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Body awareness and psychological flexibility as resilience factors against somatic symptoms and poor physical and mental health

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Emma Janssen
4156595
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Supervisor:
Prof. Dr. Rinie Geenen
Faculty of Social and Behavioural sciences

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Abstract

Introduction: Somatic symptoms and its consequences are associated with substantial functional impairment and healthcare utilization. Psychological flexibility and body awareness may be a focus in the treatment of somatic symptoms. Heightened body awareness can, however, be adaptive or maladaptive. To get insight into psychological flexibility and body awareness as potential resilience factors against somatic symptoms and poor physical and mental health, this cross-sectional study examined associations between these variables.

Methods: Participants ($N=319$) completed an online survey, measuring psychological flexibility (FIT-60), body awareness (SBC), somatic symptoms (PHQ-15) and mental and physical functioning (RAND-36). Hierarchical regression analyses examined these associations.

Results: Significant associations of medium and large effect size were found between psychological flexibility and somatic symptoms, physical functioning, and mental well-being. Especially people with low scores on psychological flexibility showed more somatic symptoms and less physical functioning. The components acceptance and cognitive defusion in particular displayed the strongest associations with the three health status measures. Neither body awareness nor the interaction of psychological flexibility with body awareness was associated with somatic symptoms, physical functioning, and mental well-being.

Discussion: Psychological flexibility (but not body awareness) is associated with less somatic symptoms and better physical functioning and mental well-being. To the extent that this correlation reflects a causative relation and given that psychological flexibility is a trainable skill, these findings indicate the potential protecting role of psychological flexibility against somatic symptoms and poor physical and mental health.

Preface

This thesis was written as part of the master Clinical Psychology at Utrecht University. My internship at Altrecht Psychosomatics made the impact of chronic somatic symptoms and the therapies applied for these complaints more vivid to me. Keeping these experiences in mind helped me to write my thesis. I would like to thank everyone who participated in the study. Notably, I want to thank my supervisor, Rinie Geenen. His devotion and enthusiasm about research inspired me. Besides, he provided me with critical feedback, which brought this thesis to a higher level. Above all, I will not forget his life lesson (from Mark Twain): *If you eat a green frog every morning, you can go through the day with the satisfaction of knowing that that is probably the worst thing that is going to happen to you all day long.* In terms of my thesis, the frog stands for the biggest, most important task, the one I am most likely to procrastinate on if I don't do something about it.

Emma Janssen, July 2018

Introduction

Chronic somatic symptoms are prevalent and associated with substantial functional impairment and healthcare utilization (Kroenke, Spitzer, & Williams, 2002). A core feature of people with chronic somatic symptoms is the problematic relation to their body (Kalisvaart et al., 2012). Patients can be stuck in daily functioning because they have difficulty to adequately acknowledge and understand their bodily signals and have limited ability to connect bodily sensations to mental states (Spaans, Koelen, & Bühring, 2010). Aside from the physical symptoms, patients with chronic somatic symptoms may report lack of confidence and trust in their own body along with feelings of depression or anxiety (Gyllensten, Skär, Miller, & Gard, 2010). Understanding that chronic somatic diseases are not only influenced by somatic pathology but also by social and psychological factors, various multidisciplinary treatments regiments have been developed (Scascighini, Toma, Dober-Spielmann, & Sprott, 2008). Third generation cognitive behavior therapies, such as Acceptance and Commitment Therapy [ACT] and a broad range of body awareness interventions are being applied in the treatment of chronic somatic symptoms (Prevedini, Presti, Rabitti, Miselli, & Moderato, 2011), which aim to improve psychological flexibility and body awareness. In this thesis, the association of these two constructs with somatic symptoms, physical and mental health will be examined by a literature review as well as by conducting a survey.

According to Hayes (2004) third generation interventions reflect the emphasis of acceptance and mindfulness principles in cognitive behavior therapy. Rather than striving for symptom reduction, these therapies focus on developing an attitude of nonjudgmental acceptance to enhance physical and mental well-being. The time and energy wasted to control thoughts and feelings can then be invested in commitment and action towards a meaningful life (Hayes, Strosahl, & Wilson, 2011). Mindfulness- and acceptance-based interventions have shown positive results among patients with stress-related symptoms, pain disorders and a variety of chronic diseases (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Gotink et al., 2015; Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016).

Being psychological flexible may help people to accept symptoms and other problems that come with a chronic disease and to be committed to make changes in daily life that are compatible with one's life values. To increase psychological flexibility, ACT is guided by six core principles (see Figure 1, Hayes, Luoma, Bond, Masuda, & Lillis, 2006). These are: *contact with the present moment* (awareness of the here and now, experienced with openness, interest and receptiveness), *acceptance* (allowing thoughts to come and go without struggling with them), *cognitive defusion* (learning to detach from thoughts, images and memories), *self as context* (assessing a transcendent sense of self, a continuity of consciousness which is unchanging), *values* (discovering what is most important to oneself) and *committed action* (setting goals according to one's values and carrying them out responsibly) (Hayes et al., 2006).

