed, (2) scheduling issues, (3) trouble in prioritizing exercise, and (4) exercising with/for someone else. While Larson and colleagues (2018) did not employ the SDT or self-determined motivation (SDM), the recurring themes they presented can be viewed as intrinsic and/or extrinsic sources of motivation. Although these themes are not directly relatable to the present study, as the present study aims to explore SDM, their study showed how different external factors can influence one's ability or motivation to stay consistent with exercise.

The literature reviewed here provided some solid explanations on how to approach SDM in CrossFit. Motivation in CrossFit is shown to differ somewhat from other training and workout domains, with CrossFit yielding more intrinsically motivated members. The literature also provided the researcher with a good understanding of factors that can influence adherence, such as, the more self-determined the motivation of an athlete is over time, the stronger the association with persistence or adherence is (Pelletier et al., 2001); athletes with higher levels of intrinsic motivation being associated with persistence and adherence (Sarrazin et al., 2002; Guzman & Kingston, 2012); the level at which the basic psychological needs are met or not, can influence the level of SDM and by that lead to some behaviour towards adherence or dropout (Calvo et al., 2010; Rogério & Josè 2011); external factors can influence one's ability or motivation to stay consistent with exercise (Larson et al., 2018); and that the affective valence immediately following intense exercise is homogeneous positive (Ekkekakis, 2003; Ekkekakis et al., 2008).

Among the CrossFit studies reviewed here, there were certain similarities in motivation, psychological needs and behavioural regulation while social, physical, and psychological factors help us better understand extrinsic or intrinsic motivational aspects. Within sport psychology research, SDT has been widely used providing us with explanations about how humans are capable to be productive and engaged or passive and alienated, as a function of the social conditions humans find themselves in, where they need to develop and function (Ryan & Deci, 2000). Furthermore, SDM research has shown that all three needs' satisfaction contributes significantly and uniquely to the prediction of one's motivation, with varying degrees of contributions made by each of the three needs. There is, however, a gap in the research when it comes to CrossFit participants and dropouts, more specifically the researcher aimed to learn about how is it that CrossFit satisfies the basic psychological needs for some and not satisfy these for others.

## Methodology

Culver, Gilbert and Sparks (2012), in writing particularly about research methods in sports science, they stated that the method should provide the readers with a base from which they can judge the research. They also defined methodology as “a theory of how inquiry should proceed. It involves analysis of the assumptions, principles and procedures in a particular approach to inquiry.” (Culver et al., 2012, p. 262). In this chapter the methodological approach used for this study is presented, preceded by the description of its epistemology, which is “the nature of knowledge, both how it [data] is constructed and how it is represented” (Culver et al., 2012, p. 262).

### Research approach and design

Considering that research on CrossFit and psychological constructs is still novel, a qualitative approach was chosen allowing the researcher to go in depth in the topic of study (Smith & Sparks, 2016). With the intention to explore CrossFit and SDM in dropouts, active CrossFit training participants, and competitive CrossFit athletes, the design best suited to achieve this was the case study. The case study design has been described as a study of a specific and bounded phenomenon (Hodge & Sharp, 2016). In qualitative research the case, or phenomenon, is something more than just an ‘n’ and it is important to appreciate that a case study is about the boundedness as well as the in-depth study of the case (Hodge & Sharp, 2016). The case study design in this particular project is an intrinsic case (Hodge & Sharp, 2016). An intrinsic case study is undertaken when the researcher aims to gain better understanding over a particular case or phenomenon; the phenomenon in the present study being CrossFit participants’ mechanisms of self-determined motivation in the three cases of active participants, competitive athletes, and dropouts.

The epistemological and ontological positioning for the study constitutes the basis from which the methodology and analysis is built, where ontology is about the nature of reality, what constitutes reality or in other words *what is*, and epistemology being the relationship between the researcher and what can be known about that reality, how knowledge can be created, acquired, and communicated, or *what it means to know* (Harreveld, Danaher, Lawson, Knight & Busch, 2016; Scotland, 2012; Ulum, 2016).

Ontology is the basis, which contains what the nature of the social world is (Weed, 2009). Epistemology builds on ontology and concerns how knowledge of the social world is possible (Weed, 2009). These two make the basis for the researcher to choose a suitable methodology for the given research question, which is what procedures or logic should be followed through the study, ending up with the actual methods, the specific techniques that should be used to collect data (Weed, 2009). Every methodological paradigm is based upon an ontological and epistemological assumption, which reveal differences in assumptions of reality and knowledge that underpin their research approach (Scotland, 2012). Lincoln, Lynham and Guba (2011) presented five different paradigm positions; positivism, post positivism, critical theories, constructivism, and participatory.

The present study is based on a constructivist inquiry paradigm, which is based on relative ontology, and subjective epistemology (Lincoln et al., 2011). Within the relativistic ontology, reality exists in multiple mental constructions, realities are socially and experientially based, they are local and specific, dependant on the form and content of the persons who hold them (Lincoln et al., 2011; Scotland, 2012). As such, we put together our own personal reality based on the social interactions and the experiences we have (Lincoln et al., 2011; Scotland, 2012). Within the subjective epistemology, the philosophical belief is that people construct their own understanding of reality, based on interactions between themselves and their surroundings, and within research the findings occur between the inquirer and the inquired, and by that due to the interaction between the researcher and the subject (Lincoln et al., 2011; Scotland, 2012). Within the constructivist paradigm, it is given that the researchers cannot separate themselves from what they already know. The investigator and the object of study are linked in a way that how we are and how we understand the world around us, is a central part of how we understand ourselves, other members of society, and the world around us (Lincoln et al., 2011).

In the process of conceptualizing and conducting the present study, relativist ontology suggested that the realities of the participants in the present study, which were sought to gain an understanding of, are based on their social interactions and experiences in their local and specific surroundings. Subjective epistemology suggested that even if the participants experienced the exact same experiences in the same surroundings, they form their own unique understanding of that reality. To serve the scope of the study as best as possible, the qualitative approach is one of the commonly used approaches within the constructivist inquiry paradigm. To tend the epistemological and ontological stances of the researcher, interviewing

and analysis of existing literature were used to ensure adequate dialogues between the researcher and the participants in order to cooperatively construct a meaningful reality that would answer the research question of the study (Lincoln et al., 2011).

## Participants

The researcher used purposeful sampling to approach active CrossFit participants and athletes who would share in depth information about the case of study (Patton, 2015). To identify potential participants for the study, owners of CrossFit-boxes were contacted, informed about the study, and asked to assist the researcher by informing the box-members of the study. Dropouts were approached through the snowball sampling method (Patton, 2015) by asking active participants and active athletes whether they had a friend or knew of someone who tried CrossFit but dropped out within the first six months or knew someone that could connect the researcher to a potential dropout participant. This information gave the researcher the opportunity to reach out to those who dropped out and ask if they wanted to partake in the study.

For the researcher to identify the participants and organize them into suitable groups as active participants, active athletes and dropouts, a set of inclusion criteria were employed (Patton, 2015). The inclusion criteria were: (1) The dropouts should have dropped out within the first six months after starting CrossFit training. Six months was chosen based on Larson and colleagues (2018) work, who found that most dropouts stop their respective exercise programme within six months. (2) The active participants should be systematically active with CrossFit training three to four times per week, for at least 12 to 18 months. Active participants with this much experience are assumed to be through with the adjustment period discussed by Simpson et al., (2017), while they also show systematic training frequency and adherence as discussed by Davies et al., (2016). (3) The active athletes should have been training regularly for at least 36 months, as well as have participated in at least three national and/or international level competitions. This criterion ensured adequate training and competition experience from athletes who have been dedicated to CrossFit as a sport over some time and did not try out competing just for the sake of the experience.

For the present study, the researcher conducted interviews with two dropouts, two active CrossFit participants, and two competitive CrossFit athletes. Each group consisted of one male and one female. Their ages ranged from 27 to 34 years old ( $M_{\text{age}} = 29,33$ ,  $SD = 3,72$ ),

and CrossFit experience ranged from three months to eight years ( $M_{\text{experience}} = 40,33$  months,  $SD = 33,66$ ). The athletes lived in a big city in Norway, training at a CrossFit box there. The active members and dropouts lived in a rural town in Norway, training or had previously trained at a local CrossFit box. All of the participants reported previous experience with both team or individual sports, as well as strength or endurance training by themselves for extended periods of time. Both athletes had experience with coaching CrossFit classes, and one of them was working as a coach at time of data collection. One of the active exercisers had also previously coached some CrossFit classes.

## Data collection

The data was obtained through semi-structured interviews. A common rationale for using interviewing as the data collection method, is that the interview is an occasion for conversation, and through conversations we can get to know other people (Smith & Sparks, 2016). Conversing in the form of an interview is as Smith and Sparks (2016) describe, an indispensable source of rich and new knowledge which suited the purpose of the present study aiming to develop in depth understanding of participants' basic needs behind their engagement (and level of it) with CrossFit. With the interviews being semi-structured, the interviewer asked predominantly open-ended questions and the interviewees answered to the best of their ability. Within a semi-constructed interview, the quality and magnitude of the data relies heavily on the interviewer's skills to ask good follow-up questions in order to get the interviewee to further elaborate on a previous answer or topic (Brinkmann & Kvale, 2015), as well as on the quality of the interview guide. It is crucial for the interviewer to be alert and responsive to what the interviewee has to say, so opportunities to get a deeper understanding of a particular subject are not lost.

Five of the six interviews were conducted in person face-to-face, and one was done via telephone due to scheduling challenges. As Smith and Sarks (2016) specify, the preferred way to have an interview is face-to-face, so the interviewer can observe the facial expressions of the interviewee as well as their body language, to get a better understanding of their emotional relation to the topics talked about. This is lost when the interview is done via telephone as the interviewer and interviewee cannot see each other. Smith and Sparks (2016) underlined that the benefit of doing an interview face-to-face is not only positive for the interviewer but both ways, as the interviewee could be more comfortable to share their feelings, thoughts and emotions around experiences upon developing some rapport with the interviewer as they talk

face-to-face. The rationale for accepting one of the interviews in the present study to be conducted over the phone, was to increase the depth of the case study, and particularly of dropouts since reaching them for research purposes was proven to be challenging.

Nonetheless, the shortcomings of a phone interview were taken into consideration before the interview was conducted. As such, to counteract as best as possible the shortcomings, the interviewer took some extra time before starting the interview to engage in small talking with the interviewee to make the interviewee more comfortable before going into the topics in the interview and during the interview used more probing questions relating to feelings, thoughts and emotions experienced by the interviewee.

Two separate interview guides were developed, one for the dropouts and one for the active members and competitive athletes (see Appendix A). Both interview guides started with questions exploring how the participants were first introduced to CrossFit and how that experience was for them. The interviewees were encouraged to include details elaborating on how they experienced their first encounter with CrossFit. If the participants did not find CrossFit themselves, they were asked about who introduced them to it, when and where. Next, they were asked to talk about aspects they liked and/or disliked about CrossFit. After getting a good understanding of their first experiences with CrossFit and their perception of it, as well as to what they liked or disliked about it, they were asked about their training habits before and outside of CrossFit, and what they liked and/or disliked about that. When talking about what they liked and/or disliked about both CrossFit and training habits before or outside of CrossFit, the interviewer used probe-questions to help the interviewee to further elaborate on things they talked about and related to the phenomenon under study. Two examples of that are, one interviewee mentioning something she found difficult in CrossFit, before quickly moving on. The interviewer took note of that, and without interrupting the interviewee later asked, 'You mention you found 'this' difficult in CrossFit, can you elaborate what you mean by that?' The other example is from another interview where the interviewee said she was motivated by a certain thing she experienced both in previous training and in CrossFit, for which the interviewer then asked, 'when you say you were motivated by that, can you please explain what you mean by that?' These examples illustrate how Brinkman and Kvale (2015) explained the use of probe questions, to further elaborate on a previous answer or topic.

After talking about training habits before and outside CrossFit, the participants were asked about their current training habits, how active they are on a daily and weekly basis, and what the activity is. Where the two interview guides differed is from this point on where dropout

participants were asked to share why they decided to drop out from CrossFit and active exercisers and athletes were asked to talk about why they decided to stay active with or to compete in CrossFit. In this context of the conversation, the interviewees were also asked about their current training habits. To get an understanding of how the participants felt around CrossFit training, they were asked to talk about how they feel before a CrossFit Class and what goes through their mind. If they had any experience with energizing themselves (psyching up) to go through a strenuous workout, they were invited to elaborate on their experience and/or routine(s) with that.

