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**"Personal trainers' coaching style as perceived by clients:
Relations to quality of motivation and subjective vitality
– A self-determination theory approach"**

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Abstract

Introduction: The fitness center sector has rapidly increased as a facilitator for enhanced physical activity levels in the modern society. Personal trainers working in the industry stand in a unique position to impact their clients by guiding them towards individualized and efficient exercise, and importantly, motivate them to sustained adherence to physical activity. Consequently, it is an important and comprehensive profession in need of professionalized expertise about psychological, as well as physiological outcomes of their coaching. This study investigates how PTs should steer their coaching in order to most efficiently influence their clients' long-term motivation.

Aim: Investigating clients' perception of personal trainers' coaching style in relation to motivational regulation and subjective vitality through a cross-sectional study, based on the self-determination theory.

Methods: 127 individuals currently undergoing personal training sessions were recruited to participate in a survey capturing perceived coaching behavior, motivational regulation and subjective vitality. Step-wise regression analyses and Structural Equation Modeling were conducted to investigate relations between variables and potential mediation effects from motivational regulation.

Results: Perceived need supportive coaching, that is, autonomy, competence and relatedness, positively affected subjective vitality in clients, fully or partially mediated by motivational regulation. Oppositely, controlling tendencies in coaching negatively influenced subjective vitality, partially mediated by motivational regulation. Furthermore, nuances of controlling coaching were found, revealing differentiating effects on vitality.

Conclusion: Personal trainers should emphasize need supportive coaching in order to positively impact clients' motivational regulation and vitality during exercise, likely leading to long-term adherence to physical activity and exercise.

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Abbreviations

BPN	Basic Psychological Needs
HCCQ-PAS	Health Care Climate Questionnaire: Perceived Autonomy Support
PA	Physical Activity
PAS	Perceived Autonomy Support
PCA-VA	Principal Component Analysis with Varimax Rotation
PCB	Perceived Coaching Behavior
PT	Personal trainer
RAI	Relative Autonomy Index
SDT	Self-Determination Theory
SEM	Structural Equation Modeling
SRQ-E	Exercise Self-Regulation Questionnaire

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1.0 Introduction

1.1 Health and physical activity

The positive effects of physical activity are extensively documented. It is a major contributor to enhancement of the global health; higher levels contributes to large health benefits such as lower rates of all-cause mortality, prevention of non-communicable diseases, higher levels of cardiorespiratory and muscular fitness and better mental health, quality of life and well-being (WHO, 2011). For medical conditions, it has a risk reduction of typically 20-30 % (Rhodes, Janssen, Bredin, Warburton, & Bauman, 2017). Physical inactivity is stated by World Health Organization (WHO) to be the fourth leading risk factor for global mortality and burden of disease.

However, despite widespread knowledge about health benefits of physical activity and the risks of the lack thereof, the prevalence of sedentariness and physical inactivity in the global population is increasingly high. The contemporary society has undergone major industrial changes the last decades; a decline in agricultural and manufacturing work resulting in more sedentary jobs, increased sedentary leisure-time activities such as TV-watching and use of other electronics, and change of infrastructure leading to increased use of automobile as primary transportation. Consequently, the demands of daily life have naturally decreased, and a physically inactive lifestyle is the dominant lifestyle pattern (Hagger & Chatzisarantis, 2007; Hanson et al., 2005). Worldwide, approximately 1 in 4 adults are insufficiently physically active, and 3.2 million deaths annually are caused by inadequate levels of physical activity (Rhodes et al., 2017; WHO, 2018). Hence, in a global health perspective, it is increasingly important that we continuously prioritize to enhance levels of physical activity and the amount of people deriving the benefits from it.

Since the modern society is not adequately facilitated for natural daily life physical activity, promoting peoples own initiative to engaging in physical activity is important. Engagement in physical activity is dependent on a variety of factors. We need to understand the reasons behind why people choose to adopt a physically active lifestyle, and how to attain high-quality motivation in order to secure long-term adherence.

1.2 The fitness center as an arena for physical activity

The fitness center industry has since the 1990s grown to be one of the most important arenas for the common population to engage in physical activity. There are 60 million members of fitness centers across Europe (Rutgers et al., 2018). In Norway, 30 % of the physically active population reports fitness center as their most used arena for physical activity, and of these, 2 of 3 reports little to no physical activity before signing up for a fitness center (Thidemann & Rekdal, 2017). Number of Fitness Centers has grown extensively the last decade (Figure 1).

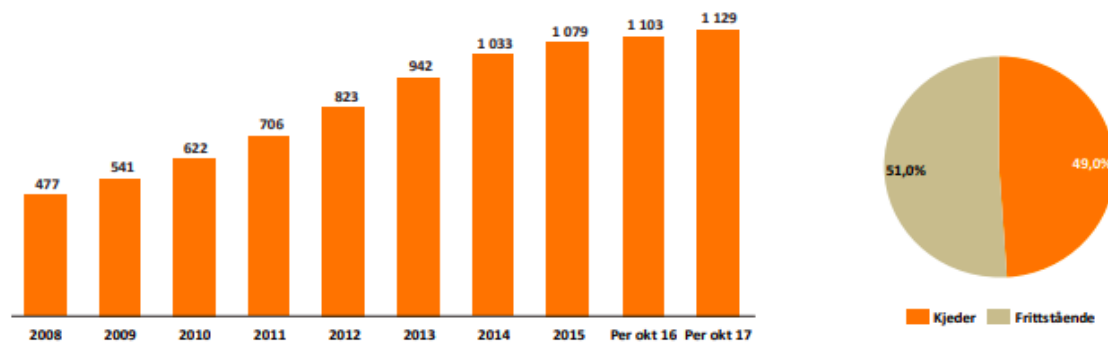


Figure 1 Report from Virke Trening. Presents the growth of Fitness Centers across Norway from 2008 to 2017, with 51 % being chain centers and 49 % being independent centers.

Considering the large health benefits physical activity serves, the fitness center sector undoubtedly contributes to enhancement of public health by promoting physical activity for the population. In the Public Health Report (2014-2015), the Norwegian Government stated the fitness center industry to be a major contributor in public health work through facilitating and promoting physical activity (Thidemann, Tønnessen, Pettersen, & Arntzen, 2016). Yet, the dropout rates are high, with 40-65 % dropouts within 3 to 6 months (Annesi, 2003; Hancox, Qvested, Ntoumanis, & Thøgersen-Ntoumani, 2015). This underlines the importance of attaining knowledge on how to most efficiently prevent these dropouts and assure continued participation specifically in the fitness center context. This is a fairly new venue for research, thus evidence is sparse on what regulates motivation for fitness center participation.

1.3 Personal trainers as contributors to public health

A coach or trainer is in a unique position to impact a person's motivation, and as a result, alter their actions and behaviors towards physical activity. The use of personal training services has grown in line with the fitness center industry. In 2015, 200 fitness centers with 400.000 members sold personal training services for 230 914 000 NOK (Thidemann et al., 2016). Personal trainers have the opportunity to play a major role in motivating to sustained adherence to physical activity and exercise, as they can reach their clients on a deeper level and have a strong impact on the client's motivation for future actions and behaviors.

1.4 Importance of professionalizing the Personal Trainer profession

Proper expertise among personal trainers on how to meet their clients with quality guidance is severely important. Firstly, a personal trainer is first hand handling their client's health. Incorrect exercise prescription can cause large health related damage, both

physically and psychologically. Correct programming is essential for adequate dosage of physical activity in order to avoid injury and overtraining. As important is knowing how to use correct communication and coaching style, to provide optimal environment for the client to develop and sustain good mental health as well as positive long-lasting physical activity habits.

During the recent years, the personal trainer-profession has grown from being only a “training counsellor” that gives simple and general advice on exercise and how to properly perform correct form, to be a more comprehensive profession. Now, the academic requirements are higher, and PTs are required to adopt an evidence-based practice. *Evidence-based practice* is a concept established in the field of medicine in the 1990s. It states that the practice as health professionals should be an interdisciplinary approach between evidence-based knowledge, and former experience (Kvernbekk, 2018). The practical work is more extensive; the PT is responsible for designing individual training programs for each client and keeping them motivated and physically active over a longer period of time (Thidemann et al., 2016). In 2016, Virke Trening presented “The Competence Building Project”. The project sought to lift the competence in the fitness center industry. The report states:

"Through a professionalization and increased formal competence, the fitness center industry is more equipped to expand its customer segment into the public sector and to take a greater role in the preventive health work." (Thidemann et al., 2016).

Further, the project committee presents a recommendation of minimum one-year study program for all personal trainers and key professionals working in the industry. The one-

year study program should further be developed to fit into a degree program; a bachelor's degree that further qualifies for a master's degree (Thidemann et al., 2016) .

In 2019, the largest fitness center chain in Norway, SATS, made a step towards meeting the recommendations from Virke Trening. They stipulated a one-year academic study requirement (60 ECTS credits) for all new personal trainers hired in the company, unlike earlier, where 30 ECTS credits or even shorter intensive courses were the minimum requirement for employment. This serves as a large step towards professionalizing the industry, which will facilitate the possibility to meet more customers' needs, create safe environments and help a wider proportion of the population, thus play a larger role in preventive health care.

It is important to acknowledge that the requirements for competence should not only involve thorough knowledge about bodily functions such as anatomy and physiology, but also knowledge about psychological mechanisms and how interactions with the clients impacts them psychologically. Such knowledge may optimize the way the PT interacts with the client, which in turn can optimize the client's motivation and help them stay motivated over time. In a large societal perspective, when enhancing their expertise, the PT profession can serve as an important contributor to increased physical activity levels, and in turn enhanced global public health and major benefits deriving from it.

2.0 Theoretical framework

2.1 What makes us motivated to engage in physical activity?

In order to increase PA levels, we need to understand the mediating factors for long term-adherence and preventing dropouts. In a regular common language, people speak about “lacking motivation” for physical activity. Motivation is a complex concept. It is not a simple unitary phenomenon, but rather a floating concept that reflects individuals sources for energy and the underlying mechanisms behind it (Deci & Ryan, 2017, p. 482). Motivation is defined by Sage (1977) in Weinberg and Gould (2015) as “the direction and intensity of effort”. It is the energy or effort that drive us towards specific actions and behavior and determines its direction and consistency (Hagger & Chatzisarantis, 2007). Researchers have over the last decades investigated the determinants behind motivation. Factors that have shown to predict exercise participation are; positive behavioral intentions and attitudes toward exercise such as believing it is beneficial for health, observing similar others like friends or family exercise regularly, self-confidence and overcoming of barriers to exercise such as believing that one will succeed. However, less attention is paid to the quality of such motivation and how it predicts exercise in the long term (Hancox, Ntoumanis, Thøgersen-Ntoumani, & Quested, 2015). Clearly, an interesting venue for research is to understand the diverse and complex processes of motivation and how to potentially optimize it for long term adherence to physical activity.

2.2 Early motivational research

Early research on motivation emphasize organismic needs as mediators for behavior. Human beings naturally strive for optimal development and growth, and researchers have presented various fundamental needs that has to be fulfilled to reach our goal of optimal functioning. They theorized that behind all behavior lays the motivation to fulfill these

needs (Baumeister & Leary, 1995; Hull, 1943; McClelland, 1953; Murray, 1938). Hull (1943) highlighted primary physiological needs, while Baumeister and Leary (1995), McClelland (1953) and Murray (1938) focused on psychological needs as drivers of behavior. More recent research builds on early motivational research and the concept of basic needs, and moreover, elaborates an even wider specter of motivational quality and the constructs behind it.

2.3 Self-Determination Theory

Deci and Ryan are prominent scientists in the field of behavior and motivation. They developed the Self-Determination Theory (SDT) to explain human behavior and the motivation behind it. The SDT has evolved over the past decades and has become a central and frequently used theory in contemporary behavioral science (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017). It provides insight in the nature of human behavior based on a body of evidence, applied practices and field observations, and as such, it offers a broad approach to understand what foster or undermine human motivation for behavior and the quality of it. Deci and Ryan's theory is congruent with early motivational research in that it gives prominence to inherent organismic needs and strive towards full functioning and development. They conceptualize psychological needs as drivers, and argued that in the same way as human physical needs such as hunger, thirst and sleep are essential for living, the psychological needs are innate and essential for optimal growth, development and health. They emphasized three innate basic psychological needs (BPN) in the human being; autonomy, competence and relatedness, as underlying mediators for motivation and behavior (Deci & Ryan, 2017).

According to Deci and Ryan, the natural strive for complete wellness is the most important determinant for our effort and energy towards motivation and subsequent behavior. Our eager to achieve wellness and full functioning by fulfilling fundamental psychological needs lay the foundation for motivation to behavior. Deci and Ryan present a coherent process of human behavior through their theoretical framework. The ladder of impacting factors is presented below (Figure 2).

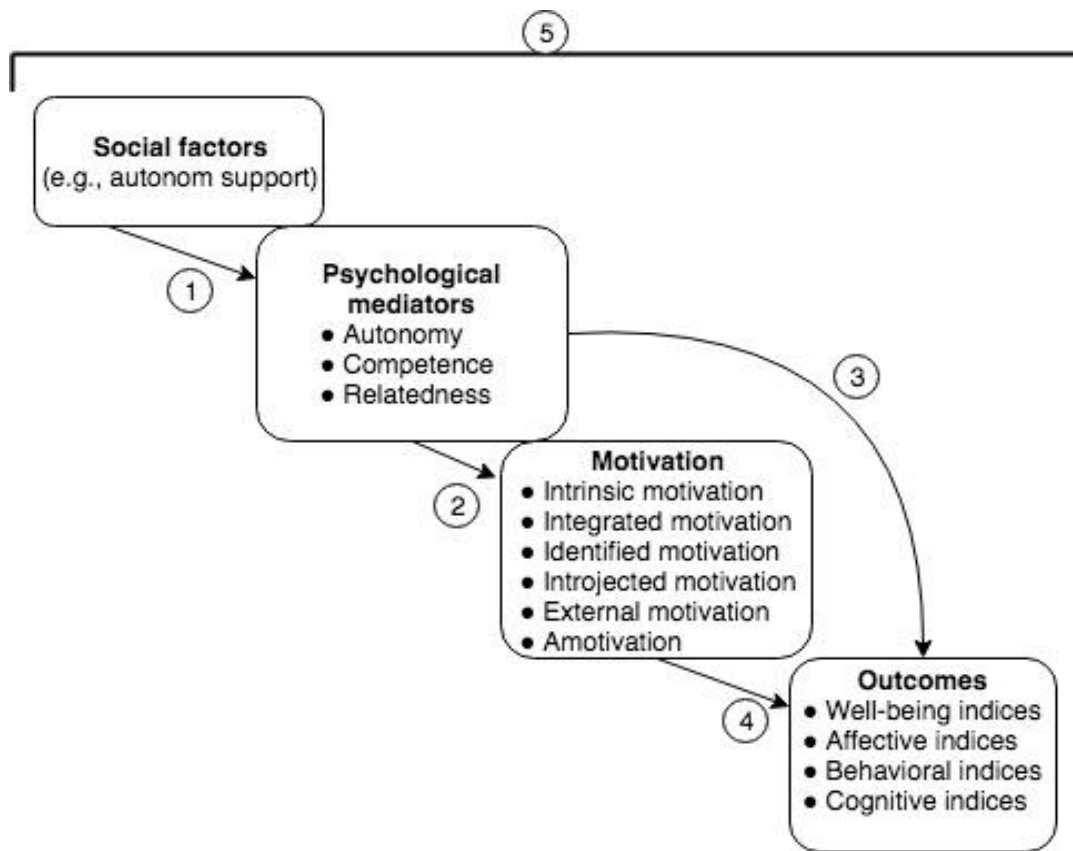


Figure 2 Main tenets of the Self-Determination Theory

Model collected from Standage, Duda, and Ntoumanis (2005) in Hagger and Chatzisarantis (2007, p. 72). Contains the main tenets of the Self-Determination, collated from works by Deci and Ryan (2000). Presents the empirically supported links between the constructs of the SDT.

