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Are Self-Criticism and Self-Compassion Mediators of the Effect of Physical Health on Mental Well-Being?

Martin Neufeld
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Supervisors:
Dr. M. Radstaak
Dr. H. R. Trompetter

Department of Psychology, Health and Technology
Faculty of Behavioural, Management and Social Sciences
University of Twente
P.O. Box 217
7500 AE Enschede
The Netherlands

Abstract

This study investigated the possible mediating effect self-criticism and self-compassion can have on the relation between physical health and mental well-being. Self-criticism is a personality style associated with fragile self-esteem and fear of failure and scrutiny from others. Self-compassion on the other hand is a positive attitude towards oneself that can protect an individual against the negative effects of self-criticism, self-judgment and isolation. These two personality styles as well as physical health affect the mental well-being of an individual and therefore play an important role in improving health, health care and overall quality of life. This study hypothesized that self-criticism and self-compassion function as mediators in explaining the effect physical health has on mental well-being.

Participants of this study consisted of various age and educational groups who filled in an online survey. The participants were sampled from a general Dutch population. The survey consisted of questions dealing with their physical health, level of self-criticism and self-compassion, as well as their current level of mental well-being. In total 329 participants completed the online survey.

Results showed that all three tested mediators (inadequate self and hated self, which are subscales of the construct of self-criticism, and self-compassion) had a significant partial mediation effect on the relation of physical health and mental well-being. Furthermore, self-compassion was found to be the most dominant predictor of mental well-being, whereas self-criticism inadequate self and physical health were only weakly predictive of mental well-being. Hated self was not a significant predictor of mental well-being in this model.

This research showed several interesting findings regarding mental well-being and the possibility of raising it in order to improve a good mental health. It can be seen as an introduction to the domain of improving well-being by not only paying attention to factors like self-criticism and self-compassion, but also the level of physical health of an individual. Further research should focus on longitudinal studies on the relation between physical health and mental well-being in order to measure change or stability of the effects of self-criticism and self-compassion on their relation, but should also focus on the causality between the four constructs of interest, as this is still a point of uncertainty.

Key Words: Physical health, Self-criticism, Self-compassion, Mental well-being, Mediation

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1. Introduction

Understanding human health behavior is a difficult challenge. There are various possible explanations to why people behave the way they do, but not a single theory or model has dominated research or practice in health-related behavior so far, explaining a healthy lifestyle and a positive mental well-being. One main aspect of living healthy is being physically active. Regular physical activity is becoming more and more an essential part of everyday life. Physical activity can be defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, Powell, & Christenson, 1985). Activities like shopping, lifting bags or vacuuming the house are examples of being physically active. Physically active people benefit from a great variety of aspects by moving enough and staying in shape. They improve their muscular structure and cardio-respiratory fitness, their functional health, have lower rates of heart diseases, high blood pressure, strokes, diabetes and mental illnesses like depression (World Health Organization, 2015). According to in ´t Panhuis, Luijben and Hoogenveen (2012), being physically active also leads to a higher life expectancy. The Dutch population over 20 years of age can add 0.7 years for men and 1.2 years for women to their life expectancy by being physically active. The population over 65 years of age benefits even more of being active. In comparison to risk factors such as smoking and overweight, being physically active adds the highest plus on life expectancy, with an average of 0.6 years for men and 1.0 years for women (in 't Panhuis, Luijben, & Hoogenveen, 2012).

In contrast to physical activity and its benefits, physical inactivity has been identified as the fourth leading risk factor of global mortality, causing an estimated 5.3 million deaths each year worldwide (Lee et al., 2012). In the Netherlands, 6% of the total number of deaths is caused by a lack of physical activity (Wendel-Vos, 2014). Possible negative results of not moving enough are apoplectic strokes, heart attacks and diabetes. Approximately one out of five (21%) new incidences of apoplectic strokes is the result of inadequate physical activity (in 't Panhuis et al., 2012). The same is true for heart attacks, with one out of five (20%) new incidences being caused by physical inactivity. For diabetes, one out of ten (10%) new incidents is caused by inactivity. Furthermore, dealing with these illnesses has another negative side effect, besides the physical one. The Dutch government spends 1.3 million euro on care-giving expenses caused by physical inactivity each year, which accounts for almost 2% of the overall costs of health care spending (in 't Panhuis et al., 2012).

When talking about physical (in)activity and its impact on the human body, another very important part of living healthy cannot be left out: the mental aspect of health. Mental health and physical health are fundamentally linked. According to the World Health Organization (2015), "there is no health without mental health", highlighting the strong correlation between these constructs and the importance of having both, physical just as mental health. An example for the correlation of both constructs is that Canadians suffering from a "chronic physical condition have twice the likelihood of also experiencing a mood or anxiety disorder" in comparison to Canadians without a chronic physical condition (The Government of Canada, 2006). Chronic physical conditions often leave the person concerned unable to participate in regular physical activity, intensifying the chronic physical condition, ultimately leaving the individual trapped in a vicious circle. Also, some chronic physical conditions can cause high blood sugar levels and disrupt the circulation of blood, which then can negatively impact brain functions (Evans et al., 2005). A decrease in brain functions in turn leads to a poor mental health. Other mental illnesses that often co-occur together with chronic physical conditions are depression and anxiety. Depression and anxiety are often developed as a result of the experience of emotional stress and chronic pain caused by a physical condition (Cmha, 2008).

Chronic physical conditions are not the only factor affecting mental health. By being physically active two to three times a week, individuals experienced significantly less depression, anger, cynical distrust and stress than those exercising less or not at all (Hassmén, Koivula, & Uutela, 2000). In another study McAuley (1994) found that while not being active enough is negatively correlated with anxiety, stress and depression, being physically active has positive correlations with self-esteem, self-efficacy, psychological well-being and cognitive functioning. According to the Canadian Mental Health Association (2008) disabilities can also affect mental health by causing distress and isolating people from social support. Researchers found evidence that the more symptomatic the chronic physical condition, the more likely that a person will also experience mental health problems (World Federation for Mental Health, 2004). Therefore it is not surprising that (chronic) physical conditions often lead to self-reported poor mental health (The Government of Canada, 2006).

While physical activity and the resultant physical health can directly improve the prevention and treatment of mental health problems, it's (in)direct effect on improving subjective well-being and quality of life has become a matter of interest. Mental well-being is defined by the World Federation for Mental Health (2004) as a state which "allows individuals to realize their abilities, cope with the normal stresses of life and work

productively and fruitfully". The foundation of a good mental well-being can be found in a positive mental health. Fox (1999) firstly described in his paper *the feeling good effect* of exercise. Individuals who were living physically healthy showed an improved quality of mood and sleep. Moreover, people who were more physically active were more likely to rate themselves and their sense of mental well-being more positively (Fox, 1999).