The participants were also asked to talk about their underlying reasons for training or competing, or why they are not training; if they have underlying reason(s) they could share of. And if they had something to share in this regard, they were asked if this reasoning changed over time in any way, through different training experiences. In closing the interview, the participants were invited to talk about anything they felt fit considering what was already talked about, or had something they wanted to add, elaborate on.

The interview guides aimed to allow a conversation between the interviewer and the interviewee and to invite the interviewee to tell stories and descriptions of their experiences, feelings and emotions, insights, perspectives and behaviour in relation to CrossFit (Smith & Sparks, 2016). The interview guides were developed following Smith and Sparks (2016) considerations. The process started with reading literature relevant to the research question, writing up a list of open-ended questions to address topics of interest in the literature (e.g. McDonough, & Crocker, 2007; Rogério, & José, 2011; Sarrazin et al., 2002), followed by a refining process of shortening the list of questions as well as refining the questions so they were clearly worded and comprehensible. The questions were structured in a way that content-wise would give a sense of flow to the interview allowing for a 'natural' conversation experience and timewise would aptly trigger information from the past, going from older to newer experiences. The interview ended with what Smith and Sparks (2016) call a "closing tour" (p. 110), inviting the interviewee to fill in any gaps that might not have been covered through the interview.

As recommended by Smith and Sparks (2016) the researcher did two pilot interviews with two adult CrossFit exercisers, not participating in the actual study. The aim was to get feedback on whether the questions were understandable, open-ended enough and opened the floor for a conversations as intended, as well to see if the interviews were set up in a way that made sense, with questions following a natural development keeping the conversation

flowing. The pilot phase also allowed the researcher to explore whether the interview guides could produce data necessary to answer the research question as well as areas to probe, and of course improve his questioning, listening, and note-taking capabilities. These pilot interviews resulted in few small changes to the interview guides, making the interview more open and conversation-like, as well as giving valuable insight on potential probe-questions the researcher could have at the ready for the actual data collection.

The decision for the number of participants for each group was informed by Smith and Sparks (2016) description of sample sizes for qualitative studies. Accordingly, the sample size of interviews in qualitative studies should be small enough to manage and large enough to learn about what you wish to know. Two participants for each group were considered manageable sample size and feasible to reach. While one may question whether the size was large enough to learn, considering that the CrossFit community in Norway is rather small and conducting the interviews also involved issues of time and cost, the sample size here was large enough to aptly serve the purpose of the study. Considering the exploratory nature of the present study with regard to the CrossFit populations it targeted, the sample size was considered as large enough to provide fundamental in depth data, lacking to this day, on the underlying mechanisms of self-determined motivation in CrossFit active participants, athletes, and dropouts which is usually the most difficult group to access for the purpose of learning.

The interviews lasted between 42 and 60 minutes ( $M_{\text{duration}} = 51$  min), were audio recorded and transcribed verbatim, yielding 47 pages of single-spaced text. After the transcription was done, the interviewees were contacted and asked to read through their transcription text to verify the completeness and accuracy of it. At this time, they were also asked to add anything if they felt like something was missing. Upon reviewing the transcriptions, all participants confirmed the completeness of the transcription, and no one added anything or made any changes. This was done in order to enhance the credibility of the study, where the reader is ensured that the transcription was not changed from the original interview, as credibility refers to whether the findings of a study are credible or believable (Smith & Sparks, 2016).

## Analysis

Deductive thematic analysis was conducted to analyse the data following Braun and Clarke's (2006) and Clarke and Braun's (2013) guidelines, with the six phases of thematic analysis followed step-by-step. Thematic analysis offers a method for identifying patterns or themes in the dataset for describing and interpreting the importance and meaning of the themes in the context of the study (Braun & Clarke, 2006; Braun, Clarke, & Weate, 2016; Clarke & Brown, 2013). The analysis starts out inductively by highlighting keywords and sentences and then can become deductive or theoretical, as Braun and Clarke (2006) described, at the latent level, when using a chosen theory for interpreting the keywords and sentences as themes. The deductive approach was the most fitting one here, since the research question asked whether and how CrossFit can satisfy the three basic psychological needs presented in self-determined motivation. According to Braun and Clarke (2006) the researcher uses the theory to analyze and reflect on the data to find meaning in it and sees the data in the context of the used theory. When analysis is done at the latent level, it signifies that the researcher goes beneath spoken words in the data and analyses underlying ideas, assumptions, and conceptualizations in the data (Braun & Clarke, 2006). In the context of the present study, this meant that the researcher would use the theory of SDM to analyse and reflect on the information given by CrossFit participants on how it satisfied or did not satisfy their autonomy, competence and relatedness needs.

In step 1 of the analysis, the transcripts were read one by one, so the researcher was further immersed in the data. In step 2 he worked through each transcript, highlighting keywords and sentences. To generate descriptive codes for the data the SDM was of help when going the data. It is at this point of analysis that the latent level of analysis mattered as the researcher went beyond the words the interviewees used to find the underlying meaning in their answers and experiences, of course through the lens of SDM. In step 3, the codes were compared to each other to specify and/or merging of similar codes, resulting in primary drafts of themes in the context of the chosen theoretical framework. In Step 4 the themes were further reviewed to ensure they were mutually exclusive and exhaustive in representing the data. In step 5 the researcher put the themes up against the reviewed literature to further refine the specificity of the themes. Braun and Clarke (2006) and Clarke and Braun (2013) clarified that the steps of thematic analysis are not supposed to viewed like a linear process, but rather a recursive process, which was the case for this analysis. Hence, the researcher did go back and forth between the steps to refine descriptive codes, specified and exclusive themes and sub themes.

Finally, in step 6, the researcher wrote the report of his data collection and analysis work, which is presented in the results and discussion sections that follow.

The data was collected and analysed in Norwegian language and then segments of it were translated to English in the process of writing up the findings of the study. Translating was a challenging process as one cannot directly translate word for word since much of the meaning and value of the data could be lost in the translation. This was discussed by Squires (2009) who emphasized that the translation process is not only translating the literal meaning of a word, but more importantly how the word relates conceptually in the context it is used. It is crucial for the rigor and trustworthiness of the study that the language is translated correctly, to avoid losing conceptual equivalence or finding the meanings of the participants' words to be altered because of an imprecise translation (Squires, 2009). Temple and Young (2004) pointed out that there is no single correct way to translate a text, with the meaning being constructed through discourses between texts. In the case of the present study, the researcher's level of involvement with the literature on motivation, CrossFit and research methods and his language skills can strengthen one's trust in the data translated in English. The researcher is fluent in Norwegian and English both orally and written, and is well acquainted with the terminology of self-determined motivation and CrossFit, and in the few cases where the vocabulary of the researcher did not cover the full meaning of a participants' words, an English dictionary was used to find a suitable translation of the words in the given context.

## Ethics and trustworthiness

Prior to the onset of the study, the Norwegian Centre of Research Data was informed (report approval # 395733). Participation in the study was voluntary and the participants were informed that they could withdraw from the study at any time. In writing up this study, the anonymity of the participants is protected by altering details that would make them recognisable. As such pseudonyms are used (Brynjar, Tom, Pål, Camilla, Kristina, and Liv) to present the data and findings, while all information on particular locations and third parties were omitted. All participants signed a consent form, which informed them about the study, their rights as participants and how the interview data will be used by the researcher. All participants were informed that they would remain anonymous, with all personal information kept confidential. Both during the planning and execution of the interviews, the participants were to be protected from any form of harm (e.g., emotional); as such, they were informed that it is voluntary to answer the questions and that they could choose not to answer any

questions that might make them feel uncomfortable. No participant asked to avoid a question for reasons of comfort or distress.

To establish trustworthiness in this work, the criteria of Schinke, Smith and McGannon (2013) and the eight 'big-tent' criteria by Tracy (2010) were considered. A commonality between these is the detailed description by which procedures are followed, and how each step of the study is conducted. Schinke et al., (2013) noted about *criteria* for producing and judging qualitative research, that a study which ticks all criteria-boxes might not necessarily be better than a study that only ticked half of the criteria-boxes. With that said, the list of eight 'big-tent' criteria for excellent qualitative research suggested by Tracy (2010) are not simple boxes to check off, but considerations the researcher must be aware of throughout the process of conducting research. The present study sought to fulfil the criteria for excellent qualitative research by providing thorough descriptions of every step taken, from ontology and epistemology, through methodology, data collection and analysis and write up, keeping the text and theoretical approaches coherent with one another. How the 'big-tent' criteria for excellent qualitative research are met is described below.

The worthiness of the topic is addressed through the thorough review of existing literature relevant to the research question, to assure that the present study provides new knowledge filling a gap in the existing body of knowledge. To ensure rich rigor, the present study employed a widely used and recognized theory, self-determined motivation, for analysing and interpreting the data. The data collection and analysis processes were guided by established and widely recognized qualitative methods, such as the case study design in exploring the phenomenon of motivation in CrossFit among different participants (Hodge & Sharp, 2016), the semi-constructed interview mode for data collection (Smith & Sparks, 2016), and a theoretically driven thematic analysis for analysing the data (Braun & Clarke, 2006; Clarke & Braun 2013). The sincerity of the study is backed up by the researcher being transparent and honest about potential biases and subjective values, described below.

To produce a credible study, the researcher provides thick and detailed descriptions of each of the steps throughout the research process, leaning on reputable research to guide the study. The knowledge produced by the study will resonate with other research on self-determined motivation as it includes three levels of participation from dropouts through regular active participants to competitive athletes in CrossFit. It will also potentially be particularly applicable for CrossFit coaches to get better knowledge on how they can motivate their clients to adhere to CrossFit training. The significance of the contributions was set up by the act of

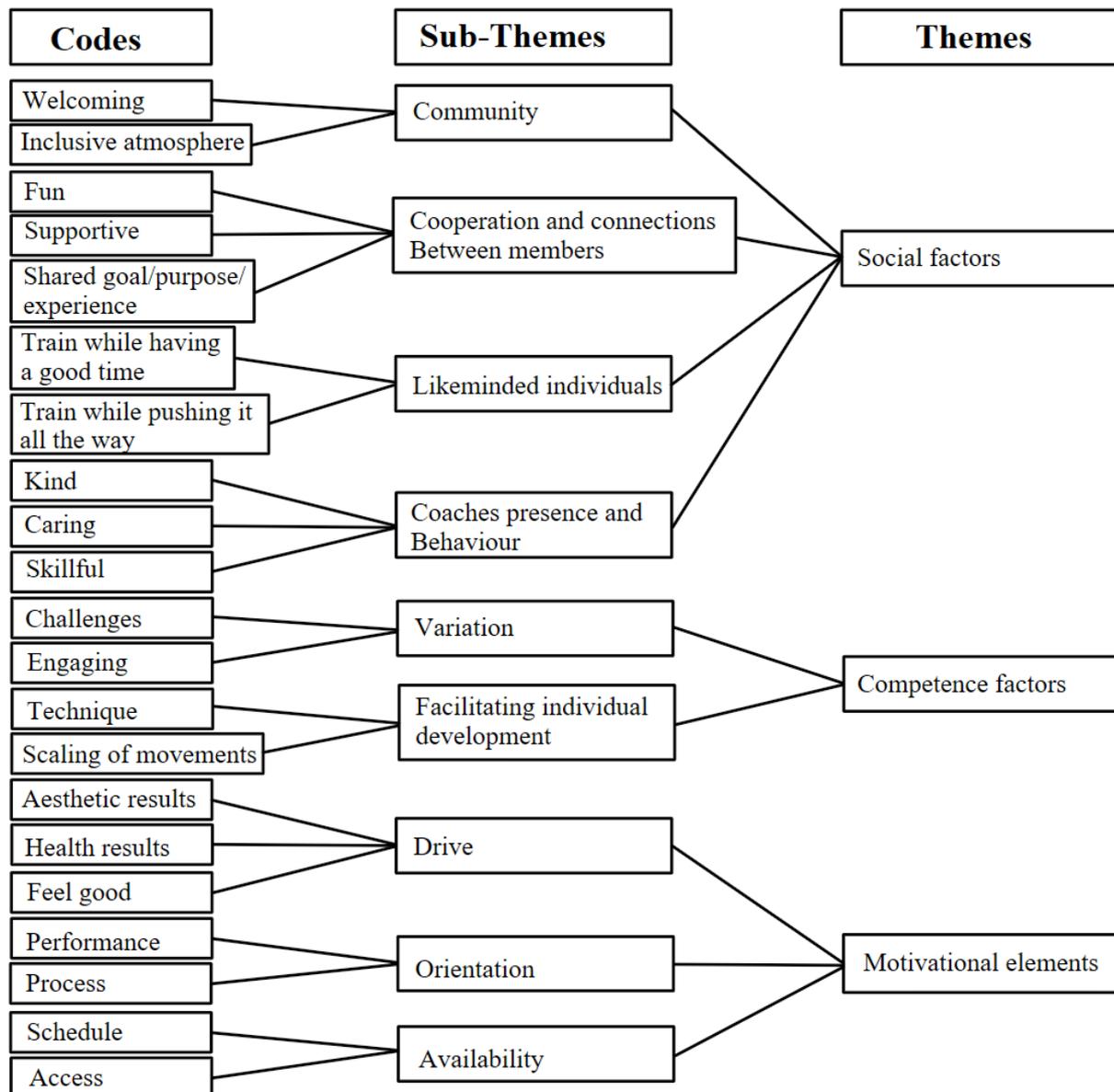
reviewing existing relevant literature to find the needs in the body of knowledge and eventually to fill this gap. In the present study the contributions are theoretical in regards of knowledge on self-determined motivation in dropouts, and practical for CrossFit coaches as the new knowledge on potential nuances of self-determined motivation can be employed with their clients. The study is conducted in line with the Norwegian Centre of Research Data's guidelines for ethical research and was approved by it.