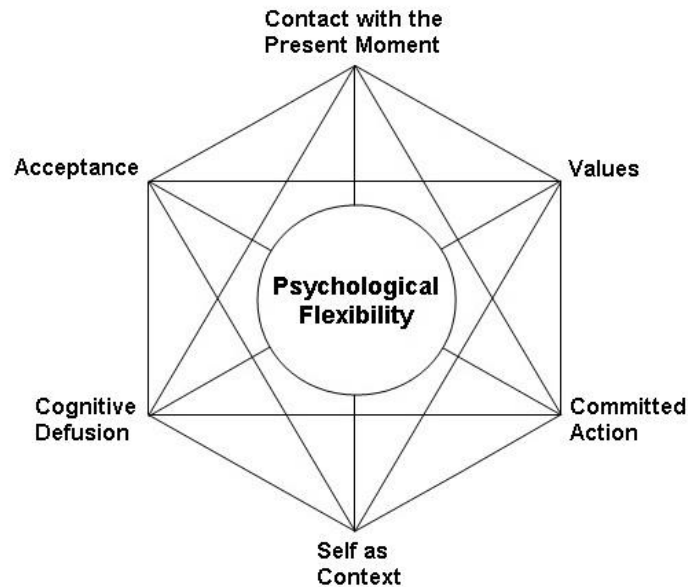


Figure 1. The six core principles of Acceptance and Commitment Therapy

A meta-analysis by A-Tjak et al. (2015) supports the use of ACT in treating somatic symptoms and suggests that it provides similar outcomes as established psychological interventions. Moreover, ACT has been associated with substantial changes regarding psychological functioning instead of just symptom reduction. Because mindfulness-based interventions, like ACT, seem beneficial for treating chronic somatic symptoms, the question arises how mindfulness exerts its effects. Body awareness has been proposed as a potential mechanism for the therapeutic effects of mindfulness (Hölzel et al., 2011; Mehling et al., 2009). While body awareness interventions have been incorporated in multidisciplinary programmes for patients suffering from chronic somatic symptoms, their clinical effectiveness has not yet been established (Van der Maas et al., 2015).

Body awareness is defined as sensitivity and attentiveness to internal body signals (e.g. muscle tension, heartbeat), overall body states (e.g. having pain, being strained or relaxed) and to the body response to changes in the environment or emotions (e.g. acceleration of breath when anxious) (Price & Thompson, 2007). Heightened body awareness has been perceived as maladaptive and as adaptive (Mehling et al., 2009). The maladaptive view states that heightened body awareness induces hypervigilance, a state in which a patient is constantly scanning the body for aversive body sensations, which has a negative impact on pain perception and cognitive functioning. This type of body awareness can lead to somatosensory amplification, worsen symptoms of anxiety and hypochondriasis, and is maladaptive for clinical outcomes (Eccleston, Crombez, Aldrich, & Stannard, 1997). In the study by Köteles and Doering (2016) body awareness was the most influential predictor of somatosensory amplification. A heightened and selective attentional focus on pain prevents an attentional shift to normal internal signals (Schaefer, Egloff, & Witthoft, 2012). For patients with chronic somatic symptoms, bodily sensations may be a source of anxiety and distress. Body awareness then serves as an alarm rather than sensitivity and attention to bodily sensations (Valenzuela-Moguillansky, Reyes, & Gaete, 2017).

In contrast, the adaptive view describes heightened body awareness as a process of more distant and non-judgmental perception of internal body signals (which can be captured by the term mindfulness) and as a state of embodiment: the extent to which a person integrates both the mind and body (Mehling et al., 2009). Body awareness is associated with acceptance of all bodily sensations rather than the avoidance of and dissociation from body experience (Gard, 2005). Reflecting and attending to body experiences provides that patients can develop a more positive attitude of their body and selves (Gyllensten et al., 2010). It has been suggested that enhancing body awareness is useful in the treatment of chronic diseases such as chronic pain (Mehling et al., 2011; Gard, 2005). Facilitating contact with the body helps patients to explore and develop their own resources for a more functional movement quality (Olsen & Skjaerven, 2016). Sertel, Simsek and Yumin (2017) showed that body awareness therapy decreases pain in patients with chronic headache and had positive effects on body image. A change in perception may help patients with chronic pain to discriminate between different physical and mental states and therefore enhance their ability to cope with pain. This implies that body awareness is adaptive, and this characteristic makes it an important focus of treatment (Van der Maas et al., 2015).

A meta-analysis by Courtois, Cools, and Calsius (2015) found that body awareness interventions may have a positive effect on pain perception and quality of life for patients with fibromyalgia and chronic fatigue syndrome. Because of methodological and heterogeneity between studies, they stated that the implementation of body awareness interventions is limited in clinical practice. This heterogeneity could be due to the fact that body awareness is a complex phenomenon, which can either have a positive or negative impact on someone's health and well-being (Mehling et al., 2009).

Löf, Johansson, Henriksson, Lindblad, and Bullington (2014) described heightened body awareness as a reactive process resulting from different positive or negative emotional triggers (e.g. loss of control or accepting the disease). These emotional triggers resulted either in heightened positively toned body awareness or negatively toned body awareness. This is in line with the study by Ginzburg, Tsur, Barak-Nahum and Defrin (2014), in which body awareness is described as a neutral quality, which can lead to opposing outcomes, according to the individual's orientation towards these bodily signals. When the orientation is highly catastrophic, body awareness is linked to increased sensitivity and focus on aversive somatic signals. In contrast, body awareness simply serves to sense the ordinary changes appearing in the body and can improve pain habituation, when an individual's orientation is not catastrophic (Ginzburg et al., 2015). Taking this into account, a more accepting and mindful attitude could cause positively toned body awareness. Hence, psychological flexibility in combination with body awareness possibly may have an additional positive impact on someone's health and well-being. However, the relation between these two constructs in predicting a person's physical and mental health needs to be established in more detail.

Therefore, the aim of the present study is to examine the association of body awareness and psychological flexibility with the three health status measures (somatic symptoms, physical functioning and mental well-being) by conducting a survey. Moreover, it will be examined how each component of psychological flexibility is related to these health status measures. To formulate specific hypotheses, a literature review was performed (see Appendix A). Most of the studies yielded by this approach were focused on the associations of body awareness and health outcomes in people with chronic pain. While the results must be interpreted with caution, because there was considerable variation in disorders and

treatments, sufficient items were collected with the review to enable the formulation of specific hypotheses.

It is hypothesized that a high functional score on psychological flexibility is associated with less somatic symptoms and better physical functioning and mental well-being. Moreover, it is hypothesized that people with both high body awareness and psychological flexibility will express less somatic symptoms and display better physical and mental functioning than people with high body awareness and low psychological flexibility. This will be shown by an interaction-effect between body awareness and psychological flexibility. This is a cross-sectional design but if the present study shows that body awareness has an additional effect on psychological flexibility in its association with the three health status measures, this can stimulate the design of prospective studies to test whether the treatments that involve both components are effective in dealing with chronic somatic symptoms.