When investigating studies that focus on the relation between physical health and mental well-being, multiple factors can be identified to explain the mechanism that underlie this relationship. Scully, Kremer, Meade, Graham and Dudgeon (1998) mentioned in their review many factors that are affected by physical health, and in turn, have an effect on psychological well-being, thus functioning as a mediator between the two constructs. Examples of these positive factors are a higher protection against stress, an enhanced mood state and an overall higher self-esteem. Factors like these can play a vital role in improving mental health and preventing mental disorders.

A factor that is long known to have a negative influence on mental health and mental well-being is self-criticism. Self-criticism can be defined as a "personality style associated with fragile self-esteem and fear of failure and scrutiny from others" (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982; Amitay, Mongrain, & Fazaa, 2008) and is also described as a major vulnerability factor to psychopathology (Gilbert & Procter, 2006; Whelton & Greenberg, 2005). Already 40 years ago, Blatt, Afflitti and Quinlan (1976) found that the factor of self-criticism correlated significantly with measures related to depression. Furthermore, self-criticism as a personality style is "implicated in poor personal and social functioning throughout adolescence and adulthood" (Amitay et al., 2008). Self-criticism was also found to be the "most robust predictor of daily stress, avoidant coping, low perceived social support, negative affect and low positive affect" (Dunkley, Zuroff, & Blankstein, 2006). All of these factors mentioned by Dunkley et al. (2006) are vital in predicting positive mental well-being. Whereas the negative consequences of being self-critical on our mental health are sufficiently researched, almost none is known about the association of physical health and self-criticism.

In order to get rid of the negative effects of self-criticism on an individual, Gilbert (2009) suggests that self-compassionate skills can be a solution as a treatment for people suffering from all kinds of self-criticism. Self-compassion and self-compassionate skills, or concepts that are strongly related to self-compassion, like for example self-forgiveness or self-kindness, can be seen as contemporary to the trait of self-criticism (Gilbert & Procter, 2006; Terry & Leary, 2011; Zuroff, Sadikaj, Kelly, & Leybman 2015). Gilbert (2009) proposes

Compassion-Focused Therapy (CFT) as therapy treatment, which focuses on teaching people with a high "threat" affect regulation that having feelings like anxiety and depression are natural experiences which are "not our fault". One of the keys of CFT is to help people develop experiences of inner warmth and safeness, through the concepts of compassion and self-compassion. Whereas self-compassionate skills are found to be useful for people suffering from self-criticism and mental health issues, it is obvious that these skills are also useful in general to enhance mental well-being and mental health for the general population.

When talking about self-compassionate skills, the love and kindness we give to ourselves and care we would give to a good friend comes to mind (Neff, 2016). Many researchers have come to the definition that self-compassion involves being caring and compassionate towards oneself in the face of hardship or perceived inadequacy (Beneath-Goleman, 2001; Brach, 2003; Hanh, 1997; Kornfield, 1993; Salzberg, 1997). In contrast to self-criticism and its negative effects on the individual in general, self-compassion is a positive self-attitude towards oneself that tries to protect against the negative effects of self-criticism, self-judgment and isolation. Self-compassion is also often correlated with self-esteem, thus with higher confidence in ones abilities and strengths, rather than disabilities and weaknesses. Neff, Kirkpatrick and Rude (2007) found in their study that individuals scoring high on self-compassion are less anxious when faced with an ego-threat in a laboratory setting. Furthermore they found that increases in self-compassion occurring over a one-month interval increased the psychological well-being of the participants, which also lead to a significant correlation between the therapists rating of self-compassion and the self-reported self-compassion of the participants (Neff et al., 2007).

Summarizing the findings of the studies reviewed above, many correlations and effects have been found regarding physical activity, mental health and factors that are affected by physical health and have an effect on mental well-being. Through physical activity and general physical health a lot can be done to avoid (chronic) physical conditions just as mental illnesses and improve overall mental health. Mediator effects from other studies have been shown to explain the effect physical health can have on mental health (see Priel & Shahar, 2000; Raque-Bogdan, Ericson, Jackson, Martin, & Bryan, 2011), but the functioning of self-criticism and self-compassion between the constructs of physical health and mental well-being has still been unknown. Based on the studied literature it was therefore hypothesized that both factors, self-criticism as well as self-compassion, function as mediators for the outcome variable mental well-being in this specific health related case as well.

Up to this point, it has not been examined whether the level of physical health of a person directly correlates with the constructs of self-criticism or self-compassion. Moreover there is no study that researched whether self-criticism or self-compassion explain the relation between the physical health and the mental well-being of a person. This effect may be mediated by the constructs of self-criticism or self-compassion (see Figure 1). This mediation effect could be fully or partially described by the mediator's self-criticism or self-compassion.

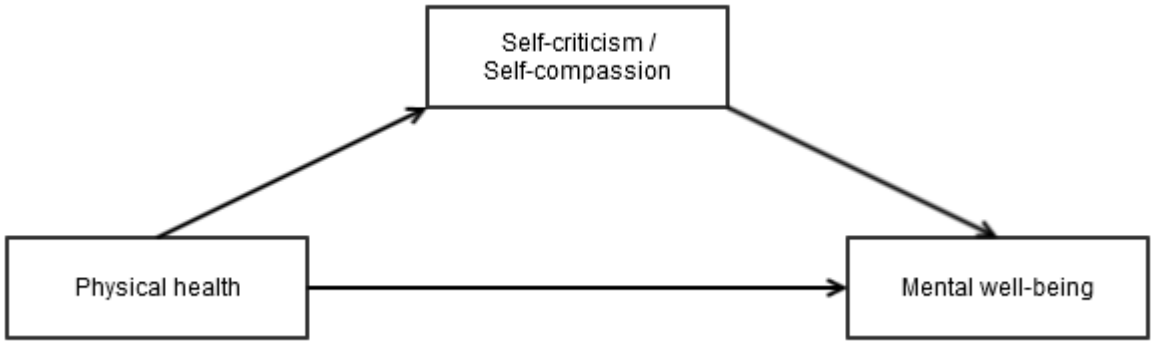

Figure 1. Mediation Model with self-criticism or self-compassion functioning as a mediator

Therefore, based on the findings of amongst others McAuley (1994) on the impact physical activity can have on mental health, the finding by Dunkley et al. (2006) of self-criticism being a robust predictor for negative mental health and well-being and Neff et al.´s (2007) findings of an increased level of self-compassion resulting in an increased psychological well-being of an individual, the three main research questions were: (1) Does self-criticism as a mediator explain the effect of physical health on mental well-being?; (2) Does self-compassion as a mediator explain the effect of physical health on mental well-being? It is hypothesized that based on prior studies self-criticism and self-compassion both will function as mediators. The third question that was examined additionally was: (3) Can the amount of mental well-being be explained more through physical health, the level of self-criticism or the level of self-compassion of a person? Based on the findings of a direct positive effect of self-compassion on mental well-being (see e.g. Neff et al., 2007) the hypothesis on this third research question is that self-compassion will be the strongest predictor for mental well-being.