The Self-Determination Theory is a hierarchical model that explains the determinants behind behavior (5). They argue that the reach towards well-being is the foundation of action and behavior (4). This is impacted by motivational regulation (3); intrinsic motivational regulation leads to higher well-being, whilst more external motivational regulation may lead to lower levels of well-being. In turn, this is dependent on the fulfillment of our basic psychological needs; autonomy, competence and relatedness (2). Whether our basic needs are fulfilled, depends on social contextual influence (1) (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017).

Deci and Ryan's framework originally seek to explain all kind of behavior. They emphasize the importance of motivational quality in enacting various behaviors, impacted by our inner seek to fulfill needs and reach complete well-being. It has been used for a variety of health behavior changes such as smoking cessation, weight loss and adherence to medical prescription (Duda et al., 2014). Additionally, over the last decades the theory has increasingly been used to describe exercise and physical activity behavior and adherence. In the following, I will present the model with elaborating the concepts that influence each other; well-being, motivational regulation, basic psychological needs and social contextual factors, respectively, in exercise and physical activity settings.

2.3.1 Well-being and vitality

A state of fully functioning and well-being is not merely being “happy”, but it is a holistic state of being “our best” that evolves being physically and psychologically energized to pursue valued activities (Deci & Ryan, 2017, p. 256). Well-being is a prominent and proliferated concept that has received much attention in the field of behavioral science. The terms well-being, quality of life and vitality are often used interchangeably to

delineate positive mental health and wellness. However, they have some discrepancies by well-being and quality of life both being broader umbrella terms describing wellness and life satisfaction that involves subjective as well as external and measurable criteria, and vitality being a subconstruct that is merely tangible and subjective. Vitality is also described to have a more precise and specific phenomenological quality, placed as a subcomponent of well-being and quality of life (Guerin, 2012).

Vitality itself is defined as a psychological state of aliveness, enthusiasm and having the energy for action and behavior. It is a positive psychological state and has value in itself. Hagger and Chatzisarantis (2007) believed it to be a “marker of health”; that the subjective sense of energy and aliveness constitute both psychological coping and wellness (Hagger & Chatzisarantis, 2007, pp. 16-17). It is an intraindividual and meaningful perceived experience (Guerin, 2012; Nix, Ryan, Manly, & Deci, 1999). In other words, vitality is an essential part of motivation; actually having the physical and psychological energy to act and being enthusiastic in the behavior. For an individual to become motivated to engage in physical activity and exercise, it seems from an SDT point of view that a premise is vitality.

But what impacts regulation of vitality? In the physical aspect; adequate nutrition, hydration and sleep affect vitality (Hagger & Chatzisarantis, 2008, pp. 16-17). With sufficient levels, one feels vital and alive, and oppositely, drained for energy and lack of vitality if the levels are non-sufficient. However, it seems that vitality does not solely depend on physical states. It may as well be affected by psychological nutrients. One may feel depleted of vitality despite adequate hunger, thirst and rest. Deci and Ryan emphasized the psychological aspects, and associated vitality with fundamental need

fulfillment; the higher autonomy, competence and relatedness, the higher vitality (Deci & Ryan, 2017).

Subsequent research is consistent with this theory; Ryan and Frederick (1997) found that subjective vitality was fostered by need fulfillment. They also found that subjective vitality was thwarted with extrinsic life goals like wealth and fame, and supported with intrinsic life goals such as personal growth. Vitality is also found to be thwarted with controlling coaching behaviors (Gucciardi, Stamatis, & Ntoumanis, 2017; Moreno-Murcia, Huescar Hernandez, & Ruiz, 2018). Nix et al. (1999) investigated autonomously motivated versus externally motivated activities and its impact on vitality. When the activities were self-directed, the participants felt more vital and energized than when they were controlled by others, despite the tasks being successfully achieved in both conditions. It only makes sense; working with something you enjoy the value of gives greater vitality and energy than working with something others force you to. Thus, whether the motivation stems from you, or from external sources, determines the quality of it.

2.3.2 Motivational regulation

Deci & Ryan differentiates between types and sources of motivation and describe constructs that influence its quality. As mentioned, motivational quality can play an important role in how much energy is put into the given behavior, and the adherence to it. To exemplify; a man who seemingly is very unmotivated, tired and low in energy during his day job might have no trouble at all enthusiastically playing golf for hours after work. Similarly, a young, ambitious woman who spends her entire day happily working for her company may have a hard time prioritizing time for physical activity, even though she is well aware of the benefits of exercising. Simply said; on one hand, motivation can

be *intrinsic*; it stems from the persons within, it is fully volitional, and the person finds value and pleasure in the behavior. The activity feels rewarding and joyful in itself and there is no reinforcement or external reward present. An intrinsically motivated individual exercise because it is fun in itself. Naturally, an intrinsically motivated person may invest more energy and effort into the behavior, and it is more easily maintained and adhered to over time. On the other hand, the motivation may be *extrinsic*; the person feels pressure and compelled from an external source to act and does not have own interest in the behavior. It may be performed merely to achieve acceptance or to avoid a punishment or a consequence, and may be acted out rather resentfully or resigned. Exercising out of guilt, shame or pressure, is presumable to cause higher chances of dropouts (Deci & Ryan, 2000).

These two types of motivation, intrinsic and extrinsic motivation, are two extremities on the motivational quality scale. Between them, there is a range of different forms of motivation, where Deci & Ryan further conceptualize extrinsic motivation into a ladder of four major types; external, introjected, identified and integrated;

With *external regulation*, the motives for a certain behavior stems solely from sources outside of the individual. These are factors that are reinforced and completely controlled from external contingencies; achieving a goal or avoiding affliction. For instance; a man feeling pressured to exercise because his spouse wants him to, or his doctor have told him to because he is genetically prone to various health risks. Consequently, the man is in fact exercising because he feels externally pressured to and would feel guilt when not exercising. This regulation of motivation may be effective to engage in exercise, however in such cases, there is a higher chance of relapse. Once the

external pressure is withdrawn, the behavior is likely to diminish (Deci & Ryan, 2000; Hancox, Ntoumanis, et al., 2015).

In *introjected regulation*, the behavior is still externally pressured and controlled, but it is slightly more internal in the sense that it is administered by the self. It may be forced by guilt or shame, and not integrated in the person's values and beliefs. As such, the regulation lies within the person, but is still not seen as self-determined. There is a slightly higher chance of maintenance than external regulation, but it is still relatively unstable (Deci & Ryan, 2000).

When the behavior is *identified*, it is still externally motivated, but it is slightly more internalized; the person is identifying themselves with the behavior and has accepted its value. For instance, a person who exercises because they believe in the positive outcomes of it, but still acts because of the outcomes and not because they enjoy the activity itself. This kind of regulation shows higher maintenance and commitment (Deci & Ryan, 2000).

Integrated regulation is the most internal form of extrinsic motivation. The behavior has become a part of the individual's identity, and the external contingency is internalized into own values and beliefs. The outcome is external, but the person values the outcome itself (Deci & Ryan, 2000).

In some cases, extrinsic regulations are gradually processed into intrinsic regulation through *internalization*. This is a process of socialization, where through social contexts, its members are naturally advocated to endorse various behaviors, attitudes and values. Through the process, the individual assimilates the external sourced behaviors into their own and integrates them with existing values, beliefs and emotions. Only when

the person acts fully on their own in absence of external pressure or control, extrinsic motivation becomes intrinsic. Then, the socially impacted behavior becomes internalized and a part of the individuals personality, and he or she feels autonomy when enacting it (Deci & Ryan, 2017, pp. 179-184). If the young, carrier ambitious woman manages to internalize and eventually perceive physical activity as something she enjoys and values, she might have less difficulty finding time for it.

Considering that the various types of motivational regulations determines behavior and adherence differently, an important question is what mediates and determines the different motivational regulations. The SDT elucidates satisfaction of BPN as the primary promoter of motivational regulation, thriving, optimal development and well-being, and consequently, self-determined behavior, and oppositely, thwarting of BPN as inhibitor.

2.3.3 Basic Psychological Needs

“It seems that when people are more able to satisfy all three of their basic psychological needs the regulation of their behavior will be characterized by choice, volition, and autonomy rather than pressure, demand, and control, and the result will be higher quality behavior and greater psychological well-being.” (Deci & Ryan, 2000).

Deci and Ryan present three needs as fundamental; autonomy, competence and relatedness (Deci & Ryan, 2017, pp. 10-11). The first need, *autonomy*, is the sense of being in control over own choices without external influencing factors; behaving self-endorsed without controlling influences. One feels volitional, and acts in congruence with own values, interests and emotions, rather than acting forced by sources external to the self. Thus, intrinsic motivation through the process of internalization, as mentioned

above, nourishes the autonomous type of regulation. When a person has internalized the value of the behavior, they feel more ownership towards it. The person acts in accordance with their own inner values and interests. Oppositely, extrinsic types of regulation may thwart autonomy, as the person sees it necessary to perform the behavior due to external sources. Autonomous behavior may engage people abilities and energy, and in contrast, forced behaviors are performed with lower efforts. Some early motivational researchers have explained this by rebellion against feeling controlled and human inner need to feel free and act without constraints (Murray, 1938), which is an interesting approach. Deci and Ryan, however, explains it as more of a volitional concept; our inner desire to be able to act out our volition, choice and self-endorsement (Deci & Ryan, 2000; 2017, pp. 97-98).

The second need, *competence*, is the feeling of mastery and being capable to achieve a task. It is often waned in situations where a task is too difficult, by negative feedback from others or personal internal feelings like self-criticism and comparison to others. Mastering the specific task seems to be an important determinant of motivation to sustain behavior (Hagger & Chatzisarantis, 2007). Other theories elaborate the theory of mastering; a prominent theory is the achievement goal theory, which differentiates between a mastery motivational climate, and a performance motivational climate (Amorose, 2007). A mastery motivational climate promotes learning, improving and effort. The person is encouraged to focus on mastering optimal challenging tasks and reward effort instead of performance. Oppositely, a performance motivational climate focus on winning, comparing to and outperforming others, and rewarding superior performance as well as punishing mistakes and creating rivalry. A considerable amount of research provides support that the former can promote sense of competence, enjoyment, enhanced learning and intrinsic motivation, whilst the latter may give less

positive achievements-outcomes and less self-determination (Amorose, 2007, p. 217). This is consistent with the SDT; a mastery motivational climate will promote the feeling of competence, thus enhance intrinsic motivation, whilst a performance motivational climate may generate extrinsic motivation due to oppressing of autonomy and competence.

The last need, *relatedness*, refers to the social connection to others. Human beings are from nature physiologically dependent on others help, care, provisions and supplies for survival. Moreover, humans are naturally social creatures, thus as important is the psychological aspects behind social connections. Some of the primary goals for behavior is the sense of belonging and feeling cared for, meaningful and significant to others. Feeling responded to, respected and mattering to others flourishes the sense of relatedness. Equally of being acknowledged, it is important to feel contribution and caring for others; feeling mutually socially connected to another human being or in a group and oppositely, avoid rejection, insignificance, disrespect and disconnection (Deci & Ryan, 2017, p. 96).

The fulfillment of basic psychological needs is dependent on social factors, which brings us further to the concept of social contextual factors and its importance for motivation and behavior.

2.3.4 Social contextual influence

According to Deci and Ryan, a critical influence on need satisfaction, motivational quality and well-being is contextual influence in form of social environment. Perceptions and experiences from the social environment determine the degree to which the basic needs are supported or thwarted. They suggest that involvement in a social context that supports autonomy, competence and relatedness, provides thriving and adequate functioning and

development. It may maintain or enhance intrinsic motivational regulations and facilitate for internalization of extrinsic motivational regulations, thus contribute to higher well-being and in this case, sustained physical activity engagement. In contrast, a need thwarting social context may oppress well-being and full functioning and development; it can undermine intrinsic motivation and promote more extrinsic and controlled regulations which in turn may lead to diminished behavior (Deci & Ryan, 2000), thus reluctance to physical activity and exercise.

Considering this, it is obvious that the social context between a personal trainer and the client plays an important role in the clients thriving, development, functioning and well-being, which in turn predicts self-determined behavior, motivational quality and adherence to physical activity and exercise. How the personal trainer acts in relation to his or her client, may play an important role in determining whether the client will sustain physical activity behavior or not.

2.4 The process of internalization: Impacts of coaching style

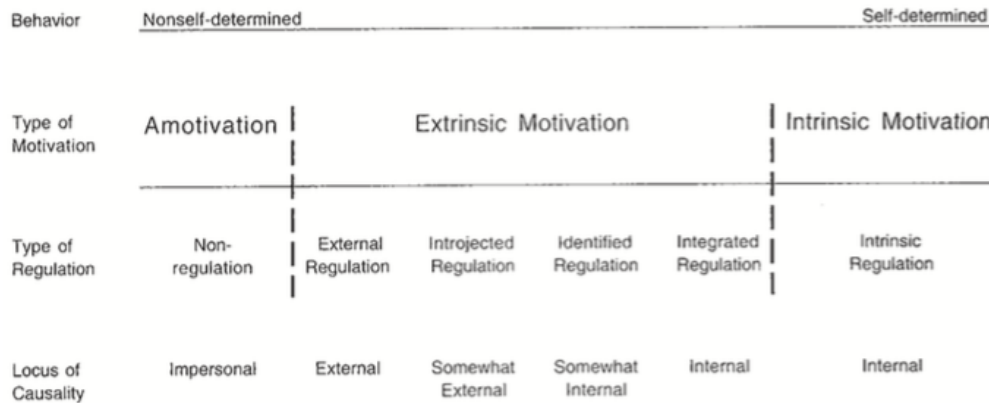


Figure 3 Shows the process of internalization based on the framework of the SDT, from nonself-determined amotivation to self-determined intrinsic motivation. Adopted from Deci and Ryan (2000).

As presented in Figure 3, the most extrinsic form of motivation is external regulation. The person feels pressured to act out the behavior from external sources. Oppositely, the far-right extremity shows intrinsic motivation and self-determination; the person finds enjoyment in the behavior itself and sustains the activity due to this. He or she feels great ownership of the behavior and acts in line with own values. Deci and Ryan argues that one can move from extrinsic motivation towards intrinsic motivation through the process of internalization. The individual moves gradually through different phases; from external regulation to introjected regulation, identified regulation, integrated regulation and lastly, intrinsic regulation. Eventually, the individual feels less controlled and conflicted about performing the behavior, adopts the values and finally reaches fully volitional and autonomous behavior. Fulfillment of basic psychological needs nourishes

the process of internalization (Deci & Ryan, 2017). Whether coaches support or thwart basic needs, depends on their coaching style.