Methods

Participants and procedure

The study was approved by the ethics committee of the faculty of social and behavioural sciences at Utrecht University (FETC-FETC17-120). The study used a descriptive correlational design. Participants were recruited from the general population. Invitations to participate in the online study were sent by emails and by messages on Facebook pages as well as a recruitment notice on social media of patient associations for chronic somatic symptoms. There were no exclusion criteria. All participants provided written informed consent. The recruitment notice included information about the aim and content of the study, the duration (20-40 min), confidentiality, and a hyperlink to the online questionnaire. Participants could decide to participate after being informed and were able to stop at any point. The survey consisted of several self-report measures (see Appendix B). First, demographic characteristics (age, gender, and education) were collected, followed by instruments that aimed to measure psychological flexibility and body awareness. Finally, somatic symptoms, physical functioning and mental well-being were measured by two different instruments.

Instruments

The Flexibility Index Test (FIT-60; Batink, Jansen, & de Mey, 2012) was used to measure psychological flexibility. The FIT-60 consists of 60 items, divided in 6 subscales: acceptance (10 items), cognitive defusion (10 items), self as context (10 items), here and now (10 items), values (10 items) and committed action (10 items). Example items are 'Worries get in the way of my success' or 'If I want to do something, I go for it.' Items are rated on a 7-points Likert scale ranging from 'Totally Disagree' (0) to 'Totally Agree' (6). A high score reflects a higher level of psychological flexibility. Reliability and validity of the FIT-60 were acceptable to good, although further research into the psychometric qualities is recommended (Batink et al., 2012). In the current study, the internal consistency for psychological flexibility was very good ($\alpha=.94$), as indicated by Cronbach's alpha (Cronbach, 1951), with the alphas for the subscales varying from $\alpha=.62$ (Self as context) to $\alpha=.89$ (Cognitive defusion).

Body awareness was measured by the Dutch version of the Scale of Body Connection (SBC; Van der Maas, Köke, Bosscher, Hoekstra, & Peters, 2014). It consists of 20 items about body awareness (12 items) and body connection (8 items). This study examined only the

subscale body awareness, because the focus was to collect information on inner body experiences. An example item is: 'I notice how my body changes when I am angry.' The items of the SBC were answered on a 5-point Likert Scale ranging from 'Never' (1) to 'Always' (5). A high score represents a high level of body awareness, which means that one's consciously paying attention to the body. The internal consistency and test-retest reliability of the Dutch version of the SBC was adequate in student samples, chronic pain patients, and primary care patients (Van der Maas et al., 2014). Internal consistency in the current study was good ($\alpha=.81$).

The Dutch version of the Patient Health Questionnaire-15 (PHQ-15; Kroenke et al., 2002) was used to measure the severity of somatic symptoms. The PHQ-15 consists of 15 items about somatic symptoms or symptom clusters that account for more than 90% of the physical symptoms reported in outpatient settings (e.g. headaches or dizziness). Participants were asked to rate the severity of each symptom as 'Not bothered at all' (0), 'Bothered a little' (1), or 'Bothered a lot' (2). A high score on the PHQ-15 indicates a high level of somatic symptom severity. Although internal consistency is not an issue here, the internal consistency was nevertheless good, as shown by a Cronbach's alpha of .80 (Kroenke et al., 2002).

Mental well-being and physical functioning were measured with the Dutch version of the RAND-36 (VanderZee, Sanderman, Heyink, & de Haes, 1996). Higher scores on these scales indicated better mental and physical health. An example item is: 'How much bodily pain have you had during the past 4 weeks?' Hays's method was used to derive weighted mental and physical subscale scores based on Item Response Theory and composite scores based on oblique factor analysis allowing the composite scores to be correlated, which gives a realistic representation of health factors (Hays & Morales, 2001). In the current study the internal consistency for the physical health composite score ($\alpha=.85$) and the mental health composite score ($\alpha=.83$) was good and comparable to those reported before (Van Middendorp et al., 2016).

Data analyses

Statistical Analyses were done with the Statistical Package for Social Science (SPSS version 24.0). Significance levels were set at $p<.05$ (two-tailed). The residual plots in the regression analyses showed that the assumptions of linearity and normality were met (see appendix C). Because of a mistake made during entering the FIT-60 in the survey, items were rated on a 5-points Likert scale ranging from 'Totally 'Disagree' (1) to 'Totally Agree' (5) instead of the original 7-point Likert scale from 0 to 6. To recreate a Likert scale ranging from 0-6 the FIT-60 variable scores were rescaled by subtracting 1 and multiplying the result by 6/4. Education level was classified into seven levels according to the Dutch education system (Centraal Bureau voor de Statistiek, 2016). Because of the skewed distribution of this parameter and the ordinal level of measurement, education level was before analysis separated into a two-level scale: academic (university of applied sciences and university education) and other (primary school, preparatory vocational secondary education, intermediate vocational education, senior vocational education and general secondary education).

To test the hypotheses that psychological flexibility and the interaction of body awareness and psychological flexibility are associated with less somatic symptoms and better physical and mental health, multiple hierarchical regression analyses were performed for each health status measure. In Block 1, the demographic variables age, (current or past) education level, and gender were entered. Centered scores of body awareness and

psychological flexibility were entered in Block 2. In Block 3, the interaction between body awareness and psychological flexibility was added. In Block 4, a condition with chronic somatic symptoms was entered to check whether the results were not due to having a chronic somatic disease and if there was still an association between psychological flexibility, body awareness and the three health status measures. To measure the size of the effect, the Beta was interpreted in a comparable way as the correlation coefficient. A value of $>.10$ indicates a small effect, $>.30$ a medium effect and $>.50$ a large effect (Cohen, 1988). Boxplots were made to display the four combinations of high/low psychological flexibility and high/low body awareness.

To further explore the relation between psychological flexibility and the three health status measures, the hierarchical regression procedure of the Block 4 parameters was reiterated for the six components of psychological flexibility. Furthermore, the six components of psychological flexibility were subdivided into tertiles ($<33.3\%$ =low, $\geq 33.3\%$ - $<66.6\%$ =middle, $\geq 66.6\%$ =high). Post-hoc Bonferroni comparisons were performed to correct for multiple testing and to determine to what extent these three groups differ from each other.