2. Method

2.1 Participants

The respondents, who were sampled from a general Dutch population, had to answer every question of the online survey in order to be included in the analyses. After deleting all the participants that did not finish the survey, (n = 397 participants started the survey), the total number of respondents was n = 329. The n = 68 participants who did not answer all the survey questions made up for a dropout rate of 17.1%. Of the 329 participants, 65.7% (n = 216) of the participants were female, 34.3% (n = 113) were male. The respondent's ages ranged from 15 to 79 years of age (*M* = 31.2, *SD* = 13.5). The largest group of the participants relating to the educational level was the ´Hoger algemeen onderwijs´ (Higher general continued education) with 40.7% (n = 134). Almost half of the participants of the online survey, with 47.7% (n = 157), stated that their current situation can be described as "education, retraining or additional training", with the almost the second half of the participants currently stating their situation as "paid work" (40.7%, n = 134).

2.2 Procedure

All participants were taking part in the survey voluntarily and were able to stop the survey at any given time, without mentioning any reason. The participants also were told that all data was saved anonymously, and therefore could not be backtracked. The online survey was approved by the Ethics Committee Faculty of Behavioral Sciences of the University of Twente, Enschede, in February, 2015. Participants were able to take part in the online survey from March, 2015, up to June, 2015.

The dataset, that was used and analyzed for this study, was collected by 2nd grade psychology university students of the University of Twente, Enschede, for their research projects. Original purpose of this research project was the validation of the ´Forms of Self-Criticising/Attacking & Self-reassuring Scale´ (FSCRS) questionnaire, which was translated from the English to the Dutch language. The data was collected via an online survey with the online program Qualtrics. This online study was carried out as a cross-sectional study, meaning it was conducted to estimate the prevalence of the outcome of interest for a given population at one given time point (Levin, 2006). Therefore, only one measurement was necessary. The 2nd grade students used the method of convenience sampling to recruit participants for the online questionnaire. Convenience sampling means that participants are recruited out of the direct environment of the researchers, in this case the students. Three

different methods were used to recruit participants: first, via e-mail, second, via sharing the questionnaire link on Facebook and third, via direct contact of the researchers to possible participants. Furthermore it was made use of the "snowball-effect". People who participated in the questionnaire spread the link on their own Facebook pages and talked to other possible participants. Additionally flyers were hung out on black boards in supermarkets and the university buildings to achieve more variety between the participants. From the beginning, the students made clear that participants could win one of the five gift vouchers with a value of 20€.

2.3 Materials

Collecting data to answer the research questions was done by using several questionnaires in Dutch, which were combined in the online survey. First, questions regarding the demographic situation were asked, like for example questions related to the age, gender and level of education. After the general data was filled in, the questionnaires dealing with topics like depression, anxiety, self-criticism, self-compassion, emotions in general and physical health had to be filled in, dealing with setbacks and deficiencies, daily negative experiences, feelings and emotions, stress, anxiety and depression, physical activity, and self-criticism and self-compassion. Below, only the questionnaires which were used to answer the research questions of this study are further described.

2.3.1 Physical health

To assess the level of physical health of the participants in everyday situations, the physical component of the SF-12, the "Physical Health Composite Scale" (PCS) (Ware, Kosinski, & Keller, 1998), was used. The SF-12 is a multipurpose short form survey with 12 questions, all selected from the SF-36 Health Survey (Ware, Kosinski, & Keller, 1996). Respectively six of the 12 questions are dealing with the mental and physical functioning and overall health-related-quality of life of the participants (Utah Dept of Health, 2001). The six questions dealing with the mental functioning (MCS) of the participants were excluded for this research. The SF-12 does not target a specific age or disease group and was therefore perfectly suited for this online survey.

An example item to measure physical health was "During the past four weeks, were you limited in the kind of work or other activities you could do as a result of your physical health?" The PCS has different answer choice categories when it comes to measuring the different topics of physical health. Two questions provide a five point Likert scale which

ranges from “bad/not at all” to “excellent/very much”, whereas the other two questions work with “yes” and “no” answer choices. Because of this variety of answer categories, the scoring of the total score was more complex than the scoring of the other questionnaires. See Ware et al. (1998) for the scoring of the SF-12. The final score of the participants can range between 0 and 100, because the SF-12 converts the raw scores to a norm-based scoring (“50/10” scoring, 50 stands for the means and 10 for the standard deviation; Ware et al., 1998). The internal consistency of the PCS of this study was good, with a Cronbach´s alpha score of .74.

2.3.2 Self-criticism

To measure the amount of self-criticism of the participants, the “Forms of Self-Criticism and Reassuring Scale” (FSCRS; Gilbert, Clarke, Hempel, Miles, & Irons, 2004) was used. The FSCRS is a 22-item self-report scale, which assesses participants´ level of self-criticizing and self-reassuring thoughts. Factor analysis found that the FSCRS consists of three subcategories: inadequate self (Is), reassured self (Rs) and hated self (Hs). The inadequate self (consisting of nine items) and the hated self domain (consisting of five items) focus on self-criticism, whereas the ability to self-reassure is measured by the reassured self category (consisting of eight items). The inadequate self category is related to “being self-critical, dwelling on mistakes and sense of inadequacy”, the second self-criticizing category, hated self, focuses on the feeling of “wanting to hurt the self and feeling self-disgust/hate”, whereas the third category reassured self focuses on “being able to remind the self of positive things about the self” (Gilbert et al., 2004). For this study only the two self-criticism categories where used.

An example question to measure the category inadequate self (Is) was: “I am easily disappointed with myself.” The hated self (Hs) category was measured with items like “I stop caring about myself.” The answers were scored on a five-point Likert scale, ranging from 1 = “not like me at all” to 5 = “just like me”. To get the average score of the two self-criticizing categories, the respective items of the categories were summed up and then divided by the number of items belonging to it. The internal consistency of the two categories was high, with a Cronbach´s alpha of .86 for the inadequate scale, and a Cronbach´s alpha of .80 for the hated self.