In light of the SDT's theoretical framework, there are two ends of the scale when differentiating between coaching styles; autonomy supportive and controlling coaching (Deci & Ryan, 2017). An autonomy-supportive coach promotes self-initiation and self-regulation, acknowledges the exercisers' thoughts, feelings and perspectives, identifies their goals and interests, encourages choice and avoids pressure, demands and control. Such coaching behaviors are, supported by SDT-based science (Teixeira, Carraca, Markland, Silva, & Ryan, 2012), promotive of intrinsic motivation, thus may engage the internalization process, moving clients towards intrinsic motivation. In contrast, according to the SDT, a controlling coach use pressure to attain certain feelings or actions. It may include using belittling language, not taking the clients feelings, opinions and preferences into account, discouraging questions and propositions, keeping a distance and appearing less accepting when the client is not acting in line with their expectations (Deci & Ryan, 2017; Hancox, Ntoumanis, et al., 2015). Such behaviors may reduce the internalization process, keeping clients in the extrinsic motivational phases.

Notably, the far-left extremity of the scale shows *amotivation* and non self-determination. Amotivation stands in contrast to extrinsic and intrinsic motivation. In this state, there is a total lack of motivation, thus no intention to behavior at all. Even the most controlled form of extrinsic motivation, and intrinsic motivation, both includes motivation and intentionality (Deci & Ryan, 2000). Because the SDT speaks about different types of motivational regulation, and because engaging in personal training sessions will involve some form of motivation, no further notice will be given the state of *amotivation* in the current study.

2.5 Former research on Self-Determination Theory in various domains

According to the Deci and Ryan's theoretical framework, satisfaction of the basic psychological needs (autonomy, competence and relatedness) leads to optimal functioning, growth and well-being, which in turn gives greater self-determined behavior. In the social environment, autonomy supportive settings will promote need satisfaction, whilst controlling settings undermine it (Deci & Ryan, 2000; Hagger & Chatzisarantis, 2007).

The study is based on a self-determination theoretical perspective. Theoretical grounds and subsequent empirical research relevant for the study was conducted beforehand with a literature search in the database PubMed, using Boolean logic with the search words "self-determin\$" AND "physical activity" OR "exercise" OR "fitness" AND "coaching" OR "instruct\$" AND "motivation". Furthermore, reference lists of relevant articles were sought through to find relevant academic papers, and academic literature in book form were used. Below, I will further present research on SDT-based coaching in various domains.

2.5.1 In the sport domain

The evidence on effects of the SDT in the sport domain is extensive. Research provides evidence that the coach has a large influence on behavior and motivation (Amorose & Horn, 2001; Fenton, Duda, Quested, & Barrett, 2014; Hagger & Chatzisarantis, 2007; Joesaar, Hein, & Hagger, 2012; Langan, Lonsdale, Blake, & Toner, 2015; Mahoney, Gucciardi, Mallett, & Ntoumanis, 2014; Sheldon & Watson, 2011; Smith, Ntoumanis, & Duda, 2010). Some research distinguish between autonomy supportive and controlling behavior in coaches, proving that controlling behavior seems to undermine need

satisfaction and promote sport disaffection and externally controlled forms of motivation (Curran, Hill, Hall, & Jowett, 2014; Healy, Ntoumanis, van Zanten, & Paine, 2014). Additionally, studies have found that controlling coaching is negatively associated with intrinsic motivation and vitality (Gucciardi et al., 2017; Moreno-Murcia et al., 2018). These studies all give us a picture of how coaching can impact motivation. A coach that fuels basic needs; autonomy, relatedness and competence, seems to be preferred over a controlling coach.

However, the studies above are all conducted on athletes. Albeit it seems presumable, we cannot know for certain that studies on the coach-athlete relationship are generalizable to other contexts such as in promoting leisure-time physical activity or health-related exercise in the fitness center context. Athletes might have different natures and motives for engagement in the activity, thus results from such studies might not be generalizable to the general population participating in physical activity and exercise, and a differentiation between populations are necessary.

2.5.2 In physical activity and exercise

An extensive amount of evidence shows that self-determined behavior is positive for exercise and physical activity. A comprehensive systematic review by Teixeira et al. (2012) that includes 66 empirical studies published between 1960 and 2011 investigates exercise, physical activity and the Self-Determination Theory. Inclusion criteria were exercise or physical activity behavior outcomes and measures of SDT-constructs in adults. Samples of competitive athletes and adolescents were excluded. The review shows consistent findings that both intrinsic forms of motivation, but also autonomous forms of external motivation (identified and introjected), predict engagement in exercise or physical activity. The autonomous external types of motivation tend to predict short term

adherence, whilst intrinsic motivation predicts long term adoption of exercise and physical activity. For controlled forms of motivation, no studies found positive associations; controlled forms of motivation showed either non or negative effects. A large amount found negative associations, but the majority found no association. Teixeira et al. (2012) also found that satisfaction of basic needs was positive for predicting exercise participation, especially the need for competence. In sum, the review presents thorough evidence that supports the SDT approach for fostering leisure-time physical activity and health-related exercise (Teixeira et al., 2012).

More recent intervention research also takes an SDT-approach. Through an intervention by Duda et al. (2014), group sessions and one-to-one training were held by health and fitness advisors. SDT-based consultations were compared with standard consultations in 6 and 7 leisure centers providing health care, respectively. Both groups showed significant changes in within-group comparisons, but surprisingly showed insignificant differences between groups in higher self-reported physical activity, perceived autonomy support (PAS), vitality and physical improvements (systolic and diastolic blood pressure, weight improvements and body mass index). However, through a sub-study, they further examined the validity of their findings by examining video recordings of a sample of the consultations and rated autonomy support, need support and structure objectively. Through their observations, it was revealed that need support was in fact higher in the SDT-based consultations, but the autonomy support was not. In addition, measures of perceived autonomy support as tapped by the 6-item version of Health Care Climate Questionnaire, showed striking ceiling effects (total high score of Perceived Autonomy Support for both groups). They suggest that the health and fitness advisors may naturally act autonomy supportive. Hence, this may explain the lack of finding significant differences in PAS. However, the SDT-based group had significant

lower levels of anxiety and higher quality of life, which is consistent with the validation observations that this group received more need support than the control group. These findings underline the importance of clarifying methods when comparing coaching styles, which is a practical implication for future studies.

Kinnafick, Thogersen-Ntoumani, and Duda (2014), conducted an intervention study where healthy inactive adults ($n = 69$; $n = 63$ females, $n = 6$ males) were led through a 10-week walking program followed by 6 weeks of independent walking. The walking leaders were trained to provide an SDT-approach when leading the groups. The results showed, consistent with the SDT framework, that autonomy support from the leaders experienced through the walking program positively predicted changes in vitality and physical activity. However, the study had no control group and true comparisons from standard coaching could not be made.

Recently, Rodrigues et al. (2018) followed up on Teixeira et al. (2012) and conducted a systematic review on motivational variables and behavioral outcomes in the exercise setting, based on the SDT. The review presents the most current evidence for exercise settings and the SDT, and how motivational constructs provides long term adherence. Their findings provide crucial evidence that also recent literature supports PAS and positive effects on need satisfaction. More autonomy support promotes engagement in exercise, enhanced well-being and greater intention to exercise. They conclude that perceived interpersonal support can strongly impact long term adherence to exercise (Rodrigues et al., 2018).

In sum, the above presented evidence provides novel support for the SDT-approach in promoting physical activity and exercise (Duda et al., 2014; Kinnafick et al.,

2014; Teixeira et al., 2012). However, these studies were all conducted across a large variety of exercise and physical activity settings such as recreational exercise, weight loss programs and clinical populations, and the overall results can therefore not be generalized to autonomy support in a fitness center context.

2.5.3 In the fitness center context

Edmunds, Ntoumanis, and Duda (2008) examined female group class exercisers over 10 weeks, where one group received SDT-based coaching focused on autonomy support, structure and interpersonal involvement ($n = 25$) and one group received typical coaching ($n = 31$). The control group had a significant decrease in autonomy support, behavioral intention and amotivation. They also reported an increase in competence and introjected regulation. The experimental group reported significantly higher structure, interpersonal involvement, relatedness and competence compared to the control group. In addition, the SDT-coached group had a significantly greater attendance rate (Edmunds et al., 2008). However, the same instructor was used for both conditions, which is a considerable limitation.

Another study in the fitness center domain by Moreno-Murcia, Belando, Huescar, and Torres (2017) found similar results; PAS positively related to psychological needs and in turn, intrinsic motivation. This positively related to health goals, which positively related to amount of regular physical activity. The study is cross-sectional and does not prove a causal relationship (Moreno-Murcia et al., 2017).

Ntoumanis, Thøgersen-Ntoumani, Quested, and Hancox (2017) conducted an SDT-based intervention in the fitness center context. The intervention included 33 indoor cycling instructors, where one group used an SDT-based coaching method ($n = 23$) and one group served as control ($n = 10$). The instructors in the experimental group were

trained to adopt a coaching approach based on the SDT that were in line with the CALO-re taxonomy from Michie et al. (2011). 321 exercisers participated in the study (whereas $n = 104$ completed all measures). Due to high dropouts and missing data particularly in the control group, the authors present only results for the intervention group. PAS, BPN satisfaction and motivation was measured for both instructors and exercisers, as well as exercisers vitality. Greater PAS (more autonomy support and relatedness and less controlling tendencies), BPN satisfaction (higher autonomy and relatedness) and stronger intentions to exercise in the future was found for exercisers in the experimental group. There were also similar findings for the instructors; less controlling behaviors and higher levels of autonomy and relatedness. Thus, instructors may also benefit from SDT-approaches, making them more motivated and engaged in coaching their clients. In conclusion, the study shows that group class instructors can be trained efficiently to use need supportive communication styles, and accordingly enhance self-determined motivation in exercisers.

However, as mentioned, it is of crucial importance to specify which domain that are investigated, to be able to apply the results to other fitness center contexts. The group exercise social setting may impact individuals differently than in a one-to-one context. In group settings, several individuals are present, and the instructor simply may have difficulties reaching everyone on a deeper level. In contrast, in one-to-one coaching, the continuous interpersonal contact may develop a closer relation. Therefore, it might be presumable to think that such settings may have a greater influence on the exercisers' thoughts, beliefs and emotions. Due to the increasing use of personal trainer services and considering the large impact PTs may have on enhancing physical activity levels, and the scarce amount of former evidence investigating this sector, it is of specific interest to conduct further research in order to understand this field in particular.

2.5.4 In personal training

Personal training is a rather new field in physical activity and exercise promotion. There are few studies investigating this matter in general, and to our knowledge, only one study taking a self-determination theoretical perspective that examines the relation between personal trainers and their respective clients; a study by Klain, de Matos, Leitao, Cid, and Moutao (2015). They aimed to analyze PAS from fitness instructors in motivational regulation and prediction of adherence to exercise for fitness academy users; users that attended fitness classes twice a week ($n = 405$) and users engaging in personal training sessions ($n = 183$). Consistent with Deci and Ryan's theoretical assumptions of the SDT (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017), they found that autonomy support from the instructor (i. e offering choices and guiding them instead of practicing pressure and control), had a positive impact on users BPN for both groups. This in turn gave a more autonomous regulation of behavior, which consequently lead to longer adherence to exercise. Furthermore, in comparative analysis between groups, they found that users engaging in personal training had significantly higher values of both PAS and the BPN *relatedness* than other users, and longer adherence to exercise (26.28 ± 29.87 months).

Results from this study can reflect the effectiveness of the close relation between the personal trainer and the client for engagement in physical activity. It underlines Deci & Ryan's theory about the importance of social relations for self-determined behavior; to show care and feel cared for, feeling socially connected and mutual acknowledgement to others flourish the sense of well-being and vitality. Differently, users not engaging in personal training had significantly higher values of amotivation and external regulation, and less adherence to exercise (18.63 ± 23.92 months) (Klain et al., 2015). According to Deci and Ryan, BPN-satisfaction will enhance well-being and vitality, thus it is likely to

presume that the individuals with higher need satisfaction gained higher well-being and vitality as well. The findings from Klain et al. (2015) investigates BPN supportive coaching, but does not include a measure of vitality and wellness. Considering how important vitality and well-being during an activity is for continued motivation, it is of particular interest to gain more knowledge on how it is impacted by the PT's coaching style as perceived by their client. Additionally, it is of interest to investigate how potential effects is mediated by clients' motivational regulation.

Klain et al. (2015) does not show an independent relationship between autonomous versus controlling coaching. The experimental study of Ntoumanis et al. (2017) is the first one that examines this. Their findings show a positive relation between PAS, intrinsic motivational regulation and vitality. The current study adopts the scales from Ntoumanis et al. (2017) capturing the different components of need supportive coaching (autonomy support, controlling tendencies, competence support and involvement support), the scales capturing different types of motivational regulation (intrinsic, identified, introjected and external), as well as measures of vitality. This provides a good opportunity to investigate these factors in the fitness domain in the social context of personal trainers and their respective clients.

2.6 Purpose of study

The fitness center industry is one of the most frequent used arenas for physical activity in the modern society. The number of fitness centers has doubled the last decade, and the contribution to public health is large. It seems of particular interest to study how to promote long-term engagement in this context; what are the motives to be physically active, and how can fitness professionals steer their coaching methods to most efficiently enhance motivation for sustained exercise?

Extensive previous research underpins Deci and Ryan's idea that coach supported autonomy, competence and relatedness will enhance motivational quality, whilst controlling coaching may thwart it (Rodrigues et al., 2018; Teixeira et al., 2012). Studies conducted in the fitness center industry with personal trainers and their respective clients, based on the SDT, are however scarce. Only one former study investigates this (Klain et al., 2015). The study finds support for need supportive coaching. However, it does not bring a holistic self-determination theoretical perspective by including outcomes on mental health by measuring vitality and well-being as well as researching BPN-support.

It would seem particularly fruitful to obtain research knowledge on PTs coaching style as perceived by their clients. This study investigates how the PTs style of coaching corresponds with clients' degree of motivation as well as mental health and well-being. It includes items that captures several dimensions of instructor behaviors; autonomy support, competence and structure support, involvement support and controlling tendencies. It separately examines need supportive coaching and its impact on inner forms of motivational regulation and high subjective vitality, and oppositely, controlling coaching and its influence on external forms of motivation and low subjective vitality.

By investigating the relationship between PTs provision of autonomy supportive versus controlling coaching styles as perceived by their client, motivational quality and indices of psychological health and well-being while exercising, the current study aims to understand mechanisms behind long-term motivation and sustained physical activity in the fitness center and personal training context.

2.7 What this study adds

Enhanced knowledge within this field may help increase the quality standards of PTs operating in the physical exercise domain to the benefit of clients' sustained exercise behavior inside the fitness center sector. This study will contribute to clarifying the need for increased focus on which specific coaching style to adopt as personal trainers, to adequately improve quality of motivation, well-being and sustained exercise among clients in a fitness center context. A professionalizing of the PT industry by including a deeper understanding of psychological aspects as well as physiological aspects is essential. As the fitness center industry has extensively grown the last decades and personal training services has become increasingly used in the modern society, the PT profession may serve as an important facilitator to enhanced physical activity levels in the population, contributing positively to enhanced public health.