Results

There were 570 participants who entered the survey. Not all questionnaires were fully completed. If a subset of the questionnaire was not completed, then this part of survey was excluded from the analysis. The final sample size entered in the hierarchical regression analysis was $N=319$ for predicting somatic symptoms, $n=315$ for physical functioning, and $n=316$ for mental well-being. Demographic characteristics of the dataset ($N=319$) are shown in Table 1. Most participants were female, and the average age was 44 years (range=18-78).

Table 1

Demographic Health-Related Characteristics Of The Participants (N=319)

Age, M (SD)	43.8 (16.48)
Gender, n (%)	
Male	91 (28.5%)
Female	227 (71.2%)
Other	1 (0.3%)
Education level, n (%)	
Academic	256 (80.3%)
Other	63 (19.7%)
Chronic Somatic Diseases, n (%)	117 (37.0%)
Psychiatric disease	32 (10.1%)
Arthrosis	31 (9.8%)
Cardiovascular disease	27 (8.5%)
Rheumatic disease	25 (7.9%)
Migraine	22 (7.0%)
Addiction	22 (7.0%)
Irritable bowel syndrome	21 (6.6%)
Lung disease	16 (5.1%)
Other pain conditions	15 (4.7%)
Chronic skin condition	10 (3.2%)
Chronic headache	10 (3.2%)
Severe obesity	8 (2.5%)
Fibromyalgia	8 (2.5%)
Chronic fatigue syndrome	7 (2.2%)
Burn-out	7 (2.2%)
Diabetes	5 (1.6%)
Epilepsy	3 (0.9%)
Somatic symptom disorder	1 (0.3%)

Note. M = mean; SD = standard deviation. (Current or past) education level; Academic: university of applied sciences and university education; Other: primary school, preparatory vocational secondary education, intermediate vocational education, senior vocational education and general secondary education.

Table 2 shows the characteristics of the predictor and outcome variables used in the regression analyses. The mean scores (\pm SD) in this sample, compared to values of the general population in previous research, are higher for the FIT-60 (3.91 ± 0.74 vs. 3.05 ± 0.70), SBC (3.68 ± 0.54 vs. 3.44 ± 0.50) and the PHQ-15 (0.49 ± 0.33 vs. 0.37 ± 0.26), but lower for the RAND-36 (47.40 ± 9.87 and 46.16 ± 10.66 vs. 50 ± 10).

Table 2

Characteristics Of The Variables Used In The Regression Analyses (N=319)

Variable	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Psychological Flexibility (FIT-60)	3.91	0.74	1.95	5.38
Acceptance	3.75	1.06	0.30	5.95
Cognitive defusion	3.36	1.23	0.00	6.00
Self as context	3.32	0.78	0.60	5.25
Here and now	3.94	0.96	0.90	6.00
Values	4.74	0.67	2.10	6.00
Committed action	4.34	0.79	1.95	6.00
Body Awareness (SBC)	3.68	0.54	1.92	5.00
Somatic Symptoms (PHQ-15)	0.49	0.33	0.00	1.53
Physical Functioning (RAND-36)	47.40	9.87	17.00	61.00
Mental Well-being (RAND-36)	46.19	10.66	16.00	65.00

Note. *M* = mean; *SD* = standard deviation; *Min* = minimum; *Max* = maximum; FIT-60 = Flexibiliteits Index Test; SBC = Scale of Body Connection; PHQ-15 = Patient Health Questionnaire – 15; RAND-36 = RAND Health Insurance Study Questionnaire.

Table 3 displays the correlations between psychological flexibility and the three health status measures, which are medium to strong. There is no association between body awareness and somatic symptoms, physical functioning or mental well-being. There is a weak to no correlation between psychological flexibility and body awareness.

Table 3

Correlations Between Psychological Flexibility, Body Awareness And The Three Health Status Measures

	Somatic Symptoms (N=319)	Physical Functioning (n=315)	Mental well-being (n=316)
Psychological Flexibility (FIT-60)	-.487***	.290***	.745***
Body Awareness (SBC)	.032	-.022	.028

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4 shows the results of the hierarchical regression analyses. In Block 1, female gender was associated with more somatic symptoms ($p=.002$) and male gender with better physical functioning ($p=.007$). Younger age was associated with more somatic symptoms ($p=.008$), better physical functioning ($p=.028$), and poorer mental well-being ($p<.001$). Lower education level was associated with more somatic symptoms ($p=.008$) and poorer physical functioning ($p=.001$). In Block 2, higher levels of psychological flexibility were associated with less somatic symptoms ($p<.001$), better physical functioning ($p<.001$) and mental well-being ($p<.001$), while body awareness was not associated with somatic symptoms ($p=.054$), physical functioning ($p=.430$) and mental well-being ($p=.072$). However, in Block 3, higher levels of body awareness were associated with more somatic symptoms ($p=.049$).

Table 4

Hierarchical Regression Analyses Predicting Somatic Symptoms, Physical Functioning And Mental Well-Being From Demographic Variables, Psychological Flexibility, Body Awareness, And Chronic Somatic Diseases.