2.3.3 Self-Compassion

In order to measure the level of self-compassion of the participants, the “Self-Compassion Scale – Short Form” (SCS-SF; Raes, Pommier, Neff, & Van Gucht, 2011) was

used. This questionnaire consists of 12 items and deals with setbacks and shortcomings in general of the participants, in order to measure the main components of self-compassion. These six main components are: self-kindness, self-judgment, common humanity, isolation, mindfulness and over-identification. An example statement is "I try to see my failings as part of the human condition". Initial studies indicated that the SCS long form had an "appropriate factor structure, good internal and test-retest reliability, shows no significant correlation with social desirability bias and displays both convergent and discriminant validity" (Neff et al., 2007). These findings were confirmed by Raes, Pommier, Neff and Van Gucht (2011), who did research on the validation of the short form of the SCS, which was used in this study. Raes et al. (2011) also found a near-perfect correlation with the long form SCS ($r \geq .97$).

An example item to measure self-compassion is "When I´m going through a very hard time, I give myself the caring and tenderness I need." The participants were asked to circle the most suitable answer, ranging from 1 = "rarely or never" to 7 = "almost always" on a Likert scale. The total score was the average of all 12 items. Cronbach´s alpha for this questionnaire was high with an alpha of .85.

2.3.4 Mental well-being

The test used to measure mental well-being was the "Mental Health Continuum Short Form" (MHC-SF; Keyes, 2009). This short form questionnaire has 14 items to measure three facets of well-being and is derived from the long form (MHC-LF), which consisted of 40 items. The three facets of well-being measured by this questionnaire are emotional well-being (based on Bradburn´s (1969) affect balance scale and on Cantril´s (1965) self-anchoring items), psychological well-being (based on the six dimensions of Ryff´s (1989) model of psychological well-being) and social well-being (measures the five dimensions of Keyes´ (1998) model of social well-being). Three items from the long form (MHC-LF) were chosen for the short form (MHC-SF) to represent emotional well-being ("During the past month, how often did you feel happy?"), six items (one item from each of the six dimensions) represent psychological well-being ("During the past month, how often did you feel that you liked most parts of your personality?") and five items (one item from each of the five dimensions) were chosen to represent social well-being ("During the past month, how often did you that people are basically good?"; Keyes, 2009).

The answers of the MHC-SF are ranging on a Likert scale from 1 = "never" to 6 = "every day". To get the total score, the average of all 14 items was calculated. The Cronbach´s alpha, which indicates the internal consistency of the scale, was excellent with an

alpha value of .91. This finding supports the also high internal consistency of over .80 which was found by Lamers, Westerhof, Bohlmeijer, ten Klooster and Keyes (2011).

2.4 Analysis

To analyze the dataset the statistic program IBM SPSS Statistics 23 was used. For all statistical analyses an alpha of 0.05 was used to determine the significance of the results. Before the hypotheses were tested, box plots were made and analyzed to examine the standard distribution of the data. Also, the internal consistency of all constructs was determined by calculating the Cronbach´s alpha.

Starting with the main analyses, first, a descriptive statistics table of the scores of the participants on the physical health questionnaire, the self-criticism scale (Is and Hs), the self-compassion questionnaire and mental well-being questionnaire was generated, showing the range, minimum, maximum, means and standard deviations of the scores. Following up, a univariate correlation table was made by correlating all constructs with each other. Therefore Pearson correlation scores were used. Correlations can range from 0, no correlation at all, to 1, perfect correlation. Correlations ranging from 0 to 0.3 are seen as weak, from 0.3 to 0.5 as moderate and correlations above 0.5 are seen as strong correlations (Cohen, 1988).

Whereas the self-criticism, self-compassion and mental well-being questionnaires were scored on a Likert-scale and its total score was calculated with the Likert-scale values, which typically ranges from low to high, or do not agree to fully agree, the physical health test scores were transformed to a norm-based scoring, ranging from 0 - 100. To understand the minimum, maximum and especially the mean score, the average score of the participants was compared to an average score of the U.S. population, which was conducted in 2001. This comparison made it easier to understand whether the average score of the participants can be classified as under or above average physical health.

In order to answer the first two research questions, mediation analyses were conducted using multiple regression analysis, as described by Baron and Kenny (1986). Therefore four steps were executed. First, it was tested if the causal variable (X; in this study: physical health) is correlated with the outcome variable (Y; mental well-being). Step two tested if the causal variable (X) is correlated with the mediator (M; in this study: self-criticism and self-compassion). Then, in the third step, it was tested if the mediator (M) affects the outcome variable (Y). In the last step to establish if M completely or partially mediates the X-Y relationship, the effect of X on Y controlling for M should be zero for a complete mediation, otherwise there is evidence for a partial mediation. Also if the effect of X on Y controlling for

M becomes insignificant, this is an indicator for a full mediation. The mediation analyses were used to test, if the relation between physical health and mental well-being was mediated through the constructs of self-criticism or self-compassion. An interactive Sobel test was conducted at the end of each mediation model to test the significance of the mediation effect (Sobel, 1982).

Finally, a multiple hierarchical regression analysis was done, in order to find an answer to the third research question whether mental well-being can be explained more through physical health, the level of self-criticism or the level of self-compassion of a person. Using the enter method, all four variables (physical health, inadequate self, hated self and self-compassion) were added into the model. With this analysis the predictive value of the four variables was examined.

3. Results

3.1 Descriptive statistics

Table 1 gives an overview over the means and standard deviations of the physical health scale, the two self-criticism scales (inadequate and hated self), the self-compassion scale and the mental well-being scale. The scoring of the results of the participants on the physical health questionnaire showed an average score of M = 48.6, with a rather small standard deviation (SD = 7.8). Whereas the mean scores of the self-criticism inadequate self (Is), the self-compassion and the mental well-being construct lie rather centered between their answer ranges, the mean score of the self-criticism hated self (Hs) is rather low (M = 1.57, with a range of 1 – 5).

Table 1.

Descriptive statistics of the participants scores on the questionnaires (N = 329)

	Range	Minimum	Maximum	Mean	Standard deviation
Physical health	0 - 100	16.85	56.58	48.61	7.80
Self-criticism (Is)	1 - 5	1.00	4.89	2.63	0.80
Self-criticism (Hs)	1 - 5	1.00	5.00	1.57	0.70
Self-compassion	1 - 7	1.50	6.92	4.39	1.04
Mental well-being	1 - 6	1.57	6.00	4.10	0.91

3.2 Correlations between the constructs

A correlation analysis was done between the different concepts and scales (see Table 2). Noticeable is that all correlations between the concepts and scales are significant with a *p*-value smaller than .001. A high negative correlation can be seen between the self-criticism scale (Is) and the self-compassion scale (r = -.70, p < .001), suggesting that these two constructs are counterparts. The self-compassion scale also correlates positive moderately with the mental well-being scale (r = .60, p < .001). The construct of physical health correlates weakly negative with the two constructs of inadequate self self-criticism (r = -.23, p < .001) and the hated self self-criticism (r = -.24, p < .001), but weakly positive with the other two constructs self-compassion (r = .25, p < .001) and mental well-being (r = .27, p < .001). The other correlations are ranging from weak to moderate correlations.