The final criterion is meaningful coherence and suggests that the research achieves the purpose of the study by using meaningful methods and procedures suitable for achieving the purpose and meaningfully interconnecting the literature, research question, and interpretations. These points were cared for throughout the study and presented in detail as per which methods and procedures were employed and why they fitted the study, supplemented with references to the literature and existing knowledge through the methods, procedures and discussion of the findings, resulting to a conclusion that achieves to answer the research question and by that achieving the purpose of the study.

On the topic of ethics, credibility, sincerity and trustworthiness, it is important to discuss potential biases with the researcher. As a researcher I have been a fan of CrossFit both as a sport and as a training methodology for the past seven years, actively training CrossFit about 5-6 times per week for the last 5 years. Currently, I also work as the head coach of a CrossFit department at a local gym. With this being said, I have noticed that I wanted CrossFit to be presented well in the existing literature, as well as CrossFit being able to satisfy the basic psychological needs within SDM. This is something I noticed early on and had to work on not letting that influence on how I collected, analysed, interpreted my data as well as present the existing literature, findings and discussion. I have had to constantly reflect to stay objective, and not let my inherent interest for, and occupation in CrossFit, influence my research. Nonetheless, considering how Braun and Clarke (2019) and Ronkainen and Wiltshire (2019) discussed how quality of qualitative research may not be an outcome of standardised procedures, the researcher's reflexive and critical engagement with the data, the literature and CrossFit can also account as key indicators of rigour and quality.

## Findings

The research question guided an exploration on whether and if so, how CrossFit satisfies individuals' basic psychological needs for autonomy, competence and relatedness as presented by Deci and Ryan's (2000), to motivate them to adhere to its training. The researcher learned from three different cases of participant experiences; individuals who dropped out of CrossFit training, individuals who adhere to CrossFit training, and competitive CrossFit athletes. Through rigorous data analysis, the researcher identified three central themes, that of social factors, competence factors, and motivational elements. Each theme was built on a set of subthemes which in turn were built on codes from the data (see Figure 3).



**Figure 3.** Thematic map of findings: Codes, subthemes, and themes identified in the data.

The findings of the study are presented here, organized around the three central themes. In summarizing the findings at the end of the section, these are positioned within the cases of active exercisers, competitive athletes and dropouts from CrossFit. To clarify for the reader, the grouping of the participants and their experience level are as follows. Brynjar and Camilla had already dropped out from CrossFit training when they were interviewed; Camilla dropped out after three months and Brynjar after six months of CrossFit training. Kristina and Pål were active exercisers at data collection time, with Kristina having eight years of CrossFit experience and Pål having two and a half years of experience. Liv and Tom were competitive athletes when the interviews were conducted, where Liv had six years of experience and Tom had just under three years of experience in training CrossFit. Liv had been competing in CrossFit the last three years, and Tom had competed for the last two years.

## Social factors

Social factors are about the different aspects that make up the CrossFit experience described by the participants, and consist of four subthemes, community, cooperation and connections between members, likeminded individuals, and coaches' presence and behaviour. These social factors are present in CrossFit according to the interviewees and appear to contribute to the satisfaction of their relatedness and competence needs, making the interviewees feel good in the environment and experiencing others to be responsive and sensitive to the individual. Starting with the community, all participants, from the dropouts to the competitive athletes, talked positively about training in and being at the CrossFit boxes with nuances in what each individual appreciated. The collective description of CrossFit boxes using the participants' words revealed a community with an inclusive atmosphere and welcoming members. The coaches are kind, caring and skilful. The members have fun working out together, supporting each other and cooperating through workouts.

The first thing to note about the community is how welcoming everyone is. When Camilla attended a class for her first time, the coach or coaches greeted and welcome her at the door, and existing members followed the coaches' lead. As Camilla shared, this is perceived as a very positive trait:

It's very nice to be there, the openness and how including everyone is, first and foremost. It makes you feel more motivated to go there to workout. I felt that they took good care of me at the CrossFit box. The community is like at no other gym. In other

gyms I never even knew any names of other members, but I do at the CrossFit box. So... yes, the community in CrossFit is something unique.

Camilla's description of her experience is quite similar to how Liv describes her first experience in CrossFit,

You almost get like a social shock starting here because everyone is so friendly, welcoming and helpful, which is very different from the gyms I have trained at previously.

It was thought-provoking to learn how Liv and Camilla described their first encounter with CrossFit and how they put it up against their past experiences from training at regular fitness gyms, which apparently lacked the welcoming and friendliness of CrossFit Boxes. Camilla and Liv had their first encounter with CrossFit in different boxes in Norway, which is different from Kristina, who had her first encounter with CrossFit in [foreign city] while studying there and had a similar experience to share. In Kristina's words,

Out of everything I like about CrossFit, the community stands at the top. I fell in love with the community in CrossFit immediately. After working out at a regular gym for a long time where everyone does their own thing and almost fights about who has the equipment, it was so refreshing to start with CrossFit where we all do the same thing and we cheer for each other through the workout.

The description Pål gave for the community in CrossFit aligns well with Camilla, Liv and Kristina's experiences, "The one thing that characterises CrossFit the best, must be the community, the relationship you build with the other members and coaches."

The experiences presented above certainly paint a pretty picture for the CrossFit community, but this perception isn't necessarily the case for everyone who tries out CrossFit for the first time, as Brynjar shared:

I didn't necessarily care for the, well, I didn't know anyone there apart from my two friends, and with all the cheering for everyone around, all the high-fives and stuff, I found that part to be a bit awkward, to be honest. It was a bit weird. I get the point that you're supposed to motivate each other to work hard, which is a good thing, but I just found it to be a bit weird.

As Brynjar described his first encounter, the community he entered was similar to Liv, Camilla and Kristina's experiences, yet it did not trigger the same perception for him. As he

pointed out, he understands that the community meant well and that it was a good thing, but it did not suit him. It is possible that this expressive camaraderie community does not resonate in the same way for everyone stepping inside a CrossFit box. Alike Brynjar, some people may find the CrossFit community to be a bit overwhelming.

The next subtheme under social factors refers to the cooperation and connections between members. The cooperation with other members seems to make the members support each other through the workouts and makes the workouts more fun. Kristina liked that everyone did the same thing and cheered for each other and Pål enjoyed the connections he builds with other members. The connections between members are made over a shared goal, purpose, or experience. Brynjar, who found it rather awkward at the box in the beginning, appeared to change over time, and came to appreciate getting to know the members quickly by working together in teams during workouts. The development of his experience in the CrossFit Box resembled his previous track-and-field experience, with regard to forming a unity with the group by working hard together and achieving results. For Tom, the CrossFit precious connection experiences reminded him of the ones he built in the military. In their words,

You get to know each other very quickly by working together during workouts. I also have had some good experiences with track and field, with the feeling you get from achieving great results as well as the unity within the group, because you get to know the people in the group really well, and you look forward to training [at a place] where you can talk some nonsense. (Brynjar)

We build an incredibly good relationship, similar to what I experienced in the military where you push through hard tasks together with the others. It results in a special bond between one another, you have gone through the same difficulties with everyone else. (Tom)

The connections made between members appear to have profound impact before and after the workouts. Brynjar shared how motivating he found the connections he built with the other members to be before a workout; he looks forward meeting the others, not only to work out, but also to hang out with them. Upon attending the same morning classes for a couple weeks, Camilla started to strongly look forward to the classes as she got to know the other members better, which made the whole experience more and more fun. Pål, while not able to join classes too often due to work, when he can join, for him it is way more motivating to workout

with the whole class. Kristina's words below, offer somewhat of a summary description on how connecting with the other members can impact CrossFit participants:

It's almost frightening the number of times I have gone on a Saturday to do a quick workout but end up staying there for over 3 hours. When I get together with the others at the CrossFit box, we have such a good time just hanging out, and working out of course. If we were just doing the training for the day we could easily be done in around an hour, but we end up talking about training and other things, and just enjoying each other's company.

When connections with other members was not in place, the experience appeared to differ from what participants above described. Tom's story portrays how the absence of connections with someone over a shared goal, purpose, or experience, influenced him negatively and then how he built relationships with persons who wanted the same thing as him.

When I started CrossFit in [rural town], I was the only one really wanting to train hard and a lot, to compete in CrossFit. This resulted in many late nights by myself doing my own thing, which I got a bit tired of after a while. After doing that for some time, it was amazing to come to [big city] CrossFit where I would work out with other people wanting the same thing.

Tom and Kristina worked out in the same CrossFit box for some time yet experienced things differently. Kristina pointed out how great relationships with others made her often stay at the box way longer than expected, while Tom talked about spending many late nights by himself which was tiresome and not experiencing the building of relationships until he moved to [big city] CrossFit. Tom was a coach at [rural town] CrossFit and liked being a coach and had good relationships with the members. Still, he felt that he did not have anyone to relate to as per wanting the same thing out of their training. This element led the researcher in identifying the third subtheme of social factors, that of likeminded individuals.

For Tom it was amazing to come to a place with other people who also wanted the same thing. Likeminded individuals is about having other people wanting the same thing as you and can mean different things to different people. While Kristina had likeminded individuals in [rural town] CrossFit who also wanted to have a good time doing CrossFit, Tom did not find likeminded people until he started training at [big city] CrossFit with individuals who wanted to train hard and a lot for competing in CrossFit. Likeminded individuals are important at any level of participation affecting the way you connect with others, which in turn affect the sense

of relatedness and competence. For competitive athletes it seems to affect them in the sense of helping them actually adhering to the training necessary to be competitive, as well as actually making the choice of going all in to become a competitive athlete. Not only can we see how the lack of likeminded individuals was draining for Tom at [rural town] CrossFit, but also how he felt when he came to CrossFit [big city] where he met likeminded individuals.

For the active exercisers, it seems to affect them to adhere to the training as well, but for a different reason. Looking back at Kristina's story where she stayed at the box for three hours several times, she was surrounded by likeminded individuals also wanting to have a great time working out. If we flip the situation and say it was Kristina that didn't have likeminded individuals around her, we can assume it would be as draining for her as it was for Tom, and she would probably not stay at the box for three hours repeatedly showing how likeminded individuals are important at any level of participation. In line with Tom's latter experience, Liv provided interesting insight in this regard on how she was motivated by likeminded individuals to go all in as a competitor.

When I started at [big city] CrossFit it became more serious. The environment among the members here is more set towards pushing each other even harder. So, unlike my previous meetings with CrossFit, when I came here it was more intense and more like this is a place where I can get good at CrossFit. Previous to training at [big city] CrossFit, even though I was told by others around me that I was really good at CrossFit, I was scared to commit and say that I'm going all in to compete in CrossFit, because you don't want to be that person to say they go all in, but never accomplishes anything, which fortunately hasn't been the case so far, so it's fun. The community here at [big city] CrossFit has definitely been accelerating and pushing me to perform both in training and in competitions, with the people you meet here also wanting to compete, the challenges you meet, building the courage I needed to say, I am going all in.