Variable	Somatic Symptoms (N=319)			Physical Functioning (n=315)			Mental Well-being (n=316)		
	B	β	Adj. R^2	B	β	Adj. R^2	B	β	Adj. R^2
Block 1			.066***			.075***			
Gender	0.125**	0.174		-3.253**	-0.151		-2.385	-0.102	.058***
Age	-0.003**	-0.151		-0.076*	-0.126		0.146***	0.225	
Education	-0.123**	-0.150		4.638**	0.186		2.371	0.088	
Block 2			.269***			.166***			.566***
Gender	0.115**	0.160		-3.119**	-0.145		-2.156*	-0.093	
Age	0.000	-0.017		-0.134***	-0.224		-0.003	-0.004	
Education	-0.050	-0.061		3.058*	0.123		-1.668	-0.062	
Psychological Flexibility (FIT-60)	-0.214***	-0.482		4.402***	0.331		10.926***	0.759	
Body Awareness (SBC)	0.058	0.096		-0.772	-0.042		-1.374	-0.070	
Block 3			.268			.165			.565
Gender	0.115**	0.161		-3.127**	-0.145		-2.160*	-0.093	
Age	0.000	-0.016		-0.135***	-0.224		-0.003	-0.004	
Education	-0.050	-0.060		3.044*	0.122		-1.675	-0.062	
Psychological Flexibility (FIT-60)	-0.213***	-0.480		4.376***	0.329		10.913***	0.758	
Body Awareness (SBC)	0.060*	0.099		-0.806	-0.044		-1.392	-0.070	
Psychological Flexibility x Body Awareness	-0.025	-0.032		0.678	0.029		0.350	0.014	
Block 4			.358***			.424***			.582***
Gender	0.082*	0.114		-1.513	-0.070		-1.702	-0.073	
Age	-0.001	-0.074		-0.078**	-0.130		0.013	0.021	
Education	0.010	0.012		-0.012	0.000		-2.557*	-0.095	
Psychological Flexibility (FIT-60)	-0.195***	-0.439		3.446***	0.259		10.647***	0.739	
Body Awareness (SBC)	0.048	0.079		-0.164	-0.009		-1.212	-0.061	
Psychological Flexibility x Body Awareness	-0.030	-0.039		1.006	0.043		0.447	0.018	
Chronic Somatic Disease	-0.220***	-0.324		11.116***	0.545		3.191***	0.145	

Note. Gender: 0 = male, 1 = female. Education: 0 = Other (primary school, preparatory vocational secondary education, intermediate vocational education, senior vocational education and general secondary education), 1 = Academic (university of applied sciences and university education).

Adj. R^2 = Adjusted R^2 = explained variance by the variables; *** = Significant F -change (model change)

* $p < .05$, ** $p < .01$, *** $p < .001$.

The interaction of body awareness and psychological flexibility had no significant association with somatic symptoms ($p=.507$), physical functioning ($p=.572$) and mental well-being ($p=.708$). Block 4 showed that chronic somatic diseases were associated with more somatic symptoms ($p<.001$) and poor physical ($p<.001$) and mental health ($p<.001$). Nevertheless, the association of psychological flexibility with less somatic symptoms ($p<.001$), better physical ($p<.001$) and mental health ($p<.001$) remained intact after inclusion of having a chronic somatic disease in the model. Likewise, the association between female gender with more somatic symptoms ($p=.016$), younger age with better physical functioning ($p=.008$) and lower education level with better mental well-being ($p=.019$) was still present.

Figure 2 displays the four combinations of having high or low body awareness and high or low psychological flexibility. Centered values <0 were considered as low; centered values ≥ 0 were considered as being high. The number of participants per group is roughly the same. The boxplots show that there is no interaction effect and that particularly low psychological flexibility is related to more somatic symptoms and impaired physical and mental functioning. In addition, the distribution of the scores in the low psychological flexibility groups is larger than in the high psychological flexibility groups.