Table 2.

Correlations among physical health, self-criticism (Is and Hs), self-compassion and mental well-being

	1	2	3	4	5
1. Physical health	-				
2. Self-criticism (Is)	-.23**	-			
3. Self-criticism (Hs)	-.24**	.63**	-		
4. Self-compassion	.25**	-.70**	-.57**	-	
5. Mental well-being	.27**	-.51**	-.40**	.60**	-

**p < .001, two-tailed significance, Is = inadequate self, Hs = hated self.

3.3 Physical Health

In order to understand the minimum, maximum and mean value measured by the PCS-12, the scores were compared to average scores of the U.S. population, conducted on a survey in 2001 (Utah Dept of Health, 2001). Therefore, first, a box plot was created using the age variable of the data set. The box plot showed that 50% of the participants of this survey were

approximately between 20 and 40 years of age at the time the survey was conducted. Compared to the age specific groups of the U.S. sample, the average score of this survey is lower, with a mean score of 48.6 (U.S. ages 18 - 44 score 52.0 - 53.3 on average). The physical health score average of 48.6 of this survey lies between the averages of the U.S. group of the 45 - 64 years olds (scoring 46.9 - 49.4). The classification in groups makes clear that the participants of this survey score lower, and can therefore be considered slightly less physically healthy, than the comparison group of the U.S. population (Utah Dept of Health, 2001).

3.4 Mediation analyses

All three mediator analyses (with inadequate self, hated self and self-compassion as mediators) showed a significant mediation effect. At first, the subscale inadequate self (Is) of the self-criticism construct was tested as a mediator. All regression analyses (steps 1 to 4 by Baron and Kenny (1986)) showed significant correlations (see Figure 2). Whereas the relation between inadequate self and mental well-being was strongly, negatively correlated (*ß* = -.509, $p < .001$), the other relations were also significant, but only weakly correlated. The results of the last regression showed that the relation between physical health and mental well-being became weaker, but not reaching a value near zero, while still being significant, after adding inadequate self as a mediator variable (*ß* = .162, $p = .001$). Therefore there is a partial mediation effect. This significant finding was supported by testing the regression values in an online interactive Sobel mediation test ($z = 4.37$, $p < .001$).

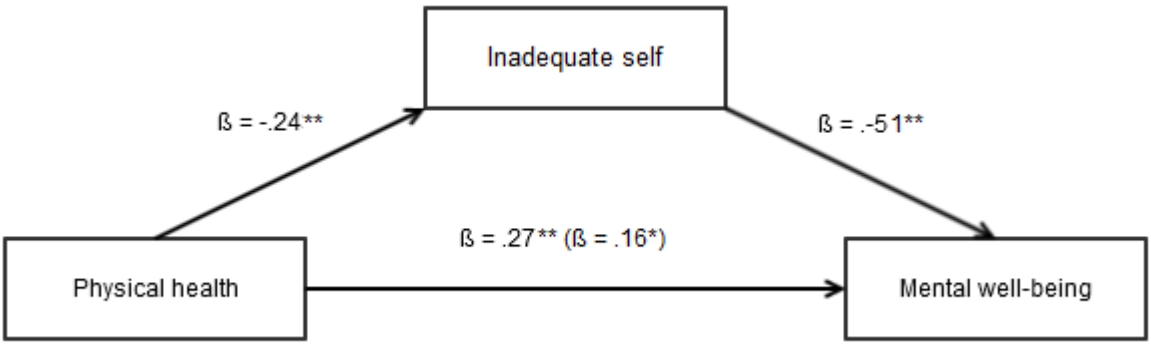

Figure 2. Mediation Model with inadequate self (Is) functioning as a partial mediator. The standardized regression coefficient between physical health and mental well-being, controlling for inadequate self, is in parentheses. *****p < .05, ******p < .001.

The second mediator tested was hated self (Hs). Physical health and mental well-being remained the independent and dependent variables in the mediator model. The results of this

mediator analysis can be seen in Figure 3. Just like in the first analysis, the direct effect of physical health on mental well-being became weaker after adding hated self (Hs) as a mediator variable (*ß* = .186, $p < .001$). A Sobel mediation test supported the significance of the partial mediation effect ($z = 3.84$, $p < .001$).

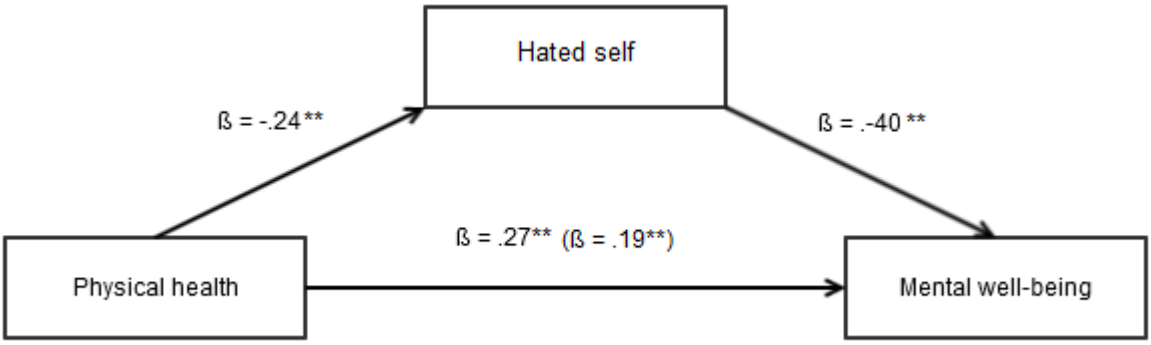

Figure 3. Mediation Model with hated self (Hs) functioning as a partial mediator. The standardized regression coefficient between physical health and mental well-being, controlling for hated self, is in parentheses. *****p < .05, ******p < .001.

The last regression analyses were performed with the construct of self-compassion functioning as the mediator between physical health and mental well-being (see Figure 4). In this model, after adding self-compassion as a mediator, the direct effect between physical health and mental well-being lowered the most, thus approaching the value of zero the closest (*ß* = .130, $p = .028$). A value close to zero for the direct effect after adding a mediator variable is an indicator for a full mediation effect. In this case the results also more support a partial mediation effect, which was also confirmed by a Sobel interactive mediation test ($z = 4.45$, $p < .001$).