The story from Liv also reveals the effect likeminded individuals can have. Even though she had the potential to compete at a high level before starting at [big city] CrossFit, it was the connection with likeminded individuals, supporting her and pushing her to go for it.

The last subtheme under social factors is the coaches' behaviour. The coach is a central part in CrossFit and has the potential to profoundly influence the members. When the coach is kind, caring, and skilful, as Camilla described for her first CrossFit encounter where the coach

greeted her at the door, welcomed her and followed her throughout the class, it appeared to make an impression. The coach greeting her at the door set a standard for her, and Camilla shared how she felt well taken care of by the coach throughout the class. Kristina offered a similar description of the coach in [foreign city] where she started CrossFit. For her, it was not just about the coach being kind and caring for the members, but also being skilful. The skilfulness of the coaches was the one thing Brynjar appreciated the most.

First and foremost, I liked how skilful the coaches were. At every class there was a coach to instruct you on technique and other things through the workout. Before every WOD [workout of the day], the coach always went through and explained what we were doing in the workout, and then took us through a thorough warmup, technical training and gave us feedback during the workout. I liked that a lot. So, the whole package with CrossFit training is kind of getting a personal trainer with the membership, teaching you the correct techniques and so forth, so that is what I liked the most.

For Brynjar the skilfulness of the coaches resembled to having a personal trainer at every class, as such increasing the value of the membership by teaching correct techniques at every WOD. Kristina also mentioned how she appreciated the coach being both kind and skilful when helping her through the workouts when she started CrossFit in [foreign city].

## Competence factors

The theme of competence factors is about the technical competence where the participants can perform the movements during the workouts and feel competent and accomplished by performing the given movements. Two subthemes led to the theme of competence factors; variation and facilitation of individual development. Variation consisted of variation in movements and of different movement combinations during a workout, providing new challenges and keeping members active through classes. Facilitating individual development is about members getting appropriate scaling for each movement so it is challenging for their level, regardless of their experience with CrossFit.

Starting with variation, Liv and Tom talked about how much they liked the variety in movements and workouts, feeling they always have something more to get better at, something new to strive to master.

The variation is the best thing about CrossFit in my opinion, because you never get tired of it. You constantly have something to improve upon, which also can be a bit frustrating at times because when you finally feel you have mastered one thing, you might start lacking on other things you haven't worked on as much, but that's the nature of the sport and it keeps me going, so it's fun. (Tom)

I love the variety in CrossFit. I thought I had decent technique and strength, but I have never been as good technically or as strong as I'm now after training CrossFit. Movement-wise there are always challenges, even after six years there are still movements I can get more proficient at, which is a good thing. (Liv)

Kristina elaborated on how the variation in CrossFit can be a good thing for everyone, independent of where they are in their development. When coaches do a good job in scaling the movements to the individuals' capacity to do work (i.e. scaling load, distance, time etc.) and capability to execute movements ( i.e. scaling type of movement, range of motion etc.), members get a sense of achievement and mastery, while also have more to learn and conquer.

With CrossFit training, I have had a progression I find positive, both technique-wise and strength-wise, which is motivating when you work on something and see the results. In CrossFit, there is always something you can get better at, but at the same time you can also be happy with the movements you have already mastered.

Camilla talked about how much she liked all movements in CrossFit and training with the many variations. The variation kept the workouts fun and challenging for her. Facilitating individual development appears to build confidence and competence as Camilla shared,

In CrossFit you work a lot on technique, so I feel safe and confident that I execute the lifts properly. I like how varied the training is, I learned a lot of new things using the whole-body during workouts, which is totally different from training with the machines at a regular gym. Some movements were more difficult than other ones, but I got better and better at them once I learned the techniques which made it more fun.

Alike Tom, Liv, Kristina and Camilla, Pål also enjoys the constant challenge that CrossFit provides through the variation in different movements and combinations requiring skill, strength, endurance, etc. In his view, he needs the challenges and the variety he gets from CrossFit to stay motivated to work out.

In CrossFit there are lots of movements you want to do but can't, like double-unders, handstand walk, toes to bar and things like that. I have had many challenges with these and other movements which made me want to work harder to feel skilled in CrossFit, and it's a real joy when you finally master something you have worked on for a long time. It's like when you break the code for a technique it solves many challenges, and when you do it's like a rush of happiness. I did classic weight training before, but I didn't feel it gave me anything, not like CrossFit does now. This is the training I need to stay motivated.

Brynjar was doing strength training on his own for seven years and found CrossFit to be a fun way to spice things up from what he was previously doing. Even when he knew the workout was going to be hard, he looked forward to the challenge.

Regarding the movements, I learned the strength pieces, snatch, clean and jerk quickly, but some of the movements on the pullup-bar were harder for me. I found the kipping to be difficult, so I did the pullups strict when the others were kipping. There are always some movements that are harder than others, but I trained there for only a short while, and you can't learn everything at once. It was a really good experience the time I was there, it was fun trying something new. I rarely got that feeling of working really hard at a regular gym. When I walked in the door at [rural town] CrossFit it was like knowing the workout is going to be challenging and exhausting. I liked that part where you just have to put your head down and do the work.

Facilitating individual development appears to be an important achievement factor. While CrossFit movements are challenging, all members regardless their skill level can do the workouts when properly scaled (modified). This is one of the most important tasks for a coach, to see and prescribe the correct scaling in movements, not only to ensure the movements and workouts are executed safely by the members, but also to challenge them enough for yielding development yet not too much that they get discouraged. Kristina has gone through the steps from doing scaled workouts to now mostly doing them RX (RX is performing the movements as prescribed in the program).

From the beginning I really liked the training, it was effective which was a good thing for us students, and we got the help we needed from the coaches to scale the workouts to our capabilities. Many people get discouraged by having to scale the movements,

but that never bothered me. However, I remember the day that I did the workout RX, it was a huge deal! And now I do the workouts more often RX than scaled.

Beside teaching the techniques and movements correctly to members, coaches also need to have a plan for a thorough warmup and skill training before the WOD and cooldown so everyone stays active and moving through the whole hour. In Camilla's experience, "when I show up the coach has some fun activities planned in the beginning of the class, with a lot of variation between workouts, so even though I'm really tired after the workout it's a lot of fun." Brynjar shared how he appreciated the coach engaging them by sharing the plan of the training and the feedback provided. "Before every WOD, the coach always went through and explained what we were doing in the workout, and then took us through a thorough warmup, technical training, and gave us feedback during the workout itself. I liked that a lot." When coaches are prepared with a thought-out plan of how the class is going to be it makes the workout engaging, fun and enjoyable.

## Motivational elements

The theme of motivational elements has three sub-themes. First, one's drive from underlying reasons to work out, wanting aesthetic – or health results, and wanting to feel good. Second, one's goal orientation as result- or process-oriented. Third, availability with the schedule and access to the box. Among the six participants the researcher saw some similarities, nonetheless all have their own view and reasoning for why they are active or inactive, which stress the importance of individuality and unique individuals.

Camilla needs the activity to be fun to consider doing it, and she prefers the type of training that takes her mind of the time. She preferably trains two to three times per week, and loves it when the hour is suddenly over, without realising the clock was moving.

Working out has always been something fun for me and that has always been the focus. So, for me, if the activity or workout isn't fun, then I don't see the point. It doesn't help to know how strong I can get or how good endurance I get from the workout if I don't think it's fun. The workouts or activities where you go like 'has an hour passed already?' those are the most fun for me, and CrossFit has been like that for me.

Knowing the benefits of the activity gives Camilla no incentive to do it, if it's not fun. Brynjar is motivated by the physical results he gets from training as physical aesthetics is of importance to him, where he previously exercised three times per week, before he stopped. A secondary motive Brynjar has for working out is to take care of his health.

In my previous strength training, I really liked it when I could see the aesthetic results from the training, where my arms, chest and legs got bigger. It's nice to see the results from the work you put in. I got hooked to a point where I was at the gym almost every day. Also, when you get comments like 'wow, you look fit, you are huge', it triggers to work out more and I liked that a lot. Those comments definitely got me to work out more. I work out to feel good and to look good. I don't want to get big and fat, I really don't. I think it's nice that other people think you look good, which must be the underlying reason for me to work out, I have to say. Well, there is two sides to it, on one hand it's to function well and stay healthy, and the other is to look good. I think it's important that other people think you look good, that you are strong and have muscles, and look healthy and fit.

Kristina loves the community and says she could spend all day at the box. She shared a personal story, where she spent so much time at the box that her boyfriend almost didn't see her during the week, which was burdensome on the relationship. This made her prioritize differently; she is now more efficient when she is at the box so she can spend time with her boyfriend also, and only exercises three to four times per week. Kristina's underlying reasons to work out is to feel well and be able to function in her everyday life.

For me it's never been about looking good in the mirror, flexing and showing off, although it is nice to see the results now and then, that I also have some muscles. But for me, working out is about improving my health and feel good. I want to master everyday challenges, like carrying two six-packs of soda at the store for instance. I want to have enough energy to get through a long and tiresome day.

Pål has two underlying reasons for working out, to be healthy and fit in present time (so his son won't outrun him soon), and to ensure he will have a strong and functional body to enjoy life when he is retired, to which he dedicates time to exercise three or four times per week. On top of his present- and future-time investment on his health through fitness, he also wants to get proficient with all CrossFit movements and challenges he faces.

In CrossFit you definitely train your whole body at the same time, and with me probably having to work until I'm 70 years old, I think that when I have to work for so long CrossFit is ideal to take care of my health and stay fit. That is definitely something that motivates me to work out regularly. Taking care of my health is motivating me, and I think few people want to stop working because of their bad health or their bad knees or something like that. It must also be sad to work all your life and when you finally have time [to yourself] your body is wrecked. In addition to my health, there is also the desire to get better at CrossFit. With all the movements and variations of movements in CrossFit I constantly have things I want to get better at.

The competitive athletes, Liv and Tom, have their own approach to motives for training. Tom is motivated by performance and results on the competition floor. The best experience for him thus far was when he set a personal record in a lift on the competition floor in Cyprus. Even talking about it gave him goose-bumps. He has set the goal to compete at the highest international level in CrossFit, the CrossFit Games. This has been his goal since he started, and he kept referring to it as a source of motivation. Furthermore, he shared how he enjoys being in the gym training and described it as his free space where he can forget everything else for some time and only focus on training. Working towards his goal, Tom trains every day with training sessions often lasting several hours.

Liv loves the process. She likes CrossFit for the challenges she gets through constantly varied functional movements, always having something to strive towards. Similar to Tom, Liv also trains every day, also sometimes for several hours. When reflecting on the fact that she performs at the highest level in competitions, she shared that she looks at the results as a bonus. At a previous year when she had many competitions and thus many opportunities to perform, it almost had a negative effect on her as she did not have enough time to work towards the competitions. She felt that she did not get enough time to enjoy the process, where she can work on her weaknesses to become a better version of herself.

For me, it's important that there is a process where I see progress in the things I do, and not for instance go for that 130kg back-squat to cross that off the list. The process as to how I get progress is more important for me. Even though CrossFit is demanding and challenging when you compete, I have fun in training and it's fun to see how good you can get. I try not to focus on a specific goal because I like the process more than the competition, I get more joy from the process than accomplishing that one goal.

The last subtheme of motivational elements is availability, consisting of the class schedule and the access the members have to the box. Brynjar told about how the schedule was set up as well as the access made it difficult for him to work out,

When I had the time to work out, the classes were fully booked, so it was difficult when I couldn't work out when I wanted and had the time. It would be a lot better if I had a key or a key card like some other gyms, so I could work out when I had the time outside of the scheduled classes.

In summarizing, the themes of social factors, competence factors and motivational elements with their respective subthemes and codes captured how exercisers, athletes and dropouts experience and view elements of SDM while doing CrossFit. The findings presented here gave insight to how CrossFit participants are influenced and motivated by certain elements which at different times and for different reasons can satisfy one's needs for autonomy, competence, relatedness.