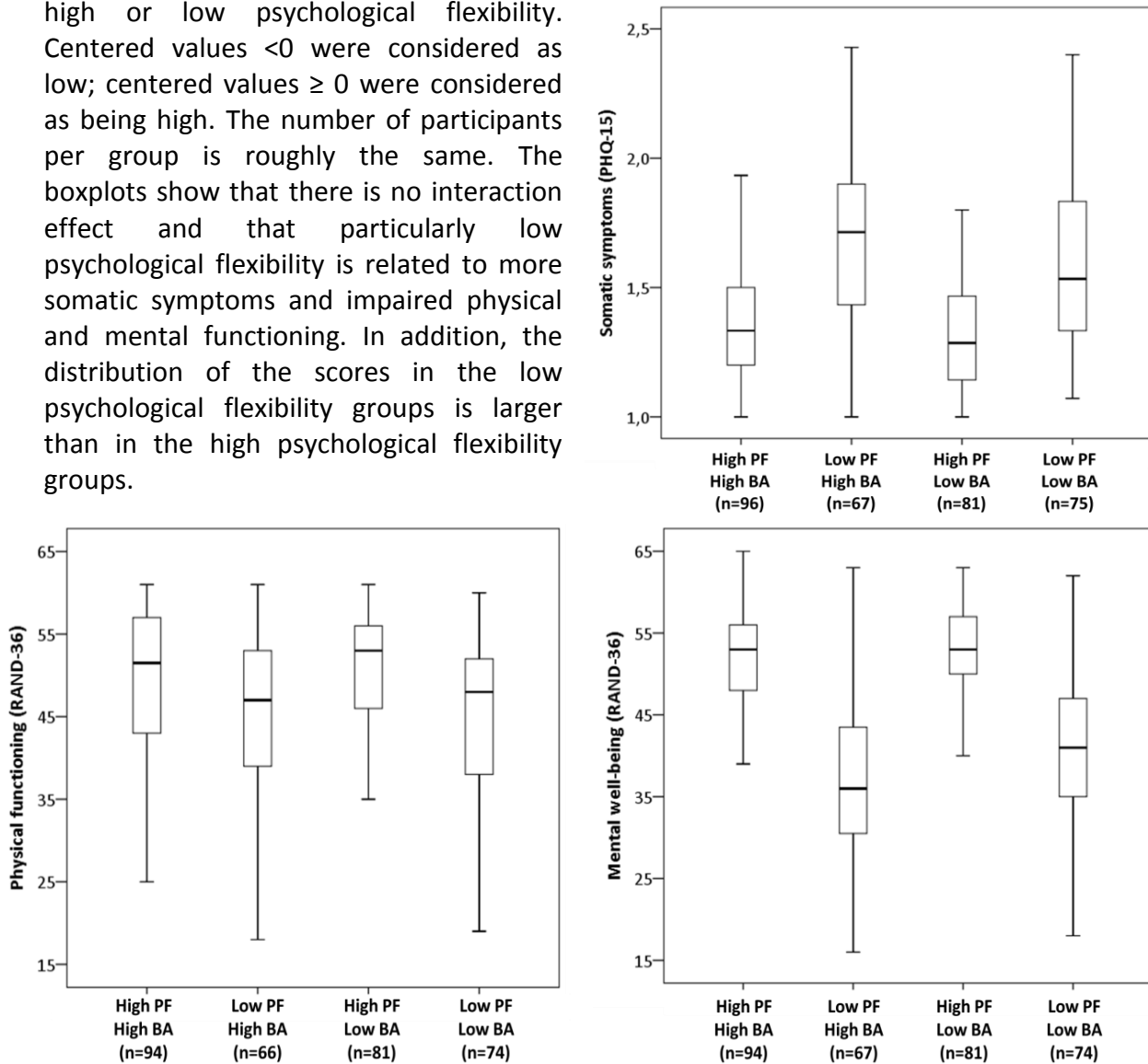


Figure 2. Somatic symptoms, physical functioning and mental well-being predicted by combinations of high and low body awareness (BA) and psychological flexibility (PF). The boxes contain the scores between the 25th and the 75th percentile. The line in the middle of the box is the median.

A sub-analysis was performed to determine which of the six components of psychological flexibility had the strongest association with the three health status measures (see Table 5). Overall highly significant negative correlations were found for the relation with somatic symptoms, while positive associations were observed for physical functioning and mental well-being. The component 'cognitive defusion' was the strongest predictor for somatic symptoms having a medium effect-size ($\beta=-0.406$). All other components showed medium effect sizes, except for 'committed action' ($\beta=-0.269$), which had a small effect size. For physical functioning, almost all predictors displayed small effect sizes, except for 'values' ($\beta=0.321$), which had a medium effect size. Regarding mental well-being, strong correlations were found between the six components of psychological flexibility and mental well-being. Effect sizes were large (>0.500) for all components except for 'committed action' ($\beta=0.409$). The standardized regression coefficients of the components in Table 5 never exceeded those of the combined psychological flexibility in Table 4.

Within-group post-hoc comparisons by Bonferroni indicated that participants with the lowest scores for each component of psychological flexibility (e.g. Acceptance) especially show more somatic symptoms and poorer physical functioning. The differences between the subgroups with middle and high scores are less distinct. Concerning mental well-being, the relationship between the subgroups seems to be more linear. Although the subgroups with the lowest scores display poorer mental well-being, the groups (low, middle, high) differ roughly to the same extent.

Table 5

Regression Analyses Predicting Somatic Symptoms, Physical Functioning And Mental Well-Being From Each Component Of Psychological Flexibility. Post-Hoc Comparisons Display The Differences Within Groups.

Variable	Somatic Symptoms		Physical functioning		Mental well-being	
	β	<i>M</i>	β	<i>M</i>	β	<i>M</i>
Acceptance	-0.378***		0.214***		0.666***	
Low		1.651 ^{bc}		44.537 ^{bc}		38.063 ^{bc}
Middle		1.456 ^a		49.451 ^a		48.394 ^{ac}
High		1.382 ^a		48.549 ^a		52.739 ^{ab}
Cognitive defusion	-0.406***		0.171***		0.669***	
Low		1.639 ^{bc}		44.966 ^{bc}		38.335 ^{bc}
Middle		1.433 ^a		48.066 ^a		47.890 ^{ac}
High		1.379 ^a		49.375 ^a		53.036 ^{ab}
Self as context	-0.334***		0.195***		0.557***	
Low		1.594 ^{bc}		45.735 ^c		39.793 ^{bc}
Middle		1.463 ^a		47.519		47.957 ^{ac}
High		1.408 ^a		48.990 ^a		51.102 ^{ab}
Here and now	-0.340***		0.159**		0.583***	
Low		1.619 ^{bc}		45.724 ^c		38.888 ^{bc}
Middle		1.479 ^{ac}		47.268		46.701 ^{ac}
High		1.372 ^{ab}		49.189 ^a		51.102 ^{ab}
Values	-0.332***		0.321***		0.579***	
Low		1.613 ^{bc}		44.066 ^{bc}		38.765 ^{bc}
Middle		1.491 ^{ac}		47.167 ^{ac}		46.334 ^{ac}
High		1.390 ^{ab}		50.259 ^{ab}		51.994 ^{ab}
Committed action	-0.269***		0.216***		0.409***	
Low		1.578 ^{bc}		44.664 ^{bc}		41.426 ^{bc}
Middle		1.457 ^a		48.649 ^a		47.108 ^{ac}
High		1.424 ^a		49.157 ^a		50.492 ^{ab}

Note. Adjusted for gender, age, level of education, body awareness, interaction between component of psychological flexibility and body awareness and chronic somatic disease.

Low = tertile 1 (<33.3%); Middle = tertile 2 (\geq 33.3 - <66.6%); High = tertile 3 (\geq 66.6%)

a =Significantly different from group 'low'; *b* =Significantly different from group 'middle';

c =Significantly different from group 'high'

p* <.05, *p* <.01, ****p* <.001.

Discussion

To examine whether body awareness and psychological flexibility are resilience factors against somatic symptoms and poor physical and mental health, this study investigated the relation of these two constructs with these three general health indicators.

The main result of this study is that psychological flexibility is associated with having less somatic symptoms and higher levels of physical functioning and mental well-being. This finding is consistent with the current hypothesis and confirms previous findings by Kashdan and Rottenberg (2010), who reported that in many forms of psychopathology, psychological flexibility processes are absent, and that psychological flexibility is a fundamental aspect of health. Because of the medium to large effect sizes, a profound discussion on the mechanisms that underlie this relation is necessary. Because no causality can be inferred from the cross-sectional design of this study, the consequences of psychological flexibility as being the causative determinant, will first be explored. The present findings suggest that a person's physical and mental health and ability to cope with somatic symptoms may increase by improving his or her psychological flexibility. Moreover, a study of A-Tjak et al. (2015) supported the use of ACT in treating physical and mental health problems. In addition, it has been suggested that an intervention enhancing psychological flexibility was effective in improving mental well-being by stimulating skills of acceptance and value-based action (Fledderus, Bohlmeijer, Smit & Westerhof, 2010). This suggests that it is possible to reduce somatic symptoms and its consequences by enhancing psychological flexibility.