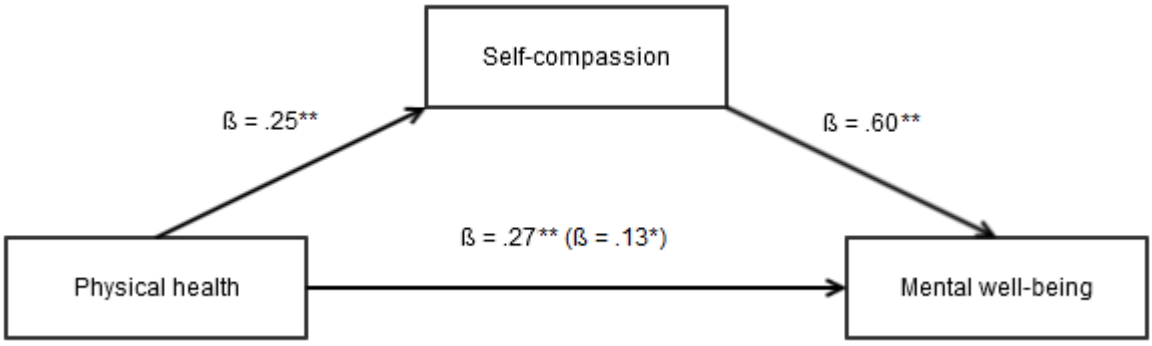

Figure 4. Mediation Model with self-compassion functioning as a partial mediator. The standardized regression coefficient between physical health and mental well-being, controlling for self-compassion, is in parentheses. *****p < .05, ******p < .001.

3.5 Multiple linear regression analysis

To test whether mental well-being can be explained more through physical health, the level of self-criticism or the level of self-compassion of a person, a hierarchical multiple regression analysis was conducted. Table 3 shows the results of the regression analysis including the four predictor variables: physical health, the two self-criticizing constructs (inadequate and hated self) and self-compassion. The data met the assumption of independent errors (Durbin-Watson value = 1.85). The model found that all four variables combined (physical health, inadequate self, hated self and self-compassion) predicted an amount of the variance in the total level of mental well-being of almost 40% (F = 52.07, p < .000, R^2 = 0.39). The strongest predictor of mental well-being was self-compassion with a ß-value of .46 (p < .000), whereas physical health (ß = .118, p = .009) and inadequate self (ß = -.146, p = .027) were only weak predictors of the amount of mental well-being. It has to be noted that the variable hated self, which almost had none effect in predicting mental well-being (ß = -.02), became insignificant (p = .676) in this model.

Table 3.

Hierarchical regression analysis with Mental Well-Being as dependent variable, and physical health, inadequate self, hated self and self-compassion functioning as predictors

Model	B	SE B	ß	p	Model
Step 1					
Constant	2.13	0.47			R^2 = 0.391
Physical health	0.01	0.01	.12	.009	F = 52.07
Inadequate self	-0.17	0.08	-.15	.027	p < .000
Hated self	-0.03	0.08	-.02	.676	
Self-compassion	0.40	0.06	.46	< .000	

4. Discussion

Aim of this research was to examine if self-criticism and self-compassion function as mediators for the effect of physical health on mental well-being. Several interesting findings have been discovered. First of all, all three tested mediators (inadequate self, hated self and self-compassion) were shown to be partially mediating the effect physical health has on mental well-being. Furthermore, it was found that a positive attitude towards oneself (self-

compassion) explained a higher amount of the variance of the level of mental well-being than a negative attitude towards oneself (self-criticism), or the level of physical health, and may therefore be a good predictor in forecasting mental well-being.

At first, the correlations between the constructs were examined. Overall the correlations showed rather normal and expected outcomes. Unexpected only was the low correlation between physical health and the construct of mental well-being. Based on the article by the World Health Organization (2015) and their striking message "there is no health without mental health", a strong correlation between physical health and mental well-being was expected. A reason for not finding a strong correlation may be the questionnaire used to measure the level of physical health of the participants. The questionnaire was using questions referring to everyday activities, like for example problems with cleaning the house or having pain while sitting at work. This questionnaire may not be as specific enough to find the same effects as the studies that were investigated dealing with for example chronic physical conditions and their impact on mental well-being. A second reason for finding a weak correlation may be that the constructs of mental health, as it is stated by the World Health Organization, cannot fully be compared to the construct of mental well-being of this study. As it is described in the article of the World Federation for Mental Health (2004), mental health can be seen as the basis in order to achieve positive mental well-being. Thus, this may be the reason for only finding a weak correlation between the two constructs.

The next findings were the partial mediation effects of the three mediators: self-criticism inadequate self, self-criticism hated self and self-compassion, which were the first and second research question of this paper. All three constructs were significantly mediating the effect of physical health on mental well-being. In all three mediator analyses the direct effect between the independent variable physical health and the dependent variable mental well-being changed from an almost moderate correlation to a still significant, but weak correlation after controlling for the mediator variable, which confirms the findings of partial mediation effects. This effect was best visible for the mediation model with self-compassion functioning as a mediator. Here the direct effect of physical health on mental well-being decreased the most after self-compassion was added to the mediation model. These results were expected. Reasons for finding mediator effects may be due to the fact that being physically active and living healthy includes an amount of self-care and self-loving, which are factors belonging to self-compassion. Therefore self-compassion could be seen as a part of physical health and might be generally higher for individuals who stay more physically active. Up to now, this study is unique in, amongst others, studying the effect that physical health has

on self-compassion and especially on self-criticism, therefore assumptions and explanations have to be viewed with caution.

A multiple regression analysis was done in order to examine whether mental well-being can be predicted more through the level of physical health, self-criticism (Is and Hs) or self-compassion (research question number three). Results showed that self-compassion was by far the most dominant predictor, being followed by self-criticism inadequate self and physical health. Self-criticism hated self became insignificant, thus not being an independent predictor for mental well-being in the tested model. Scoring high on self-compassion correlates with better coping of stressful events, reduces the emotional states and self-blame that interferes with self-regulation, increases the compliance with medical recommendations and therefore self-compassion may lead to a decreased depletion by illness and injury and to greater regulatory resources to devote to self-care (Terry & Leary, 2011). Moreover it was found that increases in self-compassion occurring over a one-month interval raises the psychological well-being of individuals (Neff et al., 2007). Therefore self-compassion has a positive effect on mental health and on mental well-being and also functions as a protective factor against the negative effects of illnesses. The negative constructs (self-criticism inadequate self and hated self) as counterparts of the positive construct of self-compassion, both showed an expected weak prediction value for mental well-being. Unexpected was the finding that physical health only weakly predicted the amount of variance of the level of mental well-being. Also this could be due to the questions being asked in order to measure physical health. The questionnaire may not be suited to measure physical health; a physical test may be a better suitable option. A second possible explanation for the finding of the weak relation between physical health and mental well-being, but also the strong relation between self-compassion and mental well-being, may be a method effect. A method effect occurs when the variance of the scores can be contributed to the measurement method rather than the attributable variance in the item of interest. The self-compassion questionnaire, just as the mental well-being questionnaire, were both formulated positively, whereas physical health and self-criticism were both using negatively formulated items. This may have had an effect on the found correlations of this research.