The active exercisers, Kristina and Pål both appreciated the CrossFit community, putting it above anything else they appreciated about CrossFit and putting the community as the main factor describing CrossFit. Pål described how the underlying reason for him to exercise, is to be active with his kinds, and to have a healthy and strong body when he retires. He is motivated by the variety of movements, and challenges he faces in CrossFit, wanting to feel skilled in CrossFit. Kristina exercises for her health and wants to have a good time when exercising. She enjoys being a part of the community in [rural town] CrossFit, where she gets support from the other members and the coaches. She enjoys seeing her technical skills develop in CrossFit, but exercises mainly to feel good, take care of her health, and have a good time doing it.

The competitors, Liv and Tom, have similar perceptions of the community as the other participants. Liv described the community in CrossFit to almost be a social shock when she first started in comparison to the other gyms she has trained at, and Tom explained how he built strong relationships with other members in [big city] CrossFit wanting the same thing as him. Liv enjoys the process of training and bettering her personal abilities, where the ability to compete at a high level comes as a bonus. She loves being in the gym, surrounded by the inclusive and positive community, going all the way in training to be as good as possible in CrossFit. Tom enjoys the free space training gives him, where he does not have to think about anything else other than training. He has his eyes set on competing at the world stage of

CrossFit, the CrossFit games, and uses that goal frequently to motivate himself through long and hard workouts. Training with and being surrounded by likeminded individuals has been an important factor for both Liv and Tom. Liv got the confidence to go all in as a competitor from the other competitors training with her, and Tom get the support to stay adherent to the training necessary to develop to an international level competitor.

The dropouts, Camilla and Brynjar, had initially a different perception of the community. Camilla found it positive and helpful, while Brynjar found it to be awkward in the beginning. Through cooperation and connecting with other members, Brynjar changed his perception over time to where he appreciated the supportive and social aspects of the community, and for Camilla it made the workouts more fun and engaging. Brynjar appreciated the professionalism and skilfulness of the coaches, and Camilla appreciated how kind and caring the coaches were, taking good care of her throughout the classes. Even though Camilla described her experience with CrossFit training as a positive one, she had difficulties prioritizing exercise and found it hard to get herself to go to [rural town] CrossFit, coupled with difficult accessibility and scheduling issues, she dropped out after three months of CrossFit training. The main reason for Brynjar to drop out from CrossFit training, was the limited access to the box outside of the classes, and difficulties matching up the class schedule and his work schedule. He would also rather prioritize work over exercise if he had the time.

## Discussion

The aim of the present study was to explore underlying mechanisms of self-determined motivation in CrossFit, and particularly to answer the question: “How motivational factors, such as one’s needs for autonomy, competence, and relatedness are met for CrossFit participants regularly adhering to the training method and those competing in CrossFit competition events or were not met for CrossFit participants who dropped out?” Through interview dialogues with two active exercisers, two competitive athletes and two dropouts, the researcher learned that the motivational factors of autonomy, competence, and relatedness are met in varying degrees in CrossFit participants thus rendering the different behaviours of adhering to training and/or competing and dropping out of it. The researcher pinpointed an interaction between the themes of social factors, competence factors and motivational elements which helped him frame the mechanism for how CrossFit participants’ psychological needs are met. It appears that CrossFit participants’ motivational elements shape a foundation upon which participants come to realize social and competence factors of CrossFit and acquire more or less meaning in these, which in turn shapes a perceived degree of satisfaction with regard to meeting their needs for autonomy, relatedness and competence. Finding meaning signifies how the person perceives and appraises these factors; how one’s mind and body come to co-exist in CrossFit training for shaping an experience that is or is not perceived as self-directed, as being in the right place and as proficient.

From a general standpoint, CrossFit meets the different participants needs for autonomy, relatedness and competence in varying degrees through a welcoming, inclusive, and development-oriented community. By cooperating and building relationships with other members, the experience of CrossFit training becomes more fun, while members provide support to each other. These elements provide members with opportunities to experience relatedness, competence and autonomy, and as such making one’s motivation more self-determined. The variability in need satisfaction (met more or less or not met) appears to be a product of interactions between motives, social factors and competence factors. In particular, the participants’ motives for CrossFit attain meaning (of different degrees) in and through social and competence factors and as such shape different degrees of satisfaction for one’s autonomy, relatedness and competence. When motivational elements yield strong meaning in the social and competence factors of CrossFit, the needs of autonomy, competence and

relatedness are well met, whereas when one's motivational elements don't yield meaning in the social and competence factors of CrossFit, one's needs are not well met.

In the section below, the researcher initially interprets and discusses the thematic findings of the study considering how these position within the existing literature. Following, he discusses how motives and factors related or did not relate in the cases of active participants, athletes and CrossFit dropouts. Lastly, the limitations of the study are considered in light of future research that could overcome these and practical implications are offered for CrossFit trainers and box owners as well as CrossFit participants and athletes.

## Social factors

The social factors revolved around participants feeling welcome and comfortable in CrossFit boxes and connecting with other members. This was built on the elements of community, cooperation and connection between members, coaches' presence and behaviour, and likeminded individuals. All participants except one had a similar first (and subsequent) encounters with CrossFit, with a community that was open, welcoming, inclusive and supportive, and with coaches being kind, caring and skilful. Looking at these findings through the lens of the literature, Eather et al., (2016) described that social support and the individual's relationships to their peers and/or coach, may influence their physical activity behaviours. In the CrossFit context, the open, welcoming, inclusive, and supportive community, coupled with cooperation and connections between members, appears to support the person towards meeting his/her basic needs for competence and relatedness.

When social factors are perceived as supportive of one's feelings of autonomy, competence and relatedness, they will have a positive impact on one's motivation in accordance with the SDT (Deci & Ryan, 2000) which states that the individual's perceptions of autonomy, competence, and relatedness represent psychological mediators of the impact of social events on one's motivation. Further on, Vallerand and Losier (1999) explained that since the social conditions may vary greatly and individual perceptions of the conditions differ, people's reasons for doing an activity will vary accordingly. There is an excellent example of this in the present study, where Brynjar perceived the CrossFit box environment very different from Kristina, both attending classes at [rural town] CrossFit; he found it overly supportive, awkward, and overwhelming when Kristina found it welcoming, inclusive, and supportive.

Within the community of CrossFit, the cooperation and connections between members seems to potentially have a profound effect on an individual's motivation. Seeing how cooperation and connection with other members made the workouts more fun and enjoyable for both Brynjar and Kristina, the self-determined motivation can be strengthened, making it more introjected as we can see from the self-determination continuum (Ryan & Deci, 2000) (Figure 1), where enjoyment is one of the descriptive aspects of intrinsic motivation. More importantly, cooperation and connections with other members seems to contribute to supporting the individuals need for competence and relatedness. Especially cooperation with other members through workouts could push the individuals to interact more with the social environment. It will also almost force the individuals to be responsive and sensitive to each other, especially between the two cooperating, in order to complete the workout in an effective manner. Connections between members are linked with likeminded individuals, where individuals wanting to have a good time working out or wanting to push it all the way in the workout will connect through shared experiences and goals in the workout. If an individual is not surrounded by likeminded individuals, and thus not making as strong connections would weaken the self-determined motivation as the needs for relatedness would be lacking.

Looking at how the coach's presence and behaviour relates to an individual's motivation, Vallerand and Losier's (1999) proposed motivation sequence, listed coaches' behaviour towards athletes as a factor that impact the motivational climate, which then influences one's motivation. A motivational climate is described by Vallerand and Losier (1999) as a mastery-oriented climate where everyone tries to do the best that they can, and not trying to be better than one another. The community in [rural town] CrossFit seem to be built to where the members are cheering and supporting each other to do the best they can and is further strengthened by the coaches' behaviour towards the individuals, described as kind and caring. More importantly, the coaches' behaviour seems to constitute the basis from where the community is built.

## Competence factors

Variation entailed variation in movements and of different movement combinations during a workout, providing new challenges and keeping members active through classes. Facilitating individual development is about members getting appropriate scaling for each movement so it is challenging for their level, regardless of their experience with CrossFit.

Facilitating individual development is done by scaling the movements to match individual capabilities, adapting the technique to make the movements safe and effective, variation in training and being active through a whole class built a sense of competence and autonomy in the participants. Of course, this sense of technical competence and autonomy did not build overnight. The interviewees talked about how they developed their techniques and skills step-by-step to eventually feel confident and skilled. What the interviewees shared about their development in CrossFit is similar to Simpson et al., (2017) writing about individuals adopting CrossFit as a training modality go through a difficult adjustment period, during which they need to overcome self-doubt, perceived barriers, and past perceptions they hold about their fitness. For Camilla there were movements she didn't enjoy in the beginning, but as she were shown and taught the techniques by the coaches, and adjusted to the training, she overcame her self-doubt on whether she could do a movement or not, perceived barriers to complete workouts, and perceptions she had about her fitness. This resulted in her enjoying all of the movements more and more. Kristina saw her capabilities advance as she adapted to CrossFit training, she was able to run further than she thought, and she could lift more load. Simpson et al., (2017) explained that those who go through this period successfully without dropping out often gained self-efficacy, a sense of control over their exercise habits, as well as new positive attitudes about their physical and mental capabilities, which is indicative of autonomy. However, although Camilla seemingly had a positive development, she ended up dropping out from CrossFit training. It might be the case that Camilla did have a positive development, but not to the point that it strengthened her self-determined motivation enough to adhere to CrossFit training.

Considering Vazou-Ekkekakis and Ekkekakis' (2009) work who reported of autonomy as enhancing participants intrinsic motivation in autonomous conditions, the scaling of CrossFit movements facilitates individual development, is leading bit by bit to participants experiencing a stronger sense of autonomy if the coach does not control the scaling but guides them to make their own informed decisions to scale appropriately. In the interviews, participants shared a strong sense of satisfaction and joy when they went from scaled training to RX. This also agrees with what Vazou-Ekkekakis and Ekkekakis (2009) described about members feeling more interested, better enjoyment and perceived choice when they are guided and helped rather than the coach or programming controlling their scaling. As such, it would help one's sense of autonomy when the coach provides guidance to each member

individually for scaling the weight to an appropriate load until the individual develops to the point of deciding his/her own scaling and eventually to RX.

The three movements Pål described, double-unders, handstand walk, and toes to bar, are advanced versions of those movements, with each of them having at least two to three less advanced alternatives that can be used in the process of working up towards the advanced alternatives. Glassman (2002) pointed that you don't necessarily have to do the most advanced variations because one can get the intended training adaptation doing less advanced variations. With that said, Ryan and Deci (2000) described how we as people have an innate drive to evolve and learn new things, and the CrossFit interviewees shared their inner drives for evolving and learning new techniques and more advanced variations of the movements, which are discussed below.

## Motivational elements

Motivational elements were viewed by the researcher as a key differentiating finding among participants in the three cases that supports individuality. Motivational elements appeared to make the basis for how each individual acquires meaning in and through the social and competence factors. Looking at the self-determined motivation continuum by Ryan and Deci (2000, p. 72) (see Figure 1), motivational elements reflect the regulatory processes described under each of the six stages of motivation. Depending on if and how CrossFit aligns with the motivational factors of the individual or does not, the motivation will be influenced in one or another direction, in line with the findings of Rogério and José (2011), and Losier and Valleran (1994).

The individuals' motives for working out, revealed a combination of factors fitting in two categories; they appear to be driven by aesthetic results, health results, or wanting to feel good, and enjoyment or discipline. To exemplify, an individual can be driven by results relating to their health and enjoying the training or can be driven by aesthetic results and disciplining themselves to train. The dropouts and active exercisers shared a combination of these two and talked about esthetical goals and/or health goals in combination with enjoying working out or disciplining themselves to work out. The factor of feeling good seems to be an underlying drive regardless, as the participants feel good by seeing their health results or aesthetic results. In addition to these combinations, the individuals' achievement orientation (being performance- or process-oriented) is also a factor of the motivational elements. The

achievement orientation is more prominent with the competitive athletes. The competitive athletes were not different on these factors yet endorsed one more relating to their achievement orientation (being performance- or process-oriented). Tom is performance oriented; driven by the ability to perform at the next competition and ultimately at the CrossFit Games. Liv is process oriented; driven by the enjoyment she gets from training. With that said, the active exercisers and dropouts also have tendencies of being either performance- or process-oriented. Even though it is not as prominent with the active exercisers and the dropouts, as they are not chasing achievements in the same way as the competitors, it is important to include as it could affect the process of individual development.