2.8 Main research questions

Is perceived need supportive PT behavior positively related to clients' well-being?

Is perceived controlling PT behavior negatively related to clients' well-being?

Is the positive influence of perceived need supportive PT behavior on clients' well-being mediated by relatively higher intrinsic forms of motivational regulation?

Is the negative influence of perceived controlling PT behavior on clients' well-being mediated by relatively lower levels of intrinsic forms of motivational regulation?

3.0 Method

3.1 Participants

This study opted to catch personal trainers coaching style in the perspective of their clients and the relation to the client's motivation and vitality, in a fitness center context. Thus, adults engaging in personal training sessions within the largest fitness center chain in Norway, SATS AS, represents the target population. Empirical research requires a thorough selection process to obtain generalizable results, thus, some inclusion criteria were determined to obtain an eligible sample population. It may take some time for clients to create an impression of their personal trainers coaching style, thus, the clients needed to have had contact with their personal trainer for at least ten sessions. Additionally, it was desired to investigate adults, hence an age of 18 year or older was required. There were no eligibility criteria for the personal trainers, besides being an employee of SATS AS. Descriptive statistics of the participants is presented below (Table 1).

Table 1: Distribution of participants age and hours with respective personal trainer

	Total #	% of total	# of men	# of women
AGE				
18-25	26	20,5 %	6	20
26-35	34	26,8 %	6	28
36-45	27	21,3 %	4	23
46-55	20	15,7 %	1	19
56-65	15	11,8 %	1	14
65+	5	3,9 %	0	5
Total	127	100 %	18	109
HOURS				
10	12	9,4 %	4	8
11-25	40	31,5 %	6	34
26-49	41	32,3 %	5	36
50 +	34	26,8 %	3	31
Total	127	100 %	18	109

3.2 Study design and procedures

A quantitative methodology with cross-sectional design is used in the current study. Electronically based questionnaires are used for data collection, as it provides the opportunity to retrieve a large quantity of statistical data in a short time while at the same time requiring little of the informants' time.

3.3 Data collection

The electronic system used for data collection in this study is SurveyXact, a web-based tool for developing, distributing and analyzing surveys created by Rambøll Management Consulting (2018). One combined survey containing three previously standardized questionnaires; 26 items capturing perceived coaching behavior (PCB) (Ntoumanis et al., 2017), 12-item Exercise Self-Regulation Questionnaire (SRQ-E) and 5-item Vitality Questionnaire (VQ) were used to obtain data. The survey collects client's perception of their personal trainers coaching behavior, and the client's motivational quality and vitality. Additionally, there were three items asking about age, gender and total amount of PT sessions. PCB and SRQ-E were translated from English to Norwegian. VQ is formerly translated to Norwegian by Songe-Møller (2009), thus the items were directly adopted from there. All items were closed questions.

68 personal trainers from 4 large SATS-centers were contacted. Data analyses to be used provide an estimated need for a random sample of at least 150 respondents. Due to an expected response rate of around 50%, the intention was to send the questionnaire to 300 respondents. Sample size and strength calculation by statistical analysis methods was done with application of Cohen's *d* for testing of power size on relationships with basis in correlation and regression analyses.

SATS holds a strict privacy policy in line with legislations of the EU (General Data Protection Regulation), stating that given personal contact information shall not be accessible for third parties without further consent. Due to this, access directly to PT clients contact information could not be provided. Therefore, the electronic link with the questionnaire was sent to the PT clients via their respective personal trainer that agreed to participate in the study. The personal trainers contacted their clients about the survey during PT sessions, via text message or via e-mail. Since number of clients each PT has varies extensively, there is no number on how many clients that received the questionnaire in total. However, SurveyXact provides the total number of how many individuals that have followed the electronic link ($n = 188$), how many that have completed the survey partially ($n = 24$), and how many that have completed the total survey ($n = 127$). PTs were asked to not follow the electronic link to avoid disturbed results in analyses. Due to unclear number of total persons that received the questionnaire, it is difficult to provide an exact response rate. The total number of participants completing the survey is 127 ($n = 18$ men and $n = 109$ women).

3.3.1 Pilot study

To promote efficiency in the data collection method, a pilot survey was administered to a small sample prior to submission to total sample population. Conducting a pilot survey provides several benefits for the researcher; it is essential for revealing potential errors and issues like confusions and unclear items, tests correctness in instructions and determines whether the directions are easy to follow (Olsson, Sörensen, & Bureid, 2003). The pilot sample were three randomly chosen participants that fit the inclusion criteria. They were asked to fulfill the survey, examine it and give initial reactions and comments, and if any, give further suggestions on alterations and revisions. From feedback from pilot participants, it was concluded that the survey instructions were easy to follow, that the

items were understandable, and that completion time was around 5-10 minutes. Therefore, only one pilot was needed before the main data collection could begin.

3.4 Measures

3.4.1 Perceived Coaching Behavior

We got access to a 26-item questionnaire measuring perceived coaching behavior (PCB), used in Ntoumanis et al. (2017). Ntoumanis and co-workers developed the scale partially based on formerly standardized measures and partially on measures specifically developed for their study. The scale taps 4 dimensions of coaching behavior perceived by the client; *Autonomy Support* (6 items, stems from a short version of Health Care Climate Questionnaire adapted to exercise and physical activity settings by Edmunds, Ntoumanis, and Duda (2006)), *Competence/ Structure support* and *Involvement support* (5 items each, both collected from Markland and Tobin (2010)), and finally, *Controlling tendencies* (10 items developed by the authors).

Participants were asked how they perceive their personal trainers coaching style, by rating all 26 items on a 7-point scale from “Strongly disagree” (1) to “Neutral” (4) to “Strongly agree” (7). The participants were asked to respond honest and sincerely based on their experience with their personal trainer during the PT sessions.

3.4.2 Motivational Regulation

Participants’ motivational regulation for exercise and physical activity was measured with a modified version of the questionnaire *Exercise Self-Regulation Questionnaire (SRQ-E)*, a previous validated questionnaire (Ryan & Connell, 1989). The questionnaire originally contains 16 items, but were modified and shortened to 12-items. Motivational regulation was measured by capturing four different subscales; intrinsic, identified, introjected and

external regulation, with three items capturing each. Participants were asked to rate how various reasons to exercise applies to them, rating on a 7-point scale from “Not true at all” (1) to “Very true” (7).¹

3.4.3 Vitality

Vitality was measured with a 5-item version of a questionnaire developed by Ryan and Frederick (1997): *Vitality Questionnaire (VQ)*. The 5 items were: “I feel alive and vital”, “I have energy and spirits”, “I am often tired”, “I feel energized” and “I nearly always feel awake and alert”, translated to Norwegian. Participants were asked to respond to the items based on how they feel during their workouts, rating on a 7-point scale from “Not true at all” to “Very true”.

Vitality serves as a rather narrow and precise term and a subdimension of the broader constructs *well-being* and *quality of life*. It is defined as having the aliveness, enthusiasm and energy towards behavior. Thus, this term is directly related to motivation to behavior (Guerin, 2012), and were chosen as a measurement in the current study.

3.5 Factorial validity and reliability

All analyses of data were conducted using SPSS Statistical Software V 24. Only fully completed questionnaires were included in analyses ($n = 127$). Due to low frequency of men completing the analysis ($n = 18$ men, $n = 109$ women), data were analyzed across gender.

Prior to main analyses, the scales were tested for factorial validity and reliability. PCB and Vitality was factor analyzed using Principal Component Analysis with Varimax rotation (PCA-VA) as a dimension reduction technique. An Eigenvalue of above 1 was accepted for including components, and a loading factor above .55 was used as inclusion criteria for each item on the particular factors together with a marginal loading on the

respective other ones. Furthermore, internal reliability analyses were conducted on all remaining scales. A Cronbach's alpha of .70 or more was accepted. For measures of motivational regulation (SRQ-E), a Relative Autonomy Index (RAI) was calculated from a provided formula. Factorial validity analyses (PCA-VA) and internal reliability coefficients for PCB and Vitality are presented below.

3.5.1 Perceived Coaching Behavior

PCA-VA revealed Eigenvalues above 1 on only one component for Autonomy (51.5 % of variance), Competence and structure (60 % of variance) and Involvement Support (75 % of variance). All items from these dimensions loaded adequately and were contained. Reliability measures revealed adequate reliability for all three dimensions; Autonomy support (Cronbach's alpha = .79), Competence and structure support (Cronbach's alpha = .80) and Involvement support (Cronbach's alpha = .89).

For Controlling tendencies however, three components had Eigenvalues above 1, explaining 37 %, 13 % and 11 % of the variance. This reflects three different dimensions of Controlling tendencies (Table 2). Further analyses were conducted to investigate which items to ideally include in the sum score, by using PCA-VA and reliability measures. The results are presented below (Table 3 and Table 4).

Table 2: Principal Component Analysis of Controlling Tendencies: Rotated Component Matrix

	Component 1	Component 2	Component 3
CONT4 Use "must" and "have to"-statements	0.839	0.216	0.078
CONT3 Use a "no pain, no gain"-approach	0.813	0.144	0.094
CONT5 Emphasize consequences of not working hard	0.772	0.041	0.339
CONT8 Offers no choice or variety	0.103	0.779	0.21
CONT9 Keeps a distance from me	0.116	0.764	0.064
CONT6 Does not explain why I do things	0.078	0.681	0.122
CONT7 Less accepting of me if I don't do as expected	0.448	0.574	0.193
CONT1 Display no interest in my feelings	-0.015	0.179	0.851
CONT2 Do not value my opinions and preferences	0.254	0.11	0.788
CONT10 Encourage to compare myself to others	0.196	0.143	0.515
Eigenvalue	3.73	1.34	1.17
% of total variance	37.338	13.411	11.769
Cronbach's alpha	0.79	0.72	0.63

Table 3: Component Matrix of Controlling tendencies

	Component 1
CONTComp1: Items 3,4,5	.78
CONTComp2: Items 6,7,8,9	.79
CONTComp3: Items 1,2,10	.77

Extraction: 1 Component

Table 4: Reliability Statistics of Controlling tendencies

	Cronbach's alpha	# of items
CONTComp1	.79	3
CONTComp2	.72	4
CONTComp3	.63	3
CONT 1-10	.80	10

In reliability analyses of the three components of Controlling tendencies separately, it appears that CONTComp3 has a lower alpha value (Cronbach's alpha = .63) than CONTComp 1 and 2 (Cronbach's alpha = .79 and .72, respectively). Controlling tendencies all together (item 1-10) has a higher alpha value (Cronbach's alpha = .80). Additionally, in secondary PCA-VA, the Varimax rotation extracted only one second-order component. Due to this, the sum score for item 1-10 was chosen to retain in further analyses.

3.5.2 Motivational regulation

Relative Autonomy Index (RAI) was calculated for the motivational regulation scale, using the formula $2 \times \text{Intrinsic} + \text{Identified} - \text{Introjected} - 2 \times \text{External}$. A higher RAI-score reflects a relatively higher intrinsically regulated motivation, whereas a lower RAI-score reflects a relatively higher extrinsically regulated motivation. Internal reliability measures for each dimension reveals adequate coefficients; intrinsic regulation (Cronbach's alpha = .85), introjected regulation (Cronbach's alpha = .52), identified regulation (Cronbach's alpha = .70) and external regulation (Cronbach's alpha = .78). Introjected regulation was lower than recommended, however, because it was considered to not affect the total RAI-score to a significant extent, it was included as a part of the RAI-formula.

3.5.3 Vitality

PCA-VA conducted on all five items representing vitality (all five translated to Norwegian in the current survey), revealed one component with Eigenvalue above 1, explaining the variance with 59 %. The component reveals adequate factor loading and reliability in 5 items; "I feel alive and vital", "I have energy and spirits", "I feel energized" and "I nearly always feel awake and alert" and "I don't feel very energetic" (reversed). Reliability measures of the above mentioned five items revealed Cronbach's alpha of .80.

Table 5: Description of the assessed variables with example items

Concept	Questionnaire	# items	Example item	α
PCB: Autonomy Support	HCCQ -PAS	6	"My PT provides me choices and options"	.79
PCB: Competence/Structure Support	Markland & Tobin 2010	5	"My PT helps me feel confident during workouts"	.80
PCB: Involvement Support	Markland & Tobin 2010	5	"My PT shows me that I matter to him or her"	.89
PCB: Controlling tendencies	Ntoumanis et al. 2017	10	"My PT use "have to" and "got to" statements when instructing"	.80
MR: Intrinsic regulation	SRQ-E	3	"Because I simply enjoy working out"	.85
MR: Identified regulation	SRQ-E	3	"Because it is personally important to me to work out"	.52
MR: Introjected regulation	SRQ-E	3	"Because I feel pressured to work out"	.70
MR: External regulation	SRQ-E	3	"Because others like me better when I am in shape"	.78
Vitality	VQ	5	"I feel alive and energized"	.80

3.6 Ethical aspects

Ethical aspects apply to all forms of scientific work. Research ethics address the principles of moral and values that shall be preserved in various fields and issues in research; when designing and conducting research projects, how to treat human participants or animals and avoidance of misuse or misconduct of data material (ENERI, 2019). It is a generic concept that has led to institutionalized guidelines and legislations. One of the most central declarations stating ethical principles is The Helsinki Declaration, developed by the World Medical Association for medical and health research. It emphasizes the ethical principles to be considered in research involving human subjects (World Medical Association, 2013). The Declaration states that "*consideration for the subjects' health and integrity must take precedence over research and society*" (Dalland, 2007, p. 237). As researchers, one must act in best interest of the participants by

maintaining their health, well-being and rights (World Medical Association, 2013). Thus, the principles of the Helsinki Declaration are strictly followed, and the relevant principles in the current study will be presented in detail below.

3.6.1 Informed consent

Paragraph 26 of the Helsinki Declaration address the principle of informed consent. This is specified in the Nurnberg Code, which contains ethical principles that protect the rights of the subjects. It is required that the subjects are aware of what the study is about and that they understand the purpose of the study and the consequences of participating. In light of this, they should be able to make an independent and voluntary decision on participation (British Medical Journal, 1996). All necessary information was provided and specified on the first page of the questionnaire (Appendix 3). The participants had to agree to have read the terms and information before being able to continue the survey.

3.6.2 Burdens and risks

Paragraph 16 in the Helsinki Declaration reads: *“Medical research involving human subjects may only be conducted if the importance of the objective outweighs the risks and burdens to the research subjects”*. Considering this study includes a fully anonymous and confidential survey, there are no major drawbacks. The study is ethically sound and considers the participants’ privacy by ensuring their anonymity. Respondents’ answers in the survey can under no circumstances be traced back to either the client himself or his/her personal trainer. Other personal information will be kept confidential. The electronic survey system does not collect participants names or other personal data that could serve to disclose their identity. Each participant will only be associated with an identification number as part of the data analysis. This is stated in the informational section of the survey (Appendix 3), where all the information about project purpose, privacy and the right to

withdraw at any time without giving reasons are presented to the participant. Consent is obtained from each participant within the first page of the survey. The participant had to agree to participation before he or she is able to start the electronic survey. All personal trainers gave approval for their clients to participate in the study prior to forwarding the electronic survey to their clients.