The fact that the positive state of self-compassion was shown to be a the strongest mediator and also showed a relatively high predictive value for mental well-being in this study could also be supported by the broaden-and-build theory (Fredrickson, 2001). The broaden-and-build theory is based on positive emotions of individuals. Positive emotions and self-compassion are not the same by definition thus should only be compared cautiously, but

both focus on positive affect states, rather than negative feelings, and their consequences. People, who are in a more positive state of mind, are likely to be more resilient and therefore are able to bounce back quicker when facing adversity, leading to a more stable and positive mental health. The broaden-and-build theory also states that positive emotions broaden people´s thought and action repertoires, which therefore helps to build long term personal resources (Fredrickson, 2001). These resources can range from intellectual to social and psychological resources, thus supporting the buildup of a good mental well-being. Another study that might support this thesis is the study done by Cohn, Fredrickson, Brown, Conway and Mikels (2009). The researchers found out that "whereas positive emotions predicted increases in both resilience and life satisfaction, negative emotions had weak or null effects, and did not interfere with the benefits of positive emotions" (Cohn et al., 2009).

4.1 Limitations and future research

Although this investigation has a number of strengths, several limitations should be considered. First, the measures that were used in this research in order to find results were based on retrospective self-reports. Self-reported data can easily be biased by the participants themselves, for example by remembering experiences or events that occurred at some point in the past (selective memory), which then influences their memory of recent events. Regarding the measurement of physical health, Hildebrandt, Ooijendijk and Hopman-Rock (2005) came to the conclusion that a few questions are not suited to trace out the respondents with a low physical condition, an important indicator for physical activity and physical health in general. Almost two thirds of the participants included in the research by Hildebrandt et al. (2005) with a measured low level of condition were estimating their own level of condition with average up to high. This also may have affected the given dataset, leading to an inaccurate measurement of people's level of physical health and diminishing the found effects on mental well-being. An actual physical test could give additional information to measure physical health and the level of physical activity and therefore could lead to more accurate results in combination with mediator variables in explaining mental well-being, or other constructs of interest.

Although this research resulted in several useful findings for a given point in time, the longitudinal effects of physical health, self-criticism, self-compassion and mental well-being could not be researched. For future research it could be interesting to set up an experiment which follows the participants over a longer period of time, with a first experimental group being forced to participate in regular physical and educational activities in order to raise their

level of physical health, a second experimental group participating in self-compassionate skills trainings (e.g. compassionate mind training or compassionate focused therapy) and a control group without participation in any of these activities. This experiment could help to find an answer to the question of change and stability of the constructs (physical health, self-criticism, self-compassion and mental well-being), as well as the causality of these four being researched in this paper. Up to now it cannot be said with certainty which of the constructs is the causal or outcome variable. As Gilbert and Procter (2006) already found, compassionate mind training (CMT) for people with high shame and self-criticism, showed significant reductions in depression, anxiety and self-criticism. Furthermore, there was a significant increase in the ability of self-soothing and focus on feelings of warmth and reassurance for the self of the participants, which are aspects of self-compassion. Therefore it can be reasoned that CMT can help individuals increasing their mental well-being by gaining self-compassionate skills and alleviating the negative effects of self-criticism. In addition, the introduced experiment could try to answer the question, if participating in a program which raises physical health affects the level of self-compassion and consequently the mental well-being of an individual.

In conclusion, this study has shown the negative correlation of self-criticism and physical health, as well as with mental well-being. In contrast, the positive relation of self-compassion and mental well-being was highlighted, pointing out the importance of self-caring and kindness to ourselves, as well as the general importance of positive feelings and their contribution to living a healthy life. Targeting self-critical individuals and improving self-compassionate skills may help reduce the negative effect of physical health on mental well-being, resulting in an overall higher mental well-being and quality of life.

5. References

Amitay, O. A., Mongrain, M., & Fazaa, N. (2008). Love and control: Self-criticism in parents and daughters and perceptions of relationship partners. *Personality and Individual Differences*, *44*(1), 75–85. doi:10.1016/j.paid.2007.07.020

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. doi:10.1037/0022-3514.51.6.1173

Beneath-Goleman, T. (2001). Emotional alchemy: How the mind can heal the heart. *New York: Three Rivers Press.*

Blatt, S. J., Afflitti, J. P. D., & Quinlan, D. M. (1976). Experiences of depression in normal young adults. *Journal of Abnormal Psychology*, *85*(4), 383–389. doi:10.1177/1073191194001001009

Blatt, S. J., Quinlan, D. M., Chevron, E. S., McDonald, C., & Zuroff, D. (1982). Dependency and self-criticism: psychological dimensions of depression. *Journal of Consulting and Clinical Psychology*, *50*(1), 113–124. doi:10.1037/0022-006X.50.1.113

Brach, T. (2003). Radical acceptance: Embracing your life with the heart of a Buddha. *New York: Bantam.*

Bradburn, N. M. (1969). The structure of psychological well-being. *Chicago:Aldine.*

Cantril, H. (1965). The pattern of human concerns. *New Brunswick, NJ: Rutgers University Press.*

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, *100*(April), 126–131.