With the motivational elements as the basis for how the individuals acquire meaning from the factors in CrossFit affecting autonomy, relatedness and competence, it looks to be particularly important regarding the social factors, and particularly connecting with other members and likeminded individuals. If an individual wanting to have a good time exercising to better his/her health is surrounded by others pushing exercise all the way to better their aesthetics, the connection between that individual and the other members would probably be weaker than if he/she was surrounded by likeminded individuals. CrossFit has an encompassing nature as a training methodology, as presented by Box et al., (2019) suggesting that CrossFit can satisfy the psychological needs for broad selection of participants. In the context of this study, this could suggest that despite individuals having differences in their motivational elements, they can still perceive strong autonomy and competence for one, but they might also experience relatedness by connecting to other members through shared experiences.

The motivational elements make the basis for the nuances in how the individual perceives and acquires meaning from the CrossFit experience. It is also of importance with regard to the coaches' presence and behaviour towards the individual. The coach needs to be adaptive and sensitive to each individual to respond in an appropriate fashion. How motivational elements can have an effect is portrayed in the proposed sequence of organismic theory of motivation (Vallerand & Losier, 1999) (Figure 2). With motivational elements setting a basis where factors in CrossFit can influence one's perceptions of autonomy, competence and relatedness, the model suggests that motivational elements shape some consequences for the individual.

The recurring themes contributing to exercise dropout found by Larson et al., (2018), that of (1) feeling good but disappointed, (2) scheduling issues, (3) trouble prioritizing exercise, and (4) exercising with/for someone else, help us explain how motivational elements could lead a person to drop out. Accordingly, the themes of scheduling issues and trouble in prioritizing

exercise appear to support well what led Brynjar and Camilla to drop out. Brynjar had trouble scheduling exercise around his work schedule and would rather prioritize work over exercise, and Camilla had trouble prioritizing exercise. These themes are indicative of low self-determined motivation, but as we see from Pelletier et al.'s (2001), the various types of extrinsic motivation were neither predictive of intentions to dropout, nor related to the actual behaviour.

While analysing the data, the researcher also considered whether motivational elements as presented here were possibly not the only factor shaping how the person acquires meaning in CrossFit. How an individual acquires meaning from a given stimuli, i.e. the CrossFit community, may be also explained by personal attributes. However, the data collected here, and the CrossFit literature have not considered yet one's personal attributes. Hence, the researcher could only speculate how personal traits may be of influence along with one's motives and meaning in social and competence factors for CrossFit, since more research is warranted.

The last motivational element identified was availability. Both dropouts talked about how the availability was a reason for why they quit, or shall we say the lack of availability. The availability at CrossFit [rural town] is such that there are one or two classes in the morning depending on the day of the week and classes again in the evening, with the box being closed between classes. Brynjar said directly that he quit CrossFit because attending the classes didn't work with his work schedule. If he had the opportunity to go to the box when he had the time, he would most likely have continued. Camilla also talked about the same thing, but her lacking motivation was the main reason for quitting.

Within the framework of the basic psychological needs, Ryan and Deci (2000) focused on supplying a more differentiated approach to motivation, by asking what kind of motivation is exhibited at any given time. That indicates that one can fluctuate between degrees of self-determined motivated when the right conditions are applied. Brynjar and Tom gives great descriptions on how they really look forward to the workouts, regret terribly during, and loving it again after. (This is in line with the findings of Larson et al., (2018) of affective valence). Also, Camilla describes a fluctuation of being more self-determined motivated when she signs up for the class, changes her mind several times before the class (getting less self-determined and amotivated, and then more self-determined again). When she finally showed up, she found herself to be intrinsically motivated when the class started. She didn't say she was intrinsically motivated during the class, but when analysing her descriptions using SDM,

this fluctuation is clearly visible, particularly the intrinsic motivation during the class. She had fun and enjoyed her time there and didn't even notice how exhausted she was until the class was over.

The descriptions of the community in [rural town] CrossFit where Camilla worked out, seems to be a positive driver of relatedness, competence and autonomy. According to self-determination theory and Vallerand and Losier's (1999) sequence of motivation, Camilla should experience her motivation to become more self-determined. With the descriptions she provided of her experiences in CrossFit it shows tendencies of her needs for competence, relatedness and autonomy being met. Considering the descriptions, she gave of thinking the training to be fun and engaging, she still couldn't get herself to go. This would indicate that despite the factors at [rural town] CrossFit seemingly supporting the psychological needs, it didn't affect her strongly enough to the point that her motivation becoming more self-determined as she balanced between external regulation and amotivation.

## The case of active exercisers

The active exercisers, Kristina and Pål appeared to have their needs for autonomy, relatedness, and competence met through the community and variation in CrossFit. Both described their initial experience with the CrossFit training and community as positive. Since then, their experiences helped build even stronger senses of relatedness, competence and autonomy.

Kristina's motivation is intrinsic and is maintained through her experiences training together with others at [rural town] CrossFit and developing her capabilities with the help from skilful coaches. Her needs for relatedness and competence is met through cooperation and connections with other members, likeminded individuals at [rural town] CrossFit, and kind, caring and skilful coaches. In line with what Rogério and Josè (2011) presented, as Kristina perceived the social factors as supportive of her psychological needs, it impacted her motivation to be high and intrinsic.

Starting with Pål's description of the community in CrossFit and how it made exercising more fun for him, even though he is not able to attend classes too often due to work, his motivation seems to be maintained high and intrinsic. Just as Kristina, Pål seems to perceive the social factors in CrossFit to be supportive of his psychological needs, with a similar result. It looks like CrossFit training provides him with a strong sense of autonomy through the variation of

challenges he meets in CrossFit, where the words of Deci and Ryan (2000) are very descriptive, as Pål has an innate drive to evolve and learn the new things he is challenged with in CrossFit.

## The case of competitive athletes

As competitive athletes, Liv and Tom could be assumed to have quite similar motivation, but their self-determined motivation developed differently and are at different levels. Liv is intrinsically motivated, and Tom is extrinsically motivated through integrated regulation.

Training with and being surrounded by likeminded individuals has been an important factor for both Liv and Tom. Although their needs for relatedness and competence probably was met to a degree in the CrossFit boxes they trained in previously, it seems that the satisfaction of those needs have gotten stronger at [big city] CrossFit, especially through the social factors of connecting with other members and likeminded individuals. Liv got the confidence to go all in as a competitor after connecting with and getting support from the other competitors at [big city] CrossFit, and Tom get the support to stay adherent to the training necessary to develop to an international level competitor. Considering the time Liv and Tom invest in training, often several hours every day, the research evidence showing that the satisfaction of one or more of the psychological needs can be an important predictor of one's behavioural investment (Gillison et al., 2006; Hein & Hagger, 2007; Losier & Vallerand, 1994; Ntoumanis & Mallett, 2014; Standage & Gillison, 2007; Inoue et al., 2015), would suggest that Liv and Tom's psychological needs should be strongly satisfied. The work of Gillison et al., (2006), Hein and Hagger (2007), Standage and Gillison (2007), are also fitting in this regard as they shed light on the association between high self-determined motivation and sport-related activities.

Both Liv and Tom seem to have a strong sense of autonomy, where Liv has the innate drive to evolve and learn new things to become better, staying engaged and keep developing through the challenges and the variation CrossFit training provides. Tom on the other hand also wants to learn new things to become better, but it seems to come from his desire to be able to compete at the highest level in CrossFit, and thus has to learn new things to be and stay at a competitive level. Looking at the self-determination continuum (Figure 1) Ryan and Deci (2000) explains how individuals which is intrinsically motivated, have the tendency to seek out novelty and challenge, explore and learn; which is a very fitting description of Liv's behaviour in CrossFit. The explanation Ryan and Deci (2000) provides of intrinsic motivation

could also be fitting for Tom, as he also seeks out novelty and challenges, etc. However, knowing his underlying reasons for training, his motivation is best described by Ryan and Deci's (2000) description of integrated regulation; the behaviour is fully assimilated to the self, meaning the behaviour has been evaluated and brought into congruence with one's other values and needs, where the individual aims to attain separable outcomes from the behaviour rather than only attaining for inherent enjoyment.

## The case of dropouts

Camilla and Brynjar's motivation seem initially to be the least self-determined. Despite the seemingly positive effect the social and competence factors development had on their sense of relatedness, competence, and autonomy, it did not make their self-determination motivation stronger. With their sense of autonomy being weakened by scheduling issues, they ended up dropping out.

In Camilla's case, the state of her motivation appeared to be unstable and changing a lot, swaying from a-motivation to intrinsic (where she really enjoyed the classes when she attended them). Although her descriptions are pointing towards intrinsic motivation during the classes, the satisfaction of the basic psychological needs are not met to the degree of making her self-determined motivation stronger. From Camilla's descriptions on how her skills and movement improved, it would seem that she had a positive development through the adjustment period as presented by Simpson et al., (2017), but this may actually be a description on what she was able to learn, movement and exercise-wise, and not descriptive of her psychological adjustment. This would prove as a barrier for her to experience a strong sense of competence and autonomy as she may not have overcome self-doubt and not feeling in control over her exercise habits.

Brynjar is extrinsically motivated towards exercise based on his underlying reason to exercise which is mainly aesthetically focused. The community in [rural town] CrossFit seems to have met his needs for relatedness and competence to a degree, with his autonomy also developing through individual development. The relatedness and competence he experienced in CrossFit seems to not have strengthened his self-determined motivation towards exercise. Coupled with the scheduling issues he had affecting his autonomy and thus his motivation towards exercise, he ended up dropping out after six months. An important keyword is that his needs for relatedness and competence were met to a degree. Considering the work of Calvo et al.,

(2010) and Rogèrio and Josè (2011) illustrating the association between the level at which the psychological needs are met or not, can influence an individual's self-determined motivation. In Brynjar's case, his needs for relatedness and competence were met to a degree, and his autonomy was weakened by the scheduling issues. Brynjar also shared that he would rather work than exercise if he had the time, which could be understood in light of Gillison et al., (2006), Hein and Hagger (2007), Losier and Vallerand (1994), Ntoumanis and Mallett (2014), Standage and Gillison (2007), and Inoue et al., (2015) showing that one's behavioural investment can be predicted by how ones psychological needs are met or not.

## Limitations and future research

As with every research, certain limitations also need to be considered for the present study. The researcher's limited experience in conducting research may have been a limitation throughout the study. Looking at the interviews, the interview guides could have been even more rooted in the existing literature, exploring key factors in the literature more in depth and not only the overarching themes and factors in self-determined motivation. The interview process itself may have also been a limiting factor. For instance, in preparation beforehand the researcher could have done a more thorough job preparing more potential probe questions to uncover more data which would then keep him more focused on the topic during the interview.

The researcher's experience was also limited when it came to methods and interpreting the data. Throughout the analysis and writeup of the study, the researcher had some difficulty differentiating between what you can and cannot do with qualitative data, with generalizing and comparing data between participants being the two main points. Regarding interpretation of the data, the limitation was twofold. Firstly, the lack of experience may have influenced the depth of the data he was able to uncover, yet discussions with the supervisor for the study helped him see meanings in the data that he originally missed. Secondly, the lack of experience may have also influenced the precision of the codes identified, which they were not always exhaustive or mutually exclusive. Once again, discussions with the supervisor helped him make the codes as precise, mutually exclusive and exhaustive as possible.

With regard to researcher's personal involvement with the study, I am a fan of both CrossFit as a training methodology and as a sport, in addition to working as a CrossFit coach. Hence, I noticed early on in the process of the study that I really wanted CrossFit to do a good job, so to speak, meeting the individuals needs for autonomy, competence and relatedness. Noticing this early on was a good thing, as I was then able to see the bias I brought into the study and reflected regularly on these in order to see the data from the participants as separate from own experiences and views as possible.

Another potential yet critical limitation may have been framing the study in self-determined motivation. With the research question specifying motivational factors within self-determined motivation to be the theoretical framework, it is not a limitation per se. The limitation might appear when it comes to why the dropouts chose to drop out, where fully inductive approach could possibly provide more precise knowledge on motivation in dropouts.

Future research should look further into why individuals drop out from CrossFit training. Although difficult, due to General Data Protection Regulation (GDPR, EU privacy policy), it would be useful to design and conduct a large comparative study investigating motivational factors in CrossFit dropouts and individuals adhering to CrossFit training. This could provide valuable knowledge on adherence and dropout, not only adding to the theoretical body of knowledge but also helping CrossFit coaches who wish to learn more about what they can do to motivate their clients to adhere to CrossFit training. Future research should also investigate if and if so how, personal attributes could have a role in one's motivation in CrossFit; it would be beneficial to include individual attributes into the comparative study of motivational factors in dropouts and active CrossFit participants.