The current finding that the components 'acceptance' and 'cognitive defusion' are most strongly associated with the three health status measures is relatively new. While Veehof et al. (2016) have suggested that acceptance- and mindfulness-based interventions are effective on several beneficial outcomes such as physical and mental health, the association of acceptance and cognitive defusion with the health status measures has not been studied in so much detail before. This finding suggests that the elements acceptance and cognitive defusion, compared with elements of commitment and behavior change, might contribute more to better physical and mental health. This may also imply that besides acceptance, cognitive defusion techniques, which are known to achieve similar or even better outcomes as cognitive restructuring (Deacon, Fawzy, Lickel, & Wolitzky-Taylor, 2011), should be implemented more in treatment which aims to increase psychological flexibility.

Post-hoc comparisons showed that especially people with low scores on psychological flexibility experience more somatic symptoms and poor physical and mental health. The differences between participants with middle and high scores were insignificant. This finding is in line with previous findings by Gloster, Meyer, and Lieb (2017), who found that psychological flexibility consistently moderated the relationship between several risk factors such as daily stress and physical- and mental health in the general population. Psychological flexibility offered a protective effect, following a dose response: higher levels were more protective. Moreover, low psychological flexibility appears to be positively associated with neuroticism and to lesser extent negatively associated with conscientiousness (Latzman & Masuda, 2013). A possible assertion may be that low psychological flexibility is a diathesis to psychopathology only because it is an indicator of neuroticism, as both constructs are theorized to reflect distress (Gámez et al., 2011). The findings may implicate that especially people with low psychological flexibility would benefit from therapy that aims to increase psychological flexibility. For people who already have this

trait in greater extent, this kind of therapy may be less relevant. However, this does not apply for improving (mental) well-being. Enhancing psychological flexibility may increase well-being at the personal and even at the societal level (Kashdan & Rottenberg, 2010). Psychological flexibility has the potential to help people suffering from somatic symptoms and other pathology, as well help highly functioning people find greater efficacy and fulfillment in their daily lives.

Because of the cross-sectional design of this study, the findings may also reflect that somatic symptoms and poor physical and mental health limit psychological flexibility or that having a better physical and mental health promotes psychological flexibility. However, Keyes (2005) stated that pathology is relatively independent of well-being. Thus, if low psychological flexibility is associated with forms of pathology, such as somatic symptoms, it cannot be assumed that psychological flexibility contributes to good physical and mental health. The exact casual relation can only be established with future prospective studies. The finding of Keyes is in line with the new definition of health, which is not merely the absence of disease anymore, but incorporates the ability to adapt and self-manage in the face of social, physical, and emotional challenges (Huber et al., 2011). Psychological flexibility may contribute to self-management by taking committed actions towards a meaningful life.

Body awareness was not associated with any of the three health status measures; neither in the univariate nor the multivariate analyses. This finding is in accordance with the study by Ginzburg et al. (2014), which described body awareness as a neutral quality that can lead to opposing outcomes, according to the individual's orientation towards bodily signals. Being aware of one's body may help to understand the relationship between physical symptoms and life experiences and improve health-related quality of life (Mehling et al., 2011), but according to the current results, this does not seem to apply to the studied population that mainly consists of highly educated women. Body awareness is assumed to be adaptive or maladaptive (Mehling et al., 2009), so possibly the association has been neutralized in this sample. Nonetheless, this finding indicates that body awareness may not be maladaptive, which is not conformable with previous research that reported that body awareness can lead to somatosensory amplification, worsening symptoms of anxiety and hypochondriasis (Eccleston, et al., 1997). This may imply that treatment aimed to increase body awareness could be useful for some people but not for others, which is a topic of further investigation.

The hypothesis was that a more accepting and mindful attitude could cause positively toned body awareness (Ginzburg et al., 2015), but the interaction between body awareness and psychological flexibility turned out to be not related to physical- or mental health. This was also shown by the relatively equal distribution of the participants over the boxplots. A potential reason that no interaction was found might be that the definition of body awareness needs more clarification. To suit all perspectives of body awareness, the definition of the construct may have lost power and precision (Mehling et al., 2009).

The findings of this study should be considered in the light of its limitations. First, self-report questionnaires—although highly acceptable and widely used—may not reveal unconscious components of the various psychological traits tested herein. Conclusions of this study are thus limited to conscious processes. Second, because the sample consists mainly of women, with an academic education, the generalization of this study is limited. A more equally distributed sample could make a difference, because in this sample, gender and level of education are associated with the three health status measures. In future studies participants need to be selected from the general population, so that gender and

level of education are proportionally distributed, possibly by using social media groups that cover a broad spectrum of the general population. Third, the Dutch version of the subscale body awareness of the SBC is a reliable measure for primary care and chronic pain patients, but in a lesser extent for healthy students (Van der Maas et al., 2014). This indicates that the instrument might be more suitable for the clinical population. Since a comprehensive part of the sample was highly educated, young, healthy and predominantly female, the validity of this instrument for this sample is questionable. Furthermore, most studies investigating the relationship between body awareness and health-related outcomes were conducted with patients and not with the general population, so this could be an explanation to the fact that no association was found. Finally, another methodological limitation of the studied sample is that inclusion of people with chronic somatic symptoms was based on self-reported diagnoses without certification by a medical specialist. However, the findings in the regression analyses remained intact when the regressions were adjusted for chronic somatic diseases.

To clarify the causal direction of the observed associations, future studies with a prospective or clinical experimental design are needed. Furthermore, it would be worthwhile to examine whether interventions aimed at increasing psychological flexibility and body awareness would be beneficial for people with and without chronic somatic symptoms. To be able to tell something about whether and to what extent psychological flexibility and body awareness scores differ between people with chronic somatic symptoms and the general population, future studies need to acquire participants from both groups and match these in classes of five years, gender and education level (low, middle, high). Finally, future research is needed to examine in more detail for which patient profiles body awareness can be effective and if there is another construct that could stimulate the adaptive form of body awareness.