Cmha, C. M. H. A. (2008). The Relationship between Mental Health, Mental Illness and Chronic Physical Conditions. *Backgrounder*, (December), 1–9. Retrieved from http://www.ontario.cmha.ca/admin_ver2/maps/cmha_chronic_disease_backgrounder.pdf

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. *Statistical Power Analysis for the Behavioral Sciences*. doi:10.1234/12345678

Cohn, M. a, Fredrickson, B. L., Brown, S. L., Conway, A. M., & Mikels, J. a. (2009). Satisfaction by Building Resilience. *Emotion Washington Dc*, *9*(3), 361–368. doi:10.1037/a0015952.Happiness

Dunkley, D. M., Zuroff, D. C., & Blankstein, K. R. (2006). Specific perfectionism

components versus self-criticism in predicting maladjustment. *Personality and Individual Differences*, *40*(4), 665–676. doi:10.1016/j.paid.2005.08.008

Evans, D. L., Charney, D. S., Lewis, L., Golden, R. N., Gorman, J. M., Krishnan, K. R. R., … Valvo, W. J. (2005). Mood disorders in the medically ill: Scientific review and recommendations. *Biological Psychiatry*, *58*(3), 175–189. doi:10.1016/j.biopsych.2005.05.001

Fox, K. R. (1999). The influence of physical activity on mental well-being. *Public Health Nutrition*, *2*(3a), 411–418. doi:10.1017/S1368980099000567

Fredrickson, B. L. (2001). The Role of Positive Emotions in Positive Psychology. *The American Psychologist*. doi:10.1037/0003-066x.56.3.218

Gilbert, P. (2009). The Compassionate Mind: A New Approach to Life´s Challenges. *London: Constable-Robinson. Oaklands CA: New Harbinger*.

Gilbert, P., Clarke, M., Hempel, S., Miles, J. N., & Irons, C. (2004). Criticizing and reassuring oneself: An exploration of forms, styles and reasons in female students. *British Journal of Clinical Psychology*, *43*(1), 31–50.

Gilbert, P., & Procter, S. (2006). Compassionate mind training for people with high shame and self-criticism: Overview and pilot study of a group therapy approach. *Clinical Psychology and Psychotherapy*, *13*(6), 353–379. doi:10.1002/cpp.507

Hanh, T. N. (1997). Teaching on love. *Berkeley, CA: Parallax Press*.

Hassmén, P., Koivula, N., & Uutela, A. (2000). Physical Exercise and Psychological Well-Being: A Population Study in Finland. *Preventive Medicine*, *30*(1), 17–25. doi:10.1006/pmed.1999.0597

Hildebrandt, V. H., Ooijendijk, W. T. M., & Hopman-Rock, M. (2005). Bewegen en Gezondheid. *Leiden.*

in 't Panhuis, M., Luijben, G., & Hoogenveen, R. (2012). Zorgkosten van ongezond gedrag: Kosten van ziekten notities 2012-2., 1–22.

Keyes, C. L. M. (1998). Keyes 1998 - Social Well-Being. *Social Psychology Quarterly*. doi:10.2307/2787065

Keyes, C. L. M. (2009). Brief description of the mental health continuum short form (MHC-SF). *American Journal of Public Health*, *100*(12), 2366–71. doi:10.2105/AJPH.2010.192245

Kornfield, J. (1993). A path with heart. *New York: Bantam*.

Lamers, S. M., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the Mental Health Continuum-Short

Form (MHC-SF). *Journal of Clinical Psychology*, *67*(1), 99–110. doi:10.1002/jclp.20741

Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., … Wells, J. C. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The Lancet*, *380*(9838), 219–229. doi:10.1016/S0140-6736(12)61031-9

Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, *7*, 24–25. doi:10.1038/sj.ebd.6400375

McAuley, E. (1994). Physical activity and psychosocial outcomes. *Physical Activity, Fitness, and Health.*, *68*, 551.

Neff, K. D. (2016). Self-Compassion. Retrieved March 15, 2016, from http://self-compassion.org/

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality*, *41*(1), 139–154. doi:10.1016/j.jrp.2006.03.004

Priel, B., & Shahar, G. (2000). Dependency, self-criticism, social context and distress: comparing moderating and mediating models. *Personality and Individual Differences*, *28*(3), 515–525. doi:10.1016/S0191-8869(99)00116-6

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology and Psychotherapy*, *18*(3), 250–255. doi:10.1002/cpp.702

Raque-Bogdan, T. L., Ericson, S. K., Jackson, J., Martin, H. M., & Bryan, N. A. (2011). Attachment and mental and physical health: Self-compassion and mattering as mediators. *Journal of Counseling Psychology*, *58*(2), 272–278.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. doi:10.1037/0022-3514.57.6.1069

Salzberg, S. (1997). Lovingkidness. The revolutionary art of happiness. *Boston: Shambala*.

Scully, D., Kremer, J., Meade, M. M., Graham, R., & Dudgeon, K. (1998). Physical exercise and psychological well being: a critical review. *British Journal of Sports Medicine*, *32*(2), 111–120. doi:10.1136/bjsm.32.2.111

Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. *Sociological methodology*.

Terry, M. L., & Leary, M. R. (2011). Self-compassion, self-regulation, and health. *Self and Identity*, *10*(3), 352–362. doi:10.1080/15298868.2011.558404

The Government of Canada. (2006). The Human Face of Mental Health and Mental Illness in Canada 2006. doi:10.1037/e611102012-001

Utah Dept of Health. (2001). Interpreting the SF-12 Health Survey. *Utah Health Status Survey*, 17. Retrieved from http://health.utah.gov/opha/publications/2001hss/sf12/SF12_Interpreting.pdf

Ware, J., Kosinski, M., & Keller, S. (1996). A 12-Item Short-Form Health Survey: Construction of Scales and Premilinary Tests of Reliability and Validity. *Medical Care*, *34*(3), 220–233.

Ware, J., Kosinski, M., & Keller, S. (1998). How to score the SF-12 physical and mental health summary scales . *Lincoln, RI: Quality Metric, (February).* Retrieved from https://scholar.google.co.in/scholar?as_q=&as_epq=&as_oq=&as_eq=&as_occt=any&as_sauthors=Ware+JE+Kosinski+M+Keller+SD&as_publication=&as_ylo=1998&as_yhi=1998&hl=en&as_sdt=0,5#0

Wendel-Vos, G. C. W. (2014). Wat zijn de mogelijke gezondheidsgevolgen van lichamelijke (in)activiteit? - *Nationaal Kompas Volksgezondheid*. Retrieved February 16, 2015, from http://www.nationaalkompas.nl/gezondheidsdeterminanten/leefstijl/lichamelijke-activiteit/wat-zijn-de-mogelijke-gezondheidsgevolgen-van-lichamelijke-activiteit/

Whelton, W. J., & Greenberg, L. S. (2005). Emotion in self-criticism. *Personality and Individual Differences*, *38*, 1583–1595.

World Federation for Mental Health. (2004). World Mental Health Day Between Physical and Mental Health. *Health (San Francisco).*

World Health Organization. (2015). WHO | Physical activity. Retrieved February 16, 2015, from http://www.who.int/topics/physical_activity/en/

Zuroff, D. C., Sadikaj, G., Kelly, A. C., & Leybman, M. J. (2015). Conceptualizing and Measuring Self-Criticism as Both a Personality Trait and a Personality State. *Journal of Personality Assessment*, *3891*(November), 1–8. doi:10.1080/00223891.2015.1044604