3.6.3 Granted ethical approvals

Paragraph 23 of the Helsinki Declaration states that all research must be submitted to a national committee for privacy in research for approval (World Medical Association, 2013). Therefore, the project was submitted for approval in advance to the Norwegian Center for Research Data and the Norwegian School of Sport Sciences Ethical Committee, who evaluated the program to fulfill all requirements and granted ethical approval for conduction (Appendix 1 and Appendix 2). No funding was needed in the project.

3.6.4 Anonymity and confidentiality

Practicing *confidentiality* means preserving the safety of research participants. Data collected shall not be revealed to anyone with unauthorized access. Data material shall be contained safely and encrypted. Protecting *anonymity* means assuring that participants true identity are not exposed to neither the researcher or others. All individual data has to be connected to identification numbers (Olsson et al., 2003).

In line with paragraph 24 of the Helsinki Declaration about anonymity and confidentiality, the identity of both the participants and the personal trainers were protected. The personal trainers' names and emails were used in the process of submitting the survey. However, the PTs were solely used as third-party informants, for the purpose

of request to submit the survey further to respective clients. Their names and e-mail address were deleted after all data material was collected. The PTs data was not used in any statistical analysis or research processes.

Under no circumstances could the PT clients' identity be revealed. They received the electronic link to the survey by e-mail or text message from their PT and did not provide any personal information when completing the survey. The electronic system, SurveyXact, did not register any other additional information about the participants than their individual response to items. Individual responses are electronically logged with identification numbers. Since neither the PTs nor the clients provided any personal information, disclosure of their true identity is not possible.

3.7 Main statistical analyses

Subsequent to examination of factorial validity and internal reliability, all scales were transformed to sum scores to be used in main data analyses. According to Baron and Kenny (1986), three conditions must hold in order to establish mediation. Firstly, the independent variable has to affect the mediator in the first equation (path A). Secondly, the independent variable has to affect the dependent variable in the second equation (path C). Lastly, the mediator has to affect the dependent variable in the third equation (path B). If these conditions all hold in the predicted direction, then the effect of the independent variable on the dependent must be less in the third equation than in the second. Perfect mediation holds if the independent variable has no effect on the dependent when the mediator is controlled (Baron & Kenny, 1986, p. 1177). Partial mediation is considered to exist when the independent variable, while being reduced, still significantly relates directly to the dependent one. In line with the premises for testing mediation revealed above, potential mediation effects were investigated through step-wise regression analyses in which it was tested whether the direct effect of PCB on Vitality were significantly reduced when the added effect of the RAI was entered into the regression equation (Figure 4). All analyses were conducted in IBM SPSS Statistics Software V 24. Statistical significance was set at three levels; $p < 0.05$ (*), $p < 0.01$ (**), and $p < 0.001$ (***)).

While the Baron and Kenny approach is well respected, results obtained by this procedure may be further strengthened by supplementary use of mediation analysis using structural equation modeling (SEM) comprising latent variables. In particular using the Baron & Kenny approach it may be questioned whether the total mediation link is significant, even in the case that both path A and B each reveal to be significant. Even the

use of Sobel's test (Baron and Kenny, 1986) cannot make up for this. Moreover, by using SEM analysis, measurement errors are much better accounted for. In the current case, we took advantage of testing the mediating effect by SEM using a score consisting of intrinsic & identified regulation in the relationship between autonomy support and vitality. Moreover, it was considered important to explore the two of the three sub-dimensions of controlling tendencies (component 1 and 2 which obtained good reliability scores and the highest Eigenvalues) given that exploratory factor analysis of this construct revealed three dimensions in the Norwegian translation and that Ntoumanis and co-workers only reported on the one-dimensional ten item construct. Our focus was whether the two dimensions of controlling behavior related differently to vitality, either directly or mediated by regulation of motivation score as defined by intrinsic & identified regulation as described above.

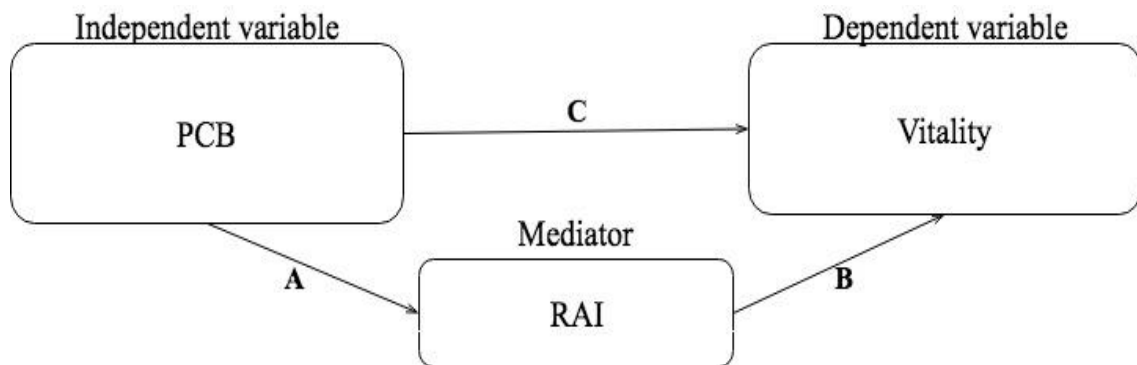


Figure 4 Construct of the step-wise linear regression analysis with mediation testing. Independent variable = Four subgroups of PCB. Dependent variable = Vitality. Mediator = RAI.

4.0 Results

Descriptive analyses and step-wise regression analyses with correlation coefficients and mediation for all variables are presented below.

4.1 Descriptive statistics and correlation coefficients

Table 6: Mean, SD and Correlation Metrics between main variables ($n = 127$).

	Mean	SD	1	2	3	4	5	6
1. Autonomy Support	6,35	0,66	1	.59***	.61***	-.36***	.21*	.43***
2. Competence Support	6,21	0,72	.59***	1	.54***	-.16	.25**	.27**
3. Involvement Support	5,72	1,15	.61***	.54***	1	-.22*	.27**	.30**
4. Controlling tendencies	1,97	0,92	-.36***	-.16	-.22*	1	-.19*	-.24**
5. RAI	7,33	3,95	.21*	.25**	.27**	-.19*	1	.25**
6. Vitality	5,56	0,93	.43***	.27**	.30**	-.24**	.25**	1

* Correlation is significant at 0.05 level

** Correlation is significant at 0.01 level

*** Correlation is significant at 0.001 level

4.2 Step-wise regression analyses and SEM analyses

4.2.1 Autonomy Support

In Model 1, (Figure 5) there is a direct positive relationship between autonomy supportive PT behavior and self-reported vitality during exercise (path C; $\beta = .40$, $p < .001$), and a positive relationship between autonomy support and RAI (path A, $\beta = .21$, $p < .05$). Moreover, the results revealed that RAI contribute significantly to Vitality (path B, $\beta = .21$, $p < .05$). When entering RAI in Model 2 in which the direct influence of autonomy supportive behavior is controlled for, the beta weight for Autonomy Support on Vitality is slightly reduced $\beta = .36$, $p < .001$. In other words, there is a partial mediation "effect" of

RAI in the relationship between Autonomy Support and self-reported Vitality. Mediation analysis using structural equation modelling with latent variables obtaining good fit indices (RMSEA =0.048; CFI = 0.96; SRMR = 0.06), revealed a similar pattern of results (Figure 9 in Appendix 4) (path C, beta= .35, p<.001), (path A, beta = .31, p<.001) and path B, beta = .48, p<.001).

A client that perceives his or her PT to be autonomy supportive experiences higher vitality during exercise. The effect is direct as well as indirect, mediated by RAI (stepwise regression analysis) and mediated by intrinsic & identified regulation of motivation (SEM analysis). Hence, through the eyes of clients, PT's that provide autonomy support to their clients seem able to enhance clients' vitality, directly, as well as indirectly by reinforcing more intrinsically regulations of motivation among them.

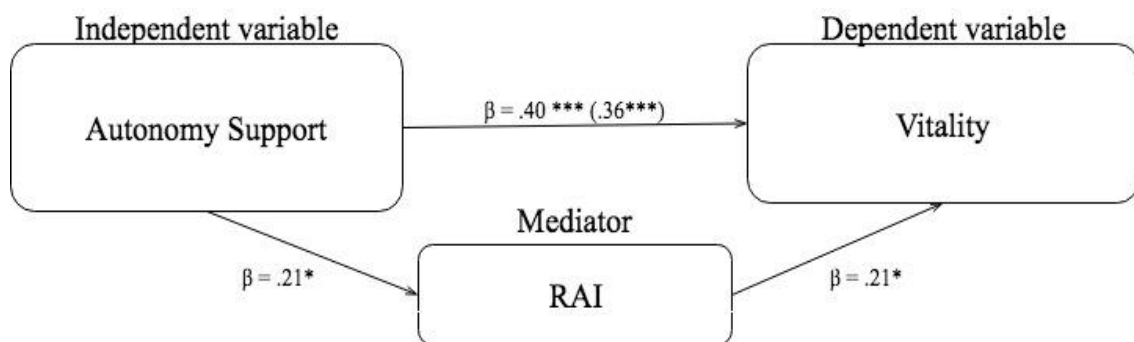


Figure 5: Linear regression analysis: Autonomy Support, RAI and Vitality. β = Standardized beta. Model 2 in step-wise analysis in parenthesis. * $p < .05$. ***. $p < .001$.

4.2.2 Competence/Structure support

As revealed in Figure 6, aside of a significant, direct relationship between competence support and vitality (path C, $\beta = .23$, $p < .01$), the requirements for mediation hold in that RAI significantly relates to vitality (path B $\beta = .24$, $p < .01$), and Competence/Structure Support relates positively to RAI (path A $\beta = .25$, $p < .01$). For Competence/Structure support, the analyses (Figure 6) show a full mediation effect by RAI. This is revealed by Model 1 results showing Competence/Structure support positively and significantly relates to Vitality (path C $\beta = .23$, $p < .01$), while being no longer significant when entering RAI into the equation in Model 2, (path A $\beta = .17$, $p > .05$). Mediation analysis using structural equation modelling with latent variables obtaining good fit indices (RMSEA = 0.054; CFI = 0.95; SRMR = 0.07), revealed a similar pattern of results (Figure 10 in Appendix 5) (path C, $\beta = .09$, $p > .05$, path A, $\beta = .39$, $p < .001$, and path B, $\beta = .49$, $p < .001$). Simply put, a PT client that perceives his or her PT to be supportive of Competence/Structure, experiences more vitality during exercise. Apparently so, due to support of competence/structure nurturing clients' relatively intrinsically regulated motivation, in turn mediating their experience of enhanced vitality.

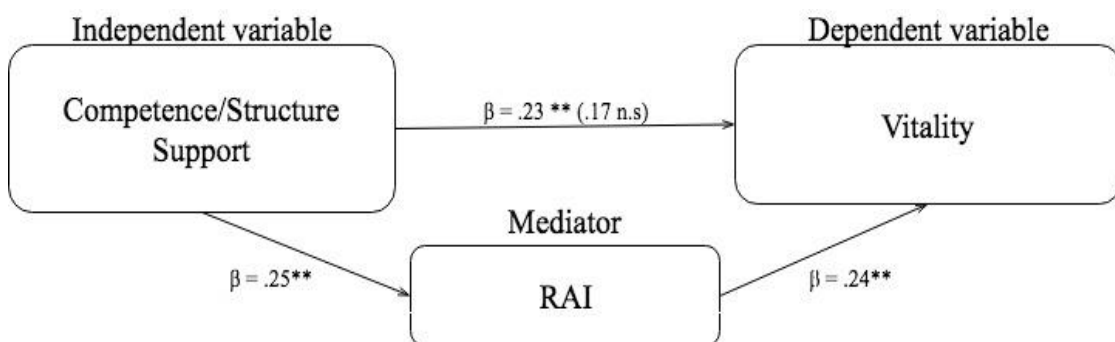


Figure 6: Linear regression analysis: Competence/Structure Support, RAI and Vitality. β = Standardized beta. Model 2 in step-wise analysis in parenthesis. ** $p < .01$. n.s = not significant.

4.2.3 Involvement support

As revealed in Figure 7, there is a direct positive effect of an Involvement support on self-reported vitality during exercise (path C, $\beta = .25$, $p < .01$) (Model 1). Moreover, criteria for mediation further hold in that RAI contributes significantly to Vitality (path B, $\beta = .23$, $p < .01$), and the relationship between Involvement Support and RAI is significant (path A; $\beta = .27$, $p < .001$). When entering RAI in Model 2, the beta for Involvement Support is somewhat reduced to $.19$, $p < .05$, thus still significant. Thus, both a direct and an indirect effect is indicated by this analysis. Mediation analysis using structural equation modelling with latent variables obtaining good fit indices (RMSEA = 0.055; CFI = 0.97; SRMR = 0.05), showed, however, that only the mediated (indirect) effect was significant (Figure 11 in Appendix 6) (path C, $\beta = .07$, $p > .05$), (path A, $\beta = .28$, $p < .001$) and path B, $\beta = .47$, $p < .001$). Put differently, whereas the Baron & Kenny analysis revealed a partial, positive mediation effect of RAI in the relationship between Involvement Support and self-reported Vitality, the SEM based approach revealed a mediated link only. Thus, a client that perceives his or her PT to be Involvement supportive, experiences higher vitality during exercise. According to the Baron & Kenny analysis directly as well as indirectly, by involvement supportive behavior reinforcing relatively higher intrinsically regulated motivation (RAI), in turn strengthening clients' perception of exercise vitality. According to the SEM analysis only directly.

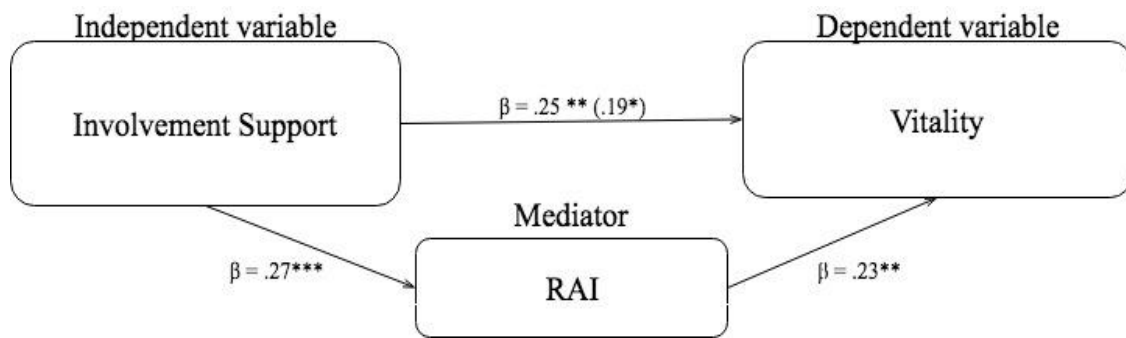


Figure 7 Linear regression analysis: Involvement Support, RAI and Vitality. β = Standardized beta. Model 2 in step-wise analysis in parenthesis. ** $p < .01$. * $p < .05$.