## Practical applications

The present study provides insight into self-determined motivation in CrossFit. Although the findings from the interviews cannot be generalized to other populations in CrossFit, through the reviewed literature and the discussion there are some applicable concepts that could prove useful to make CrossFit participants motivation more self-determined and adhere to the training. The practical applications discussed here present potential ways on how the individual needs for autonomy, relatedness and competence can be met.

The area with probably the most direct practical implications is facilitating individual development through scaling of movements. The technical execution of the movements is important to tailor to the individual's capabilities to make the movement safe and effective. The coaches' therefore need a thorough understanding of the techniques used in CrossFit and how they can be tailored to the individual. By looking at the Crossfit level 1 and level 2 training guides (CrossFit, 2019a; CrossFit, 2019b), both effective and safe execution of technical movements and proper scaling options for the many movements in CrossFit are emphasized. As discussed above, the literature and the findings of the study suggest that a way of strengthening an individual's perception of autonomy would be for the coach to help and guide the person with scaling the movement properly instead of controlling and prescribing the scaling for the person.

Looking also at the works of Ekkekakis (2003) and Larson et al., (2018) interesting and useful information can be offered regarding motivational elements. If a member responds badly to going all out in a workout (going as hard to a point where you cannot do any more) Ekkekakis (2003) presented five trends in affective responses to exercise. If the coach has built a sufficient relationship with the member (critical based on the social factors identified) to be able to tell how he/she is responding during and after a workout, the coach might have the opportunity to help the member through a phase of low self-determined motivation by providing the necessary support and help to go them through the workout. The findings from Larson et al., (2018) and Ekkekakis (2003) would then suggest that that an individual will end up having a positive experience, regardless of their varying experience through the workout. The five affective responses can also help the coaches with regard to how the members potentially are impacted throughout a workout. Depending on the intensity the programmed workout is intended to have, the coach can be prepared on how to most effectively handle the members' different responses to the intensity of the workout.

Regarding motivational elements, it could prove useful for a coach to have a conversation with each of the members both when they first start as well as follow up conversations, to get to know and understand the individual's underlying reasons to exercise, what results they are driven by, and if there are any other factors influencing their ability (and availability) to exercise and attend classes. These suggested topics for discussion are based on the sub-themes and codes of motivational elements, found in the study, but can certainly be extended to cover other areas. Such conversations could serve as added opportunity to build the connection between the coach and the individual, and for the coach to learn how to effectively handle to and behave towards the individual for strengthening the his/her sense of relatedness, competence and autonomy.

## Conclusion

Based on data collected through interviews and analyses conducted in light of self-determined motivation, the researcher managed to bring to light a particular mechanism in explaining how CrossFit comes to satisfy one's basic psychological needs for autonomy, competence and relatedness. Accordingly, motivational elements interact with social and competence factors related to CrossFit bring out different meanings for the individual, which means one's need satisfaction will vary. From a theoretical standpoint, the data allowed the researcher to identify a mechanism explaining self-determined motivation in CrossFit. Nonetheless, the small number of participants demands that these findings are treated with caution. From a practical standpoint, the researcher identified and presented some applicable cases in line with self-determined motivation. From the present study, CrossFit practitioners can get a better understanding of motivation in CrossFit, and how they possibly can satisfy individual psychological needs of autonomy, competence and relatedness, yielding in as intrinsically motivated members as possible, and preventing dropout.

## Bibliography

- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Box, A., G., Feito, Y., Brown, C., & Petruzzello, S., J. (2019) Individual differences influence exercise behaviour: How personality, motivation, and behavioural regulation vary among exercise mode preferences. *Heliyon*, 5(4). <https://doi.org/10.1016/j.heliyon.2019.e01459>
- Brinkmann, S., & Kvale, S. (2015). *InterViews: Learning the craft of qualitative research interviewing* (3<sup>rd</sup> ed.). Thousand Oaks, CA: Sage.
- Braun, V., & Clarke, V. (2006). “Using Thematic Analysis in Psychology.” *Qualitative Research in Psychology*, 3(2), 77–101. doi:10.1191/1478088706qp063oa.
- Braun, V., & Clarke, V. (2019) To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales, *Qualitative Research in Sport, Exercise and Health*. doi:10.1080/2159676X.2019.1704846
- Braun, V., Clarke, V., & Weate, P. (2016) Using thematic analysis in sport and exercise research. In B. Smith, & A.C. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp. 191-205). London: Routledge.
- Calvo, T. G., Cervelló, E., Jiménez, R., Iglesias, D., & Murcia, J. A. M. (2010). Using self-determination theory to explain sport persistence and dropout in adolescent athletes. *The Spanish Journal of Psychology*, 13(2), 677-684. <https://doi.org/10.1017/S1138741600002341>
- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26, 120–123.
- Creswell, J. W. (2014). *Research design*. (4<sup>th</sup> ed.) Thousand Oaks, CA: Sage.
- CrossFit. (2019c, December 11). *History of the games*. Retrieved from <https://games.crossfit.com/history-of-the-games>
- CrossFit. (2019a, December 11). *CrossFit level 1 training guide*. Retrieved from: [http://library.crossfit.com/free/pdf/CFJ\\_English\\_Level1\\_TrainingGuide.pdf](http://library.crossfit.com/free/pdf/CFJ_English_Level1_TrainingGuide.pdf)
- CrossFit. (2019b, December 11). *Crossfit Level 2 training guide and workbook*. Retrieved from: [http://library.crossfit.com/free/pdf/CFJ\\_English\\_L2\\_TrainingGuide.pdf](http://library.crossfit.com/free/pdf/CFJ_English_L2_TrainingGuide.pdf)

- Culver, D. M., Gilbert, W., & Sparkes, A. (2012). Qualitative research in sport psychology journals: The next decade 2000-2009 and beyond. *The Sport Psychologist*, 26(2), 261-281.
- Davies, M. J., Coleman, L., & Stellino, M. B. (2016). The relationship between basic psychological need satisfaction, behavioural regulation, and participation in CrossFit. *Journal of Sport Behaviour*, 39(3), 239.
- Eather, N., Morgan, P. J., & Lubans, D. R. (2016). Effects of exercise on mental health outcomes in adolescents: Findings from the CrossFit™ teens randomized controlled trial. *Psychology of Sport & Exercise*, 26, 14-23. <https://doi.org/10.1016/j.psychsport.2016.05.008>
- Ekkekakis, P. (2003). Pleasure and displeasure from the body: Perspectives from exercise. *Cognition and Emotion*, 17(2), 213-239. <https://doi.org/10.1080/02699930302292>
- Ekkekakis, P., Hall, E., & Petruzzello, S. (2008). The relationship between exercise intensity and affective responses demystified: To crack the 40-year-old nut, replace the 40-year-old nutcracker! *Annals of Behavioural Medicine*, 35(2), 136-149. <https://doi.org/10.1007/s12160-008-9025-z>
- Fisher, J., Sales, A., Carlson, L., & Steele, J. (2016) A comparison of the motivational factors between CrossFit participants and other exercise modalities: A pilot study. *The Journal of Sport Medicine and Physical Fitness*.
- Glassman, G. (2002). What is fitness. *Crossfit Journal*, 1(3), 1-11. Retrieved from [http://library.crossfit.com/free/pdf/CFJ\\_Trial\\_04\\_2012.pdf](http://library.crossfit.com/free/pdf/CFJ_Trial_04_2012.pdf)
- Glassman, G. (2004). The new girls. *The CrossFit Journal*, 27, 1-2. Retrieved from [http://library.crossfit.com/free/pdf/27\\_04\\_new\\_girls.pdf](http://library.crossfit.com/free/pdf/27_04_new_girls.pdf)
- Gillison, F. B., Standage, M., & Skevington, S. M. (2006) Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behaviour: A self-determination theory approach. *Health Education Research*, 21(6), 836-847. <https://doi.org/10.1093/her/cy1139>
- Harreveld, B., Danaher, M., Lawson, C., Knight, B. A., & Busch, G. (2016). *Constructing methodology for qualitative research: Researching education and social practices*. London: Palgrave Macmillan.
- Hodge, K., & Sharp, L. (2016) Case studies. In Smith, B. & Sparkes, A. C. (Red.), *Routledge handbook of qualitative research in sport and exercise* (pp. 62-74). London: Routledge.

- Hein, V., & Hagger, M. S. (2007). Global self-esteem, goal achievement orientations, and self-determined behavioural regulations in a physical education setting. *Journal of Sports Sciences*, 25(2), 149-159. <https://doi.org/10.1080/02640410600598315>
- Inoue, Y., Wegner, C. E., Jordan, J. S., & Funk, D. C. (2015). Relationships between self-determined motivation and developmental outcomes in sport-based positive youth development. *Journal of Applied Sport Psychology*, 19(1), 371-383. <https://doi.org/10.1080/10413200.2015.1010662>
- Köteles, F., Kollsete, M. & Kollsete, H. (2016). Psychological concomitants of crossfit training: does more exercise really make your everyday psychological functioning better? *Kinesiology*, 48(1), 39-48. <https://doi.org/10.26582/k.48.1.13>
- Larson, H. K., McFadden, K., McHugh, T.-L. F., Berry, T. R. & Rodgers, W. M. (2018). When you don't get what you want—and it's really hard: Exploring motivational contributions to exercise dropout. *Psychology of Sport & Exercise*, 37(2018), 59-66. <https://doi.org/10.1016/j.psychsport.2018.04.006>
- Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.) *The SAGE handbook of qualitative research* (pp. 97-128). London: SAGE Publications.
- Losier, G. F., & Vallerand, R. J. (1994). The temporal relationship between perceived competence and self-determined motivation. *The Journal of Social Psychology*, 134(6), 793-801. <https://doi.org/10.1080/00224545.1994.9923014>
- McDonough, M. H., & Crocker, P. R. E. (2007). Testing self-determined motivation as a mediator of the relationship between psychological needs and affective and behavioural outcomes. *Journal of Sport & Exercise Psychology*, 29(5), 645-663. <https://doi.org/10.1123/jsep.29.5.645>
- Ntoumanis, N. & Mallett, C. J. (2014). Motivation in sport: A self-determination theory perspective. In A. Papaioannou & D. Hackfort (Eds.), *Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts*. London: Routledge.
- Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4<sup>th</sup> ed.). Los Angeles, CA: Sage.

Pelletier, L., Fortier, M., Vallerand, R., & Brière, N. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, 25(4), 279-306. <https://doi.org/10.1023/A:1014805132406>

Rogério, M. L., & José, F. G. L. (2011). Sport commitment and adherence: A social-cognitive analysis [Compromiso deportivo y adherencia: Un análisis cognitivo social]. *Revista Internacional de Ciencias del Deporte*, 7(25), 277-286. <https://doi.org/10.5232/ricyde2011.02503>

Ronkainen, N. J., & Wiltshire, G. (2019). Rethinking validity in qualitative sport and exercise psychology research: a realist perspective. *International Journal of Sport and Exercise Psychology*, 1-16. doi:10.1080/1612197X.2019.1637363

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. London: The Guilford Press. Accessed at: <https://ebookcentral.proquest.com/lib/hilhmr-ebooks/reader.action?docID=4773318>

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78. <https://doi.org/10.1037/0003-066X.55.1.68>

Sarrazin, P., Vallerand, R., Guillet, E., Pelletier, L., & Cury, F. (2002). Motivation and dropout in female handballers: A 21-month prospective study. *European Journal of Social Psychology*, 32(3), 395-418. <https://doi.org/10.1002/ejsp.98>

Schinke, R. J., Smith, B., & McGannon, K. R. (2013). Pathways for community research in sport and physical activity: Criteria for consideration. *Qualitative Research in Sport, Exercise and Health: Community Research*, 5(3), 460-468. <https://doi.org/10.1080/2159676X.2013.846274>

Scotland, J. (2012) Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. *English Language Teaching*, 5(9), 9-16.

Sibley, B. A. (2012). Using Sport Education to Implement a CrossFit Unit. *Journal of Physical Education, Recreation & Dance*, 83(8), 42-48. <https://doi.org/10.1080/07303084.2012.10598829>

Simpson, D., Prewitt-White, T. R., Feito, Y., Guisti, J., & Shuda, R. (2017). Challenge, commitment, community, and empowerment: Factors that promote the adaptation of CrossFit as a training program. *Sport Journal*, 1-14.