4.2.4 Controlling tendencies

As revealed in Figure 8, for Controlling tendencies (all ten items of the controlling behavior dimension), there is a significant negative relationship between controlling tendencies and vitality (path C; Model 1 $\beta = -.25$, $p < .01$). Additionally, the relationship between Controlling tendencies and RAI is significant (path A, $\beta = -.19$, $p < .05$). The relationship between RAI and Vitality is significant (path B, $\beta = .24$, $p < .01$, and when entered in step 2 (model 2), it can be observed that the direct relationship between controlling tendencies and vitality drops to $\beta = -.21$, $p < .05$. In other words, we can observe a modest mediation effect of RAI in the relationship between controlling PT behavioral tendencies and self-reported Vitality. Practically put, PT's that operate in a controlling manner vis a vis their clients, may come to reduced clients' self-reported vitality in exercise, not only directly, but also indirectly by reducing their clients' self-reports of relatively intrinsically regulated motivation when exercising.

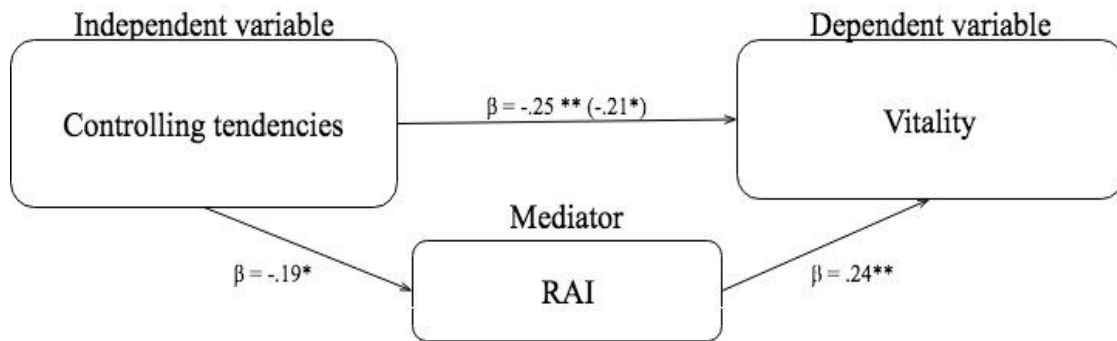


Figure 8 Linear regression analysis: Controlling tendencies, RAI and Vitality. β = Standardized beta. Model 2 in step-wise analysis in parenthesis. ** $p < .01$. * $p < .05$.

4.2.4.1 Controlling tendencies component 1 and 2

To further explore whether sub-components 1 and 2 identified by the SPSS factor analysis related differently to vitality either directly or mediated by the score consisting of intrinsic & identified regulation, the two components were tested in separate mediation analyses using structural equation modelling with latent variables. Both models obtained good fit (model component 1; RMSEA = 0.048; CFI = 0.97; SRMR = 0.06), and model component 2; RMSEA = 0.051; CFI = 0.95; SRMR = 0.06). The results for the two components were different as well as different from the results of the model in which the total score of ten controlling items were used (Figure 8). Results for component 1 revealed no direct or mediated effect. Only the link between the mediator (intrinsic & identified regulation) and vitality was significant (path B, beta = .53, $p < .001$), whereas path A, beta = .09, and path C, beta = -.16 both were insignificant, $p > .05$) (Figure 12 in Appendix 7). Results for component 2 revealed a direct effect (path C, beta = -.28, $p < .001$), whereas no mediated effect was observed due to a non-significant path A, between the predictor controlling tendencies component 2 and the mediator (beta = -.16, $p > .05$). Hence, in the mediation chain, only the link between the mediator (intrinsic & identified regulation) and vitality was significant (path B, beta = .48, $p < .001$) (Figure 13 in Appendix 8).

Apparently, teasing out the influence of the sub-components of controlling behaviors in the analyses has merit. Results suggest that controlling behaviors pertaining to adoption a "no pain-no gain" approach when instructing clients, making use of "have to" and "got to" as well as motivating clients by drawing attention to the consequences of not working hard enough, do not seem to deprive clients from a sense of vitality in exercise. In contrast, personal trainers who are making use of language indicating lack of explanations during clients' work-out, appearing less accepting of their clients if they do not follow up the PT's expectations, not offering much variety and choice as well as keeping distance from their clients, seem far more at risk for lowering their clients' sense of vitality in exercise.

4.3 Variance in Vitality explained by independent variables

Autonomy support, Competence/Structure support and Involvement support all together explained 9 % of the variance in intrinsically regulated motivation (high RAI-score) and 16 % of the variance in enhanced self-reported vitality among the clients. When adding RAI to the equation, the total explained variance in self-reported vitality was 21 %. On the other hand, Controlling tendencies alone explained 6 % of the variance in reduced vitality.

5.0 Discussion

This study serves as a contribution to scarce literature on the personal trainer/PT-client-relationship in the fitness center industry. Considering the large contribution the fitness center industry has in a global public health perspective by increasing physical activity levels, it is certainly an important venue of interest in contemporary science. Advanced knowledge is needed about how personal trainers and other health professionals should act in relation to their clients, in order to most optimally influence and facilitate their motivational quality and long-term adherence to exercise and physical activity.

To our knowledge, there is only one former study based on the Self-Determination Theory in the fitness center context between the PT and their respective clients. The study found, in line with SDT-framework and subsequent research in other contexts, that need supportive coaching enhance motivational regulation (Klain et al., 2015). However, the SDT also propose mental well-being during an activity as an important determinant for sustained motivation. Therefore, this study sought to investigate how the personal trainers' coaching style perceived by their client can impact subjective vitality, as well as whether it potentially is mediated by motivational regulation. Moreover, adding to previous research, the study captures all dimensions of need supportive coaching behavior in an SDT-perspective, three positively influencing behaviors and one negative; Autonomy Support, Competence/Structure Support, Involvement Support and Controlling tendencies, respectively.

5.1 Discussion of statistical findings

5.1.1 Need supportive coaching

It appears from the findings in this study, aligning well with theoretical SDT-framework (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017), that need supportive behavior promotes PT clients' vitality and well-being, directly as well as indirectly mediated by high intrinsically regulated motivation, whilst oppositely, controlling tendencies thwart it. This is apparent in the step-wise linear regression analyses using simple mediation testing suggested by Baron & Kenny (1986), and further spelled out more in more detail through fine-grained SEM analyses.

Autonomy support seems to be partially mediated by high intrinsically regulated motivation. Practically put, if the PT acts autonomy supportive by providing the client with choices and options, explaining thoroughly and encourage questions, listens, acts understanding and conveys confidence in their capabilities, the client experiences higher vitality and well-being during the activity. As the partial mediation results revealed, this may to some extent be explained by autonomy supportive coaching behaviors leading to more intrinsically regulated types of motivation, in turn influencing vitality. Vitality is shown to promote adherence and persistence (Kinnafick et al., 2014; Solberg, Halvari, Ommundsen, & Hopkins, 2014). Additionally, former research have found that autonomy support from the instructor leads to longer adherence to exercise (Klain et al., 2015). Drawing on this, it seems that PTs should act autonomy supportive to promote long term adherence to physical activity. Seemingly, coaching clients to become more independent when exercising may be efficient in the long run.

The need for *Competence and Structure* as well related positively with higher vitality, but fully mediated by high intrinsically regulated motivation. Both the step-wise

regression based mediation analysis and the SEM based analysis supported this claim. This promotes the thought that the PT should reward mastery and learning, support confidence in own abilities, emphasize effort and provide clear guidance and advice, in order to enhance clients' feeling of competence. Our findings, in line with former research (Teixeira et al., 2012), show that such coaching behaviors relates positively to intrinsically regulated motivation and in turn, higher well-being. If the client feels competent around exercising, more vitality and positive experiences are present, leading to an inner desire to sustain the activity. The achievement goal theory by Amorose (2007) provides a supplementary theoretical framework for competence promotion, stating that a mastery motivational climate will enhance the sense of competence, whilst a performance motivational climate may oppress it. Accordingly, to enhance the feeling of competence and possibly longer adherence to exercise, coaches, aside of providing useful advice, clear expectations and help clients feel confident, should emphasize and reward clients' effort, learning, relative improvements toward self-set goals and mastering of optimally challenging tasks, rather than promoting unrealistic goal settings, comparing to others and punishing mistakes and inferior performance.

Involvement support was shown to have a direct path to vitality. But, an indirect one as well was observed, mediated by intrinsically regulated motivation in the step-wise regression based analysis. This indirect effect was further supported by the SEM based analysis. Involvement is otherwise referred to as relatedness. When clients feel related, they feel socially connected to their respective PT. They feel cared for and acknowledged. This leads to higher vitality and well-being. Apparently so, also due to social involvement eliciting high intrinsically regulated motivation among clients (at least in the step-wise regression analysis). As the social context is an essential venue for experiencing relatedness, and the personal trainer and their clients spend a vast amount of time together

during sessions, it is presumable to believe that this social setting itself will promote relatedness. However, appearing empathetic and understanding, genuinely showing interest and acknowledge feelings and thoughts will make the client feel seen, heard, respected and valued, accordingly flourish the sense of relatedness.

In sum, coaching behavior that supports basic psychological needs autonomy, competence and relatedness acts positively towards intrinsically regulated motivation and vitality during exercise. Former studies have commonly had a mere focus on coaches' autonomy supportive behaviors and clients need satisfaction, while to a much lesser extent lacking explicit measurements of competence and relatedness supportive coaching (Hancox, Quested, et al., 2015; Klain et al., 2015; Moreno-Murcia et al., 2017; Ntoumanis et al., 2017; Rodrigues et al., 2018). The current study manages to capture perceived support of all three basic needs from personal trainers to respective clients in a fitness center context, and finds that they all relate to higher intrinsically regulated motivation and vitality. These are promising findings, as they correspond with the SDT and other research stating that fulfilled basic needs, intrinsically regulated motivation and vitality leads to long term adherence to behavior. This suggests that PTs and other health professionals should emphasize all need supportive behavior, that is competence and relatedness as well as autonomy, which may help fuel intrinsic motives for taking part in physical training. This may help preventing pure external forms of motives or goal contents such as body shape, attractiveness and change in body composition to become the primary ones for practicing physical training (Donaghue & Allen, 2015).

5.1.2 Controlling tendencies

When analyzing *Controlling tendencies* in coaching behavior, the ten items comprehensively were shown to be directly and negatively influencing vitality, partially

mediated by reduced intrinsically regulated motivation. The ten items capture controlling behavior with not providing choices and options, keeping a distance to clients, encouraging to compare against others rather than themselves, emphasizing consequences of not working hard enough and acting less accepting if the clients are not doing what is expected from them. As a unitary principle, this type of behavior seemingly directly reduces clients' sense of vitality, but also to some extent negatively affect their intrinsically regulated motivation. This pattern of results confirms the self-determination framework and subsequent research (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017; Teixeira et al., 2012), by suggesting that feeling controlled is akin to negative feelings such as rejection and pressure, which in turn impacts our levels of energy towards behavior, our vitality and well-being. Low levels of vitality will likely lead to faster dropouts (Moreno-Murcia et al., 2018), which suggests that if PTs and other health professionals sustains controlling tendencies when coaching, it may over time result in decreased physical activity levels.

5.2 Controlling tendencies – only a back side of the coin?

5.2.1 Differing results in nuances of controlling behavior

Through initial factorial analyses, several components of controlling tendencies were revealed. It appeared that controlling behavior may be nuanced. From a theoretical point of view this was particularly interesting, as it raised questions; can the different dimensions influence clients differently? Can some controlling behaviors be more positively perceived by some clients, whereas others perceive them negatively? To explore this matter, it was decided to conduct further analyses of two of the three sub-dimensions. Component 1 consisted of items capturing coaching behaviors such as using “have to”, “got to” and “no pain, no gain”-statements when coaching, as well as

emphasizing consequences of not working hard enough. Component 2 captures tendencies of keeping a distance, offering no choice or variety, not explaining why and appearing less accepting (Table 2). Interestingly, results revealed that the two dimensions did in fact differ from each other, as well as differing from the effect of the ten items in total. Component 1 had no effect on vitality, neither directly, nor mediated by intrinsic & identified regulation (Figure 12 in Appendix 7). Component 2 had a direct negative effect on vitality, whereas no mediation effect was observed (Figure 13 in Appendix 8). Thus, it seems that some behaviors conceptualized as controlling behaviors such as coercive speaking and comparing to others (Component 1) is not perceived to affect vitality, whilst other controlling types of behaviors do (Component 2). As Component 2 captures behaviors that are naturally perceived negatively (keeping a distance and appearing rejecting), it is more readily explainable that such behaviors will provoke negative emotions, less vitality and well-being. Component 1, however, captures behaviors that can be argued to represent a typical cultural norm in the fitness center industry. Typical “Boot Camp”-inspired circuit training has become a popular training method, along with coaches appearing “controlling” in this exact manner; pushing the client to work harder with coercive speaking and emphasizing consequences. It seems as clients may be more accepting of this type of coaching behavior. At least, such behavior by PTs', does not seem to affect clients' vitality negatively. Such types of behaviors may be considered as culturally accepted, it may even be presumable to believe that it can impact positively for completion of a single exercise-bout or a short-term program. Despite this, we do not know how the effects carries out in a long-term perspective on adherence to exercise. A client engaging in PT sessions with a controlling PT may be acutely motivated, however when the PT sessions stops, or when they are asked to exercise independently, they may be less able to motivate themselves. Further studies are needed to explore how these types

of coaching communication impact motivation acutely as well as in a long-term perspective.

5.2.2 Personality differences

Even though the collapsed sum score of controlling tendencies generally were shown to be negatively related to regulation of motivation and vitality, and the different sub-dimensions revealed differing results, one cannot rule out that results might have been finely tuned if an examination of clients' personality types had been included in the analyses. This line of reasoning is supported by the SDT sub-theory, causality orientations, which deals with the idea that individuals have different personalities and preferences, thus are motivated in different ways. Some may be motivated by a more controlling approach and likes to be told what to do, whilst others don't. Deci and Ryan (1990) differentiate people in *autonomy-oriented*, *control-oriented* and *impersonal-orientated*. An *autonomy-oriented* individual is behaving based on self-endorsed interests, values and beliefs; general self-determined behavior. A *control-oriented* individual is dependent on externally controlled factors on how they should act; they value being controlled by incentives and directions from others rather than by own values and wants. They often place importance to external outcomes rather than internal. An *impersonal-oriented* individual believes that his or her behavior is out of their control; what they achieve is simply a matter of luck, and they have a sense of not being able to affect desired outcomes. Such individuals often tend to be anxious and feel ineffective and amotivated (Deci & Ryan, 2000; Deci & Ryan, 1990).

Accordingly, each person is differentially motivated. If so, it is presumable to think that control-oriented individuals may benefit from some forms of controlling tendencies. For instance, some clients may be motivated by coercive speaking and

consequences, or by being compared to others. Furthermore, hiring a personal trainer is in fact giving the responsibility for one's workout routine and programs to the trainer. People may want a trainer for the sake of being externally controlled and not having to deal with the programming themselves. Thus, it is presumable to believe that individuals engaging in PT sessions may be mainly control-oriented, whilst other autonomy-oriented individuals want to control their exercise themselves and does not seek to personal training. One can also argue that control-oriented individuals actually experience a sense of autonomy, as they volitionally want more clear direction and controlled guidance. However, some controlling tendencies such as rejection, less acceptance and devaluation, may be expected to be perceived negatively by people in general.