Smith, B., & Sparkes A., C. (2016) Interviews: Qualitative interviewing in the sport and exercise sciences. In Smith, B. & Sparkes, A. C. (Red.), *Routledge handbook of qualitative research in sport and exercise* (pp. 103-123). London: Routledge.

Sport. (2020) In *Cambridge dictionary*. Retrieved at <https://dictionary.cambridge.org/dictionary/english/sport>

Standage, M., & Gillison, F. (2007). Students' motivational responses toward school physical education and their relationship to general self-esteem and health-related quality of life.

*Psychology of Sport & Exercise*, 8(5), 704-721.

<https://doi.org/10.1016/j.psychsport.2006.12.004>

Squires, A. (2009). Methodological challenges in cross-language qualitative research: A research review. *International Journal of Nursing Studies*, 46(2), 277-287.

<https://doi.org/10.1016/j.ijnurstu.2008.08.006>

Temple, B., & Young, A. (2004). Qualitative research and translation dilemmas. *Qualitative Research*, 4(2), 161-178. <https://doi.org/10.1177/1468794104044430>

Thøgersen-Ntoumani, C. & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations.

*Journal of Sports Sciences*, 24(4), 393-404. <https://doi.org/10.1080/02640410500131670>

Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837-851. <https://doi.org/10.1177/1077800410383121>

Ulum, Ö. G. (2016) Epistemology in qualitative educational research: A review of published articles. *Journal of Education and Humanities: Theory and Practice*, 7(13), 19-28.

Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology*, 11(1), 142-169.

<https://doi.org/10.1080/10413209908402956>

Vazou-Ekkekakis, S., & Ekkekakis, P. (2009). Affective consequences of imposing the intensity of physical activity: Does the loss of perceived autonomy matter? *Hellenic Journal of Psychology*, 6, 125-144.

Weed, M. (2009). Research quality considerations for grounded theory research in sport and exercise psychology. *Psychology of Sport & Exercise, 10*(5), 502-510.  
<https://doi.org/10.1016/j.psychsport.2009.02.007>

## Appendix A

### Interview guide for dropouts

Jeg starter intervjuet med å introdusere meg selv og takker deltakeren for å møte meg. Deretter går jeg gjennom hensikten med studien; at jeg ønsker å utforske ulike motivasjonsfaktorer hos personer som har trent, trener aktivt og konkurrerer i CrossFit. Jeg spør deltakeren om samtykke for å være med i studien, og for å være sikker på at deltakeren har full forståelse for hva deltakelsen innebærer, går jeg gjennom samtykkeskjemaet og får signert denne før jeg fortsetter. Før vi setter i gang selve intervjuet spør jeg deltakeren om han/hun har noen spørsmål.

Pseudonym: \_\_\_\_\_

### Intervju

#### Bakgrunn:

1. Fortell meg om hvordan du ble introdusert for CrossFit trening for første gang, og gjerne i detalj hvordan du opplevde det? Inkluder detaljer som utdyper erfaringen din.
  - a. Om deltakeren ikke kommer inn på det selv, spør jeg om når, hvor, og hvem som introduserte han/henne til CrossFit.
  - b. Fortell meg om hva du likte med CrossFit, og om hva du ikke likte.
2. Utover det du alt har fortalt, kan du fortelle mer om trenings-erfaringen din utenom og før du trente CrossFit?
  - a. Fortell meg om hva du likte og/eller ikke likte med tidligere treningsvanene dine.
3. Fortell meg om erfaringer du har med trening utenom CrossFit som har vært positivt eller utfordrende med tanke på hvorfor/ hvorfor ikke du trener/ er i aktivitet?
4. Når du tenker tilbake på erfaringen din med CrossFit, er det noe som stikker seg ut som påvirket hvorfor du valgte å slutte med CrossFit trening?
5. Kan du snakke med meg om hvilke tanker og følelser du hadde før en Crossfit-økt?

- a. Kan du fortelle meg og erfaringer du har med å psyke deg opp eller ned i før og/eller etter trening
6. Kan du fortellen meg om hvorfor du valgte å slutte med crossfit?
7. Kan du fortellen meg om hvordan aktivitetsnivået ditt/ treningshverdagen din ser ut nå?
8. Kan du snakke om hva som er grunnen til at du trener aktivt/ hvorfor du ikke trener aktivt lenger?
9. Har denne grunnen forandret seg med tiden?
  - a. Kan du fortelle meg om hvordan denne har utviklet seg.

## **Avslutning**

10. Utover det vi har snakket om, er det noe mer du ønsker å fortelle meg eller trekke frem?

**Jeg avslutter intervjuet med å takke for deltakelsen.**

## Interview guide for active participants

Jeg starter intervjuet med å introdusere meg selv og takker deltakeren for å møte meg. Deretter går jeg gjennom hensikten med studien; at jeg ønsker å utforske ulike motivasjonsfaktorer hos personer som har trent, trener aktivt og konkurrerer i CrossFit. Jeg spør deltakeren om samtykke for å være med i studien, og for å være sikker på at deltakeren har full forståelse for hva deltakelsen innebærer, går jeg gjennom samtykkeskjemaet og får signert denne før jeg fortsetter. Før vi setter i gang selve intervjuet spør jeg deltakeren om han/hun har noen spørsmål.

Pseudonym: \_\_\_\_\_

## Intervju

### Bakgrunn:

1. Fortell meg om hvordan du ble introdusert for CrossFit trening for første gang, og gjerne i detalj hvordan du opplevde det. Inkluder gjerne detaljer som utdyper erfaringen din.
  - a. Om deltakeren ikke kommer inn på det selv, spør jeg om når, hvor, og hvem som introduserte han/henne til CrossFit.
  - b. Fortell meg om hva du liker med Crossfit, og om noe du ikke liker.
2. Utover det du alt har fortalt, kan du fortelle mer om trenings-erfaringen din utenom, og før du begynte med CrossFit?
  - a. kan du snakke med meg om hva du likte og/eller ikke likte med tidligere treningsvanene dine.
3. Når du tenker tilbake på erfaringen din med CrossFit, fortell om noe som stikker seg ut som positivt og/eller utfordrende som har påvirket hvorfor du trener CrossFit.
4. Kan du fortelle meg om hvordan treningshverdagen din ser ut nå?
5. Kan du snakke med meg om hva som er grunnen til at du trener aktivt.
6. Har denne grunnen forandret seg med tiden?
  - a. Hvis ja, Kan du fortelle meg om hvordan denne har utviklet seg?

7. Fortell meg om erfaringer du har med å psyke deg opp eller ned i før og/eller etter en CrossFit økt.
8. Om du tenker frem til neste CrossFit økt, hva tenker og føler du da?
9. Kunne du fortalt meg om hva som får deg til å komme tilbake på trening.
  
10. Utover det vi har snakket om til nå, er det noe mer du ønsker å fortelle meg eller trekke frem?

**Jeg avslutter intervjuet med å takke for deltakelsen.**

# Appendix B

## Consent form

### 1. Title of the study

Exploring cases of participation and dropping out in CrossFit

### 2. Aim of the study

The aim of the present study is to explore CrossFit as a training method and underlying mechanisms of motivation in cases of participants who compete in CrossFit, systematically train using the CrossFit method, and in participants that dropped out.

### 3. Description of research activities

As a participant you are asked to take part in one-on-one interview with the researcher. The interview will be conducted in person or video call if a physical meeting is not possible. **what does the data say on these different data types.**

You are also asked to be available to be contacted for further information or clarifications in case that is needed. The duration of the interview is uncertain, as the interview will continue until sufficient information is obtained but estimated around 60 minutes.

As a participant you will also be asked to read the transcription of the interview to verify the completeness and accuracy of the information you shared.

### 4. Risks/ Discomfort involved

There are no anticipated risks involved with participating in this study. If you are uncomfortable sharing information on a question or topic, please let me know and I will withdraw that question or topic.

### 5. Expected impact

This study seeks to understand the underlying mechanisms of motivation and how these mechanisms work for different persons. The obtained information can advance our knowledge on how to better support CrossFit participants to stay in the sport.

### 6. Dissemination of results

The results from this study will be presented as a written report. When participating in the study, you will remain anonymous, as a pseudonym will be used for you through the entire

report. Any information or details that could identify you will not be made public. Please choose your pseudonym here: \_\_\_\_\_

### **7. Further information**

You should not hesitate to ask questions regarding the aim, procedures or implication of the study. If you have any questions, doubts or need clarification, you can contact me, Steffen Håndlykken, using [steffenhaand@gmail.com](mailto:steffenhaand@gmail.com).

Please provide me with your email address to send the transcript of the interview.

Email: \_\_\_\_\_

Once you read and verify the completeness and accuracy of the transcript, your email address and any email exchanged between us will be deleted permanently.

### **8. Freedom of consent**

You are a volunteer participant in this study. You are free to withdraw your consent now or later. In case you decide to withdraw as a participant to this study, please contact me at [steffenhaand@gmail.com](mailto:steffenhaand@gmail.com) and any recordings and data related to you will be permanently deleted and not used in the study.

### **Participant's declaration**

I have read this form and understand the procedures and terms of participating in this study. I agree to participate in this study.

Date: \_\_\_/\_\_\_/\_\_\_

---

Signature of participant

---

Signature of researcher

## Appendix C

### Search log

Database	Search nr.	Keywords	Hits	Search refinements / Comments
Science Direct	1	Self-determined motivation AND CrossFit	11	No refinements/ 1 picked out for further inspection
	2	Self-determined motivation AND sport-dropout	55	Research articles, open access/ 8 picked out for further inspection
	3	Self-determined motivation AND sport-adherence	116	Research articles, open access/ 14 picked out for further inspection
	4	Self-determined motivation AND high intensity interval training	261	Research articles, open access/ 6 picked out for further inspection
	5	Self-determined motivation AND high intensity interval training AND adherence	76	Research articles, open access/ 4 picked out for further inspection
	6	Self-determined motivation AND high intensity interval training AND dropout	32	Research articles, open access/ 2 picked out for further inspection
Sports Discuss	1	Self-determined motivation	319	Full text, Academic journal/ 28 picked out for further inspection
	2	Self-determined motivation AND professional athletes	6	Full text, Academic journal/ 1 picked out for further inspection
	3	Self-determined motivation AND dropout	5	Full text, Academic journal/ 1 picked out for further inspection
	4	Self-determined motivation AND Sport performance	45	Full text, Academic journal/ 3 picked out for further inspection
	5	Self-determined motivation AND Crossfit	1	Full text, Academic journal/ 1 picked out for further inspection
	6	Self-determined motivation AND high Intensity interval training	7	Full text, Academic journal/ 2 picked out for further inspection
	7	Self-determined motivation AND adherence	8	Full text, Academic journal/ 2 picked out for further inspection
	8	Self-determined motivation AND training	26	Full text, Academic journal/ 2 picked out for further inspection
	9	Motivation AND high intensity interval training	17	Full text, Academic journal/ no relevant hits
	10	Motivation AND high intensity interval training AND dropout	0	Full text, Academic journal/
	11	Motivation AND high intensity interval training AND adherence	0	Full text, Academic journal/
	12	Motivation AND CrossFit	12	Full text, Academic journal/ 4 picked out for further inspection
	13	Motivation AND crossfit AND dropout	0	Full text, Academic journal/
	14	Motivation AND crossfit AND adherence	1	Full text, Academic journal/ no relevant hits
	15	Motivation AND sport dropouts	47	Full text, Academic journal/ 3 picked out for further inspection
	16	Motivation AND adherence	248	Full text, Academic journal/ 13 picked out for further inspection

	17	Motivation AND sport adherence	133	Full text, Academic journal/ 9 picked out for further inspection
	18	Training AND self-determined motivation	47	Full text, Academic journal/ 3 picked out for further inspection
	19	Crossfit AND psychology	26	Full text, Academic journal/ 4 picked out for further inspection
	20	CrossFit AND motivation AND dropout	0	Full text, Academic journal/
	21	CrossFit AND motivation AND adherence	1	Full text, Academic journal/ 0 picked out for further inspection
Google Scholar	1	CrossFit AND dropout	283	No refinements/ 10 picked out for further inspection – many results were displayed several times.
	2	CrossFit AND adherence	1320	No refinements/
		At this point google scholar was only used to search for specific articles not available in the other databases		