These suggestions are beyond the scope of this study, however, and further research on the different dimensions of controlling coaching behaviors and its relation to various types of personality is needed to provide a deeper understanding. A full examination of the outcomes of controlling tendencies is dependent on considering also the clients' personality orientation. Future studies are encouraged to investigate this matter. Additionally, it would be of particular interest to investigate acute influence versus long-term influence of coaching styles on sustained exercise and physical activity. A thought is that some individuals may be motivated by controlling coaching such as external goal setting and coercive speaking in the initial phases of the physical activity engagement, albeit as they move through the internalization process, what keeps them motivated in the long-term is more autonomy supportive coaching and intrinsic motivation.

5.3 Extrinsic vs. intrinsic goal setting in personal training

A common reason to seek out to personal training is appearance-based goals such as achieving a specific body composition, gain of muscle or weight reduction (Donaghue & Allen, 2015), goals that in fact are externally oriented, as they are controlled motives. They may be controlled by the clients themselves by felt societal pressure such as “I feel the need to appear attractive, because others will become more accepting of me” or “I will gain more self-confidence as soon as I look better”. They may also be enforced by significant others, such as a spouse or family members expressing opinions about e.g. weight loss or body composition. This is in line with introjected regulation, where the individual is mostly externally controlled, but is administered by themselves. They are engaging in exercise because they think they should. Identified regulation is also somewhat externally controlled, however, the individual has moved forward in the internalization process and is slightly more committed. Deci and Ryan (2000) suggests these types of regulation provides higher chance of maintenance, but still are relatively unstable. This is evident in Teixeira et al. (2012) where autonomous external types of motivation (introjected and identified) were shown to predict short-term adherence. They also found intrinsic motivation to be predictive of long-term adherence. As such, it seems that having a sole focus on such goals may be efficient in the initial phases of exercising, albeit not in the long term.

A qualitative study on 12 personal trainers revealed that appearance-based external goal settings such as weight loss, muscle gain and change in body composition were typically the most common reason clients engaged in personal training sessions (Donaghue & Allen, 2015). Seemingly, the practical norm in the fitness center context is in fact reaching towards such externally based goals. However, some studies have shown associations between aesthetic goal settings and higher levels of self-objectification,

disordered eating and body dissatisfaction (Prichard & Triggerman, 2005); experiences contrasting to well-being that may cause detrimental impacts on mental health. They may potentially cause more harmful and iatrogenic effects than positive outcomes (Donaghue & Allen, 2015). This aligns well with findings in this study, in line with the SDT and subsequent research, stating that extrinsic motivation leads to reduced vitality. Additionally, it is plausible that once the external pressure is removed or when they have achieved their specific goal, the behavior diminishes. Seemingly, to sustain exercise over time and to avoid detrimental outcomes, a higher emphasize should be placed on intrinsically regulated motivations such as enjoyment in exercising itself, felt mastery and competence, going beyond the typical appearance-based achievements. It is of importance that personal trainers gain expertise on how to steer their clients towards more intrinsically regulated goal settings, to prevent dropouts and facilitate for long-term adherence. Through the internalization process (Figure 3), they can motivate clients that originally sought for external achievements to rather move towards intrinsically regulated motivation.

5.4 Summary of findings, practical implications and future research

The findings from this study all align well with the SDT. Need supportive coaching behavior influence vitality and well-being positively, whilst oppositely, controlling coaching behavior thwart it. This study elucidates the fact that the PT's coaching behavior will influence their clients' well-being and motivation to physical activity, which may impact long-term adherence.

Factorial analyses of controlling tendencies provide interesting findings. Several dimensions of controlling behavior appeared, raising the question whether controlling tendencies is a unidimensional construct. This opens for future research investigating whether some of these controlling dimensions may be beneficial for some individuals dependent on personality, or in some parts of the exercise and physical activity initiation process. Irrespectively, behavior that is perceived negatively will naturally decrease well-being, which in extensive former literature is shown to conduce dropouts. Thus, any kind of coaching that promotes negative reactions should generally be avoided. A suggestion is keeping an open and on-going dialogue with the client on how he or she perceives the coaching strategies. External goal settings, a common reason for individuals to approach personal training, should be used with caution until further investigated.

It is of interest to pursue further knowledge on how various coaching styles may impact clients in a longitudinal perspective, both with engaging in PT sessions over time, as well as adherence to exercise and physical activity post PT assistance. Some individuals may be motivated by controlling coaching and external regulations such as external goal setting and coercive speaking in the initial phases of the physical activity engagement, albeit what keeps them motivated in the long-term is more autonomy supportive coaching and intrinsic motivation.

This study underscores that as a PT, or as any health professional, trainer or coach, it is important to be aware of one's actions, behaviors and attitudes. As explained initially, the fitness center industry largely and expandingly contributes to global physical activity levels. This is an important consideration; any small impact each PT may have on their respective clients, contributes to promote physical activity levels and subsequently enhanced public health.

5.5 Strengths and limitations

The current study contains several strengths. It includes a large research sample of PT clients gathered from a fitness center chain, all currently or recently having engaged in PT sessions for at least 10 sessions, and up to 50+ sessions. This reduces the risk of threat to validity due to recall bias. The questionnaire was strictly anonymous, with no chance of tracing the answers back to the individual participants. The participants were made aware of this, which reduce or exclude the risk of social desirability bias. Since the study is conducted in a fitness center context, it is generalizable to other PT clients in the fitness center industry. Considering the increasing popularity of this industry, this serves as an important strength as it adds to the understanding of how to manage physical activity levels in the modern society. Research in this relatively new field is rather unrepresented in the existing literature.

Our measures included four dimensions of coaching behavior, three need supportive behaviors (autonomy, competence and relatedness), and one need thwarting behavior (controlling tendencies), suggested from former literature (Deci & Ryan, 1980; Deci & Ryan, 2000; Deci & Ryan, 2007; Deci & Ryan, 2017; Teixeira et al., 2012). A majority of former research emphasize autonomy support, and to various extents fails to explicitly measure competence and relatedness supportive coaching dimensions.

According to the SDT and subsequent literature, all basic needs should be fueled and need thwarting behaviors should be avoided (Deci & Ryan, 2017; Nix et al., 1999; Ryan & Frederick, 1997). Thus, the present study provides first-hand experience in investigating several dimensions at the same time for the PT/client relation in the exercise and fitness center domain. As we manage to capture four different dimensions with our measurement instrument, gathered from Ntoumanis et al. (2017), we were in a unique position to investigate a broader aspect of the coaching role and how it impacts the client in a PT setting.

Subsequent to primary analyses in SPSS, further analyses were conducted using structural equation modelling. This allowed for a more thorough examination of the research questions, including also further exploration of the differing effects on vitality from sub-components of controlling tendencies found in initial factorial analyses. It provided a more nuanced analysis of mediation in which unsystematic error in all variables were controlled for (Geiser, 2013).

Despite the strengths, the study includes limitations. The study is cross-sectional, hence no causality can be inferred. Clients experiencing more vitality during the session may perceive their coach to be more need supportive, simply because they feel socially connected to their PT, or because they perceive the PT session as a positive experience in itself. Albeit reasonable internal validity and generalizability, such limitations should be regarded when interpreting the results. To explore causality, prospective and experimental studies are required. This would also be profitable to allow for further investigations of acute versus long-term effects of coaching methods.

Moreover, the validity of the measures was investigated through exploratory factorial analyses using SPSS. Ideally, when translating the questionnaire used, one would also need to confirm the validity of the translated constructs using a different sample before including these into the current main sample. Nevertheless, all mediation models using the added SEM based mediation models obtained good fit indices, reflecting that the measurement models of the latent constructs were satisfactorily.

6.0 Conclusion

The current study replicates previous findings from Self-Determination based research. Results reveal positive relationships between need supportive coaching behavior (autonomy, competence and relatedness) perceived by the client and experienced vitality during exercise. Most relations were shown to be partially mediated by the clients' regulation of motivation. Additionally, when making use of perceived controlling coaching behavior as a unified construct, such types of behavior were directly and negatively influencing experienced vitality, as well as indirectly by reducing their intrinsically regulated motivation.

These findings contribute to the assumption that the theoretical framework of the SDT also is applicable in a fitness center context between personal trainers and their respective clients. The SEM based analyses, using sub-components of controlling behaviors, did, however reveal a bit more differentiated pattern of results, attesting to the need to further examine the conceptualization of controlling types of behavior. Coaching behaviors with coercive speaking and emphasizing consequences seemingly does not affect vitality, whilst behaviors that are naturally perceived negatively (e. g. keeping a distance and appearing rejecting), do. Exploring how sub-dimensions of coaching behavior impacts vitality acutely and in a long-term perspective, as well as including measures of individual differences in clients' personality orientations, would be particularly interesting.

The fitness center sector as investigated in the current study has expanded as an arena for physical activity promotion. Accordingly, the personal trainer profession has increasingly grown to be a comprehensive profession. Proper expertise and professionalization on how to meet clients with quality guidance is severely important,

not only for physiological, but also psychological aspects. The current study examines the psychological aspects in the interaction between personal trainers and their respective clients, thus serves as an important contribution in understanding clients' motivation to sustained physical activity and exercise, which in turn can provide major positive outcomes in a public health perspective.

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Appendix 1

Approval letter for storage of personal data from Norsk Senter for forskningsdata (NSD)

NSD Personvern

03.04.2019 14:05

Det innsendte meldeskjemaet med referansekode 590508 er nå vurdert av NSD.

Følgende vurdering er gitt:

Det er vår vurdering at behandlingen vil være i samsvar med personvernlovgivningen, så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet 03.04.2019 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER

Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET

Prosjektet vil behandle særlige kategorier av personopplysninger om helseforhold og alminnelige personopplysninger frem til 31.10.2019. Data vil bli oppbevart videre til forskningsformål frem til 31.10.2025.

LOVLIG GRUNNLAG

Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 nr. 11 og art. 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse, som kan dokumenteres, og som den registrerte kan trekke tilbake.

Lovlig grunnlag for behandlingen vil dermed være den registrertes uttrykkelige samtykke, jf. personvernforordningen art. 6 nr. 1 a), jf. art. 9 nr. 2 bokstav a, jf. personopplysningsloven § 10, jf. § 9 (2).

PERSONVERNPRINSIPPER

NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke viderebehandles til nye uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER

Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19). I tillegg til utvalg 1 ha rett til dataportabilitet (art. 20) og tredjepersoner til protest (art. 21).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13 og 14.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER

NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

SurveyXact er databehandler i prosjektet. NSD legger til grunn at behandlingen oppfyller kravene til bruk av databehandler, jf. art 28 og 29.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET

NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Kajsa Amundsen
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Appendix 2

Copy of the e-mail from The Norwegian School of Sport Sciences ethics committee, confirming that the project did not involve significant potential for harm or strain beyond normal risk and burden for research participants. The project fell outside the guidelines for application to the ethical committee, thus were approved for initiation.

From: Turid Sjøstedt [turid.sjostedt@nih.no]

Sent: 26. februar 2019 13:34

To: Anna Elise Evensen [annaeevensen@hotmail.com]

Subject: Sv: Søknad til NIH etiske komité: Anna Elise Evensen

Hei,

Det vises til retningslinjene for behandling av søknader til etisk komite hvor det fremgår følgende; (alle tre punktene skal være oppfylt) Idrettsvitenskapelig forskning på mennesker skal ha godkjenning fra NIHs etiske komite dersom forskningsprosjektet:

- * ikke er fremleggelsespliktig for REK (som faller utenfor Helseforskningslovens virkeområde),
- * involverer mennesker direkte i form av intervensjoner (psykisk og/eller fysisk),
- * har betydelig potensial for skade og belastning utover hva som kan regnes som normal risiko og belastning for deltaker.

Forskningsprosjekter som involverer sårbare grupper, herunder deltakere uten samtykkekompetanse, skal ALLTID godkjennes av NIHs etiske komite i de tilfeller prosjektet ikke er fremleggelsespliktig for REK.

Prosjektet "Personlige treners veiledningsstil i relasjon til kundenes motivasjonskvalitet og subjektive vitalitet" innebærer ikke betydelig potensiale for skade og belastning utover normal risiko og belastning for forskningsdeltakerne (ref også pkt 4.2 i søknadsskjemaet for prosjektet). Utvalget involverer ikke sårbare grupper. Prosjektet faller således utenfor retningslinjene for søknad til NIHs etiske og kan igangsettes når vurdering og vilkår fra NSD er mottatt og hensyntatt.

Ta kontakt hvis noe er uklart.

Mvh Turid

Appendix 3

Survey capturing PCB, RAI and Vitality, including informed consent.

Velkommen til undersøkelsen "Personlige treneres veiledningsstil i relasjon til kunders motivasjonskvalitet og overskudd/tilfredshet".

Hei,

Du er utvalgt til å delta fordi du har fullført 10 eller flere timer med personlig trener gjennom et treningssenter. Din personlige trener har samtykket til at du deltar i studien, og sender denne linken til deg på vegne av meg som forsker.

Studien vil kunne bidra til avklaring av behovet for økt fokus på dette i utdannelsesforløpet til personlige trenere, med sikte på høynet kvalitet på motivasjon og deltakelse i fysisk aktivitet blant kunder. Ditt svar er et viktig bidrag til økt forståelse rundt dette.

Det understrekes at din besvarelse er frivillig og anonym. Dine svar vil ikke kunne spores tilbake til deg som enkeltperson. NSD – Norsk senter for forskningsdata AS har vurdert at prosjektet er i samsvar med personvernregelverket. Din deltakelse vil heller ikke under noen omstendighet påvirke din relasjon til det aktuelle treningssenteret eller din personlige trener.

Det vil ta deg ca. 5-10 min å svare.
Tusen takk for at du tar deg tid til å svare!

Med vennlig hilsen,
Anna Elise Evensen
Masterstudent ved Norges Idrettshøgskole

Samtykke til å delta

Jeg har forstått informasjon om prosjektet. Jeg samtykker til å delta ved å fylle ut dette spørreskjemaet, hvor mine svar er anonyme og ikke sporbare tilbake til meg som person.

Hva er din alder?

18-25
26-35
36-45
46-55
56-65
65+

Kjønn

Mann
Kvinne

Videre finner du en rekke utsagn vedrørende din personlige treners veiledningsstil, samt din egen motivasjon, overskudd og tilfredshet i forbindelse med treningen din. Jeg ber deg om at

du leser spørsmålene nøye og svarer ærlig og oppriktig. Trykk på neste for å starte undersøkelsen. På forhånd tusen takk!

Personlig treners veiledningsstil

Personlige trenere kan ha ulike veiledningsstil i møte med sine kunder.

Hvordan opplever du din personlige trener?

Kategoriene er som følger:

Sterkt uenig		Nøytral			Sterkt enig	
1	2	3	4	5	6	7

Min PT gir meg valgmuligheter og alternativer

Min PT forsøker å se ting fra mitt ståsted

Min PT formidler at han/hun har tillit til min evne til å gjøre det bra under våre treningsøkter

Min PT oppmuntrer meg til å stille spørsmål

Min PT lytter til ønsker fra min side under treningsøktene

Min PT forsøker å sette seg inn i hvordan jeg ser ting før han/hun foreslår nye løsninger

Min PT viser ikke interesse for hvordan jeg føler meg

Min PT er ikke opptatt av mine meninger og preferanser

Min PT benytter en "no pain, no gain"-tilnærming når han/hun instruerer

Min PT benytter seg av "skal" og "må" under instruering

Min PT legger vekt på konsekvensene av å ikke trene hardt nok

Min PT forklarer ikke hvorfor når han/hun ber meg om å gjøre noe

Min PT er mindre anerkjennende overfor meg når jeg ikke gjør det han/hun forventer

Min PT gir meg ikke mye valgfrihet eller variasjon i treningsøktene

Min PT holder en viss avstand fra meg

Min PT oppmuntrer meg til å sammenlikne meg selv med andre

Min PT gir meg personlig nyttige råd

Min PT gjør det klart og tydelig for meg hva jeg behøver å gjøre for å oppnå resultater

Min PT gjør det klart og tydelig for meg hva jeg kan forvente å få igjen for treningsøktene

Min PT tilpasser treningsøktene slik at det passer mitt nivå

Min PT bidrar til at jeg opplever selvtillit under treningen

Min PT setter av tid til meg utenfor treningsøktene våre dersom jeg har behov for det

Min PT viser at jeg betyr noe for han eller henne

Min PT er opptatt av mitt velvære

Min PT tar vare på meg

Min PT bryr seg om meg

Grunner til å trene

Folk kan ha ulike grunner til å trene. **Hvor sant er de ulike grunnene nevnt under for at du er treningsaktiv?**

Kategoriene er som følger:

Ikke sant i det hele tatt							Veldig sant
1	2	3	4	5	6	7	

Fordi andre liker meg bedre når jeg er i form

Fordi jeg vil at andre skal se på meg som i fysisk form

Fordi det hjelper på mitt «image»

Fordi jeg har det ikke bra med meg selv hvis jeg ikke trener

Fordi jeg er redd for å bli i for dårlig form

Fordi jeg føler meg presset til å trene

Fordi trening er viktig og fordelaktig for min helse og livsstil

Fordi det er personlig viktig for meg å trene

Fordi jeg verdsetter sterkt å være fysisk aktiv og sunn

Fordi jeg liker det å trene i seg selv

Fordi det er gøy og interessant

På grunn av gleden ved å oppdage og mestre nye ferdigheter og treningsteknikker

Overskudd og tilfredshet

Under er det ulike utsagn vedrørende hvordan man kan oppleve og føle seg når man trener. **Angi i hvilken grad hvert av utsagnene stemmer for deg når du deltar på PT-treningen din?**

Kategoriene er som følger:

Ikke sant i det hele tatt			Delvis sant				Veldig sant
1	2	3	4	5	6	7	

Jeg føler meg levende og vital

Jeg har mye energi og pågangsmot

Jeg føler jeg har overskudd

Jeg er ofte trett og sliten

Jeg føler meg nesten alltid klar og våken

Appendix 4

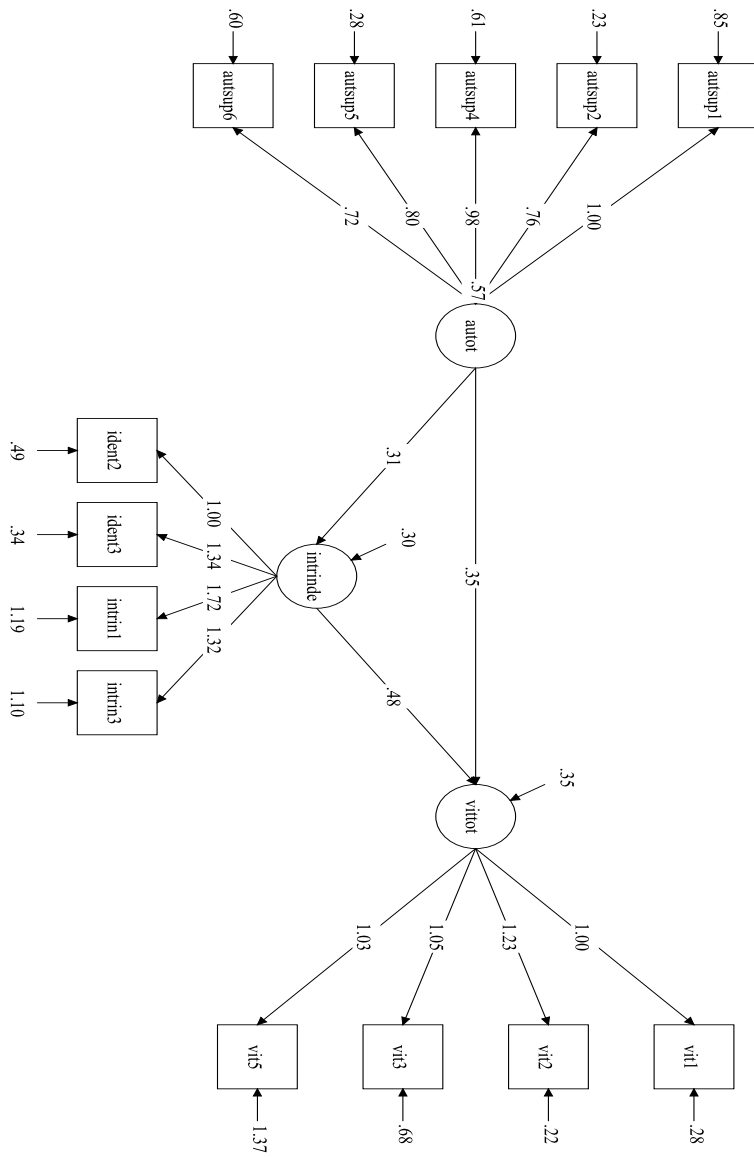


Figure 9 SEM analysis of Autonomy Support

Appendix 5

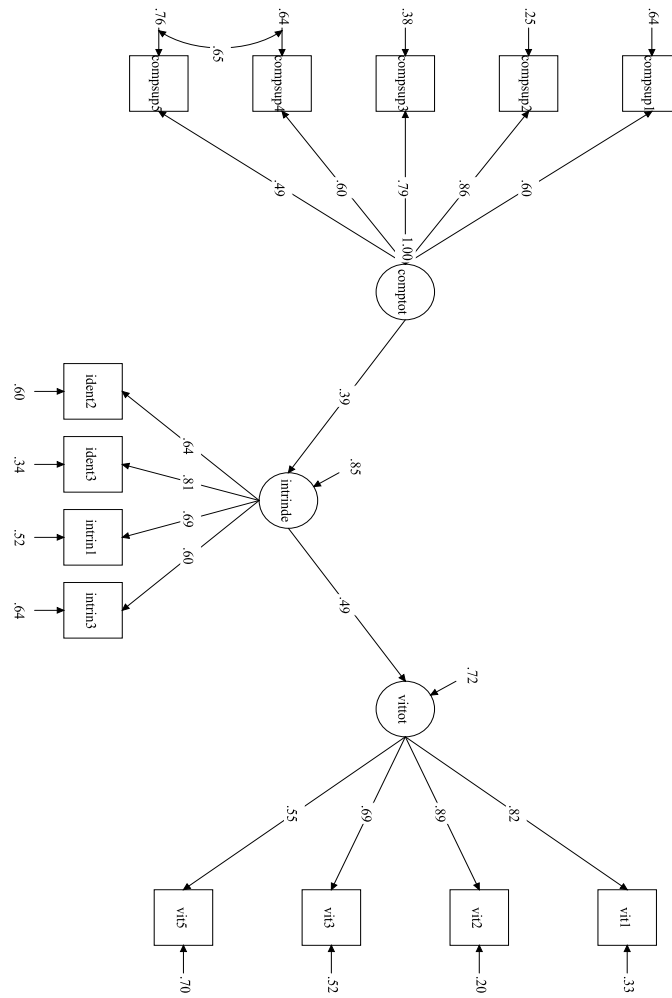


Figure 10 SEM analysis of Competence Support

Appendix 6

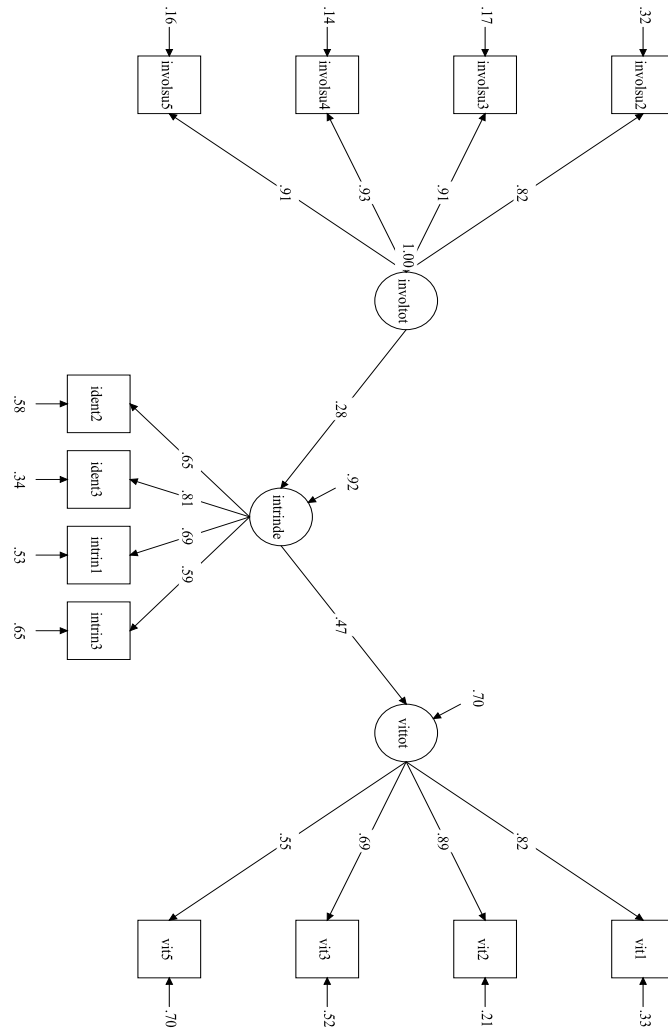


Figure 11 SEM analysis of Involvement Support

Appendix 7

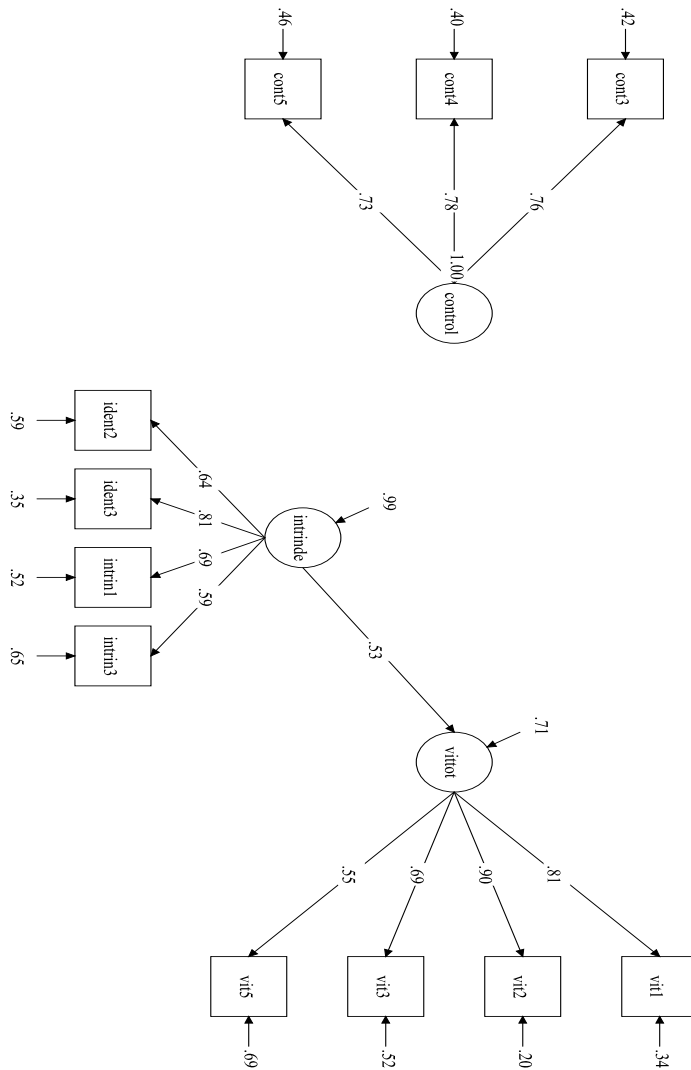


Figure 12 SEM analysis of Component 1 – Controlling tendencies

Appendix 8

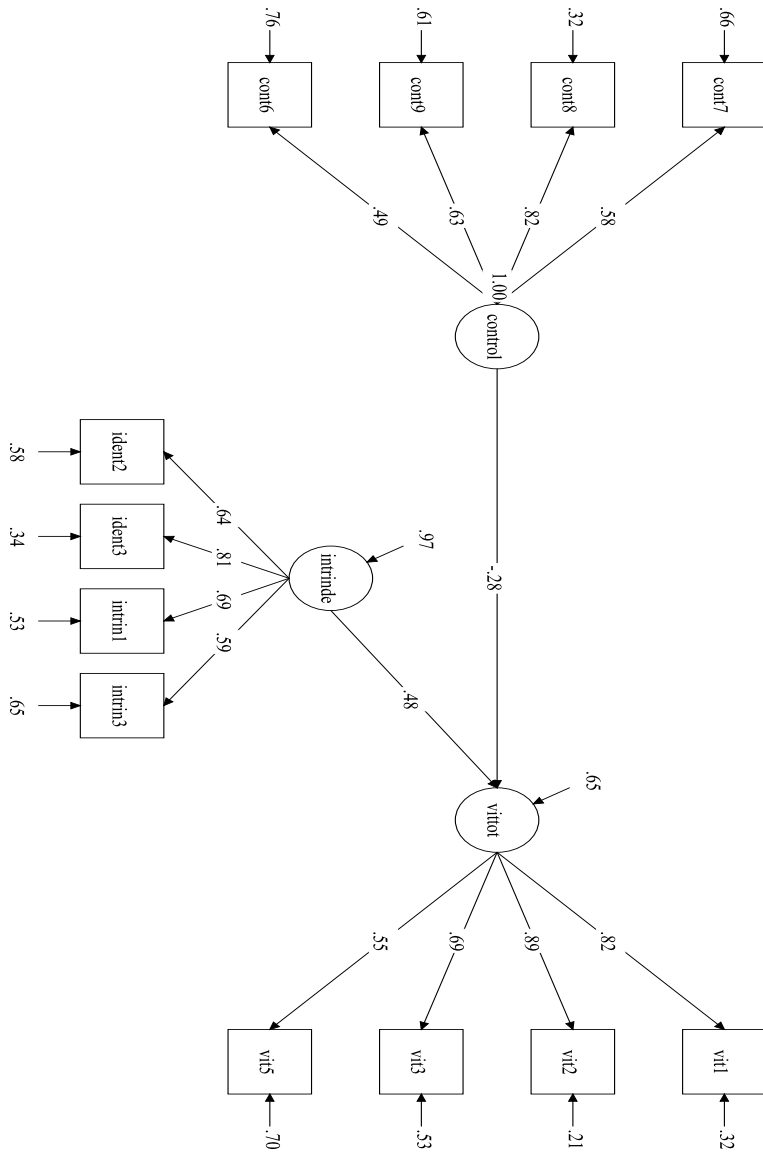


Figure 13 SEM analysis of Component 2 – Controlling tendencies