In conclusion, the findings indicate that psychological flexibility is related to better physical and mental health. This suggests that an intervention aimed at improving psychological flexibility might be beneficial for dealing with somatic symptoms and experiencing a better physical functioning and mental well-being. Body awareness, however, has no association with the three health status measures. Therefore, the findings suggest that psychological flexibility (but not body awareness) might be a resilience factor against somatic symptoms and poor physical functioning and mental well-being.

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Appendix A

Results of the Literature Review

Search Method

Searches were performed on Web of Science and Google Scholar, and focused mainly on studies investigating patients with chronic somatic symptoms. For the literature search on body awareness, the following combination of terms was used: TI= (body awareness) AND TS= (complain* OR somatic* OR chronic* OR disease*). For the literature concerning other topic, the following terms were used: 'SBC', 'body awareness', 'somatic symptoms', 'chronic', 'outcome', 'health', 'psychological flexibility', 'ACT'. Studies investigating the association between mental and physical health and body awareness and psychological flexibility were selected. For some articles, the 'cited by...' function in Web of Science and Google Scholar was used and reference lists of relevant articles were also examined.

Tables

Table A.1 shows cross-sectional studies investigating the relationship between body awareness and health-related outcomes. Table A.2 shows experimental studies investigating the effect of a broad range of body awareness interventions on health-related outcomes. Table A.3 shows other kind of studies (validation study, qualitative study, meta-analysis, systematic review and descriptive study) related to body awareness and chronic somatic symptoms.

Table A.1

Cross-Sectional Studies Investigating The Relationship Between Body Awareness And Health-Related Outcomes

Study	Disorder	Independent variables	Dependent variables	Outcome
Valenzuela-Moguillansky, Reyes & Gaete (2017)	Fibromyalgia	Exteroceptive and interoceptive aspects of body awareness	Pain (functionality and intensity)	Fibromyalgia patients exhibited a higher tendency to note bodily sensations and decreased body confidence
Köteles & Doering (2016)	Healthy controls and patients visiting the GP	Body awareness, subjective symptoms, and anxiety	Somatosensory amplification	Body awareness is body awareness was the most influential predictor of somatosensory amplification.
Ginzburg, Tsur, Karmin, Speizman, Tourgeman & Defrin (2015)	-	Body awareness, pain catastrophizing and mindfulness	Pain habituation	The association between body awareness and pain habituation was moderated by pain catastrophizing. Among low pain catastrophizers, the higher the body awareness, the stronger the tendency to exhibit complete habituation.
d'Alcala, Webster & Esteves (2015)	Chronic Pain (and healthy controls)	Chronic pain and body awareness.	Interoceptive awareness	The findings did not reveal a statistical significant difference in interoceptive awareness and body awareness across the groups (with and without chronic pain)

Table A.2

Experimental Studies Investigating The Effect Of A Broad Range Of Body Awareness Interventions On Health-Related Outcomes

Study	Disorder	Treatment type	Outcome measures	Outcome
Sertel, Simsek & Yumin (2017)	Migraine and tension type headache	Body awareness therapy (BAT)	Pain and body image	BAT is an alternative treatment method that can be securely used in order to decrease pain in patients with chronic headache and to increase body image.
Olsen, Strand, Skjaerven, Sundal & Magnussen (2017)	Hip osteoarthritis	Patient education (PE) and basic body awareness therapy (BBAT)	Encouragement and support, movement awareness and long term perspective	PE followed by BBAT in groups may be beneficial to patients with hip OA, and provide lasting benefits regarding daily life function.
van der Maas, Koke, Bosscher, Twisk, Janssen & Peters (2016)	Chronic pain	Psychomotor therapy (PMT)	Health-related quality of life, disability, and depression	BA might be an important target of treatment to improve the multidisciplinary treatment outcome in chronic pain patients. PMT provides its benefits through improving BA and may be especially beneficial for patients with low BA.
de Jong, Lazar Hug, Mehling, Holzel, Sack, Peeters, Ashih, Mischoulon & Gard (2016)	Chronic pain and comorbid active depression	Mindfulness-Based Cognitive Therapy (MBCT)	Body awareness	A mindfulness-based intervention may increase facets of body awareness and are consistent with a long hypothesized mechanism for mindfulness and emphasize the clinical relevance of body awareness
Olsen & Skjaerven (2016)	Rheumatic disease	Basic Body Awareness Therapy	Movement quality	Contact with the body can help patients exploring and cultivating their own resources for a more functional movement quality
Bang & Cho (2016)	Chronic stroke	Body awareness training	Balance and walking ability	Body awareness training has a positive effect on balance in patients with chronic stroke.
Van der Maas, Koke, Pont, Bosscher, Twisk, Janssen & Peters (2015)	Chronic Pain	Psychomotor therapy (PMT)	health-related quality of life, disability, and depression	No clinical meaningful differences were found between treatment conditions in the primary outcome measures health-related quality of life and disability. However, PMT improves BA in patients with chronic pain and shows good effect size and a significant decrease for catastrophizing.

Eriksson, Moller, Soderberg, Eriksson & Kurlberg (2007)	Irritable bowel syndrome (IBS)	Body awareness therapy	Gastrointestinal and psychological symptoms	Body awareness therapy gave relief of both somatic complaints, psychological symptoms and normalized body tension
Anderson, Strand & Rahei (2007)	Chronic pain	Psychomotor physiotherapy group	Work status, Global Physiotherapeutic Examination, pain levels, and quality of life	Follow-up psychomotor physiotherapy based on body awareness training might cause additional improvement of symptoms and a higher rate of return to work

Table A.3

Other Kind Of Studies (Validation Study, Qualitative Study, Meta-Analysis, Systematic Review And Descriptive Study) Related To Body Awareness And Chronic Somatic Symptoms

Study	Kind of study	Disorder	Outcome
Cramer, Lauche, Daubenmier, Mehling, Bussing, Saha, Dobos & Shields (2018)	Validation study	Chronic pain	Body awareness and body responsiveness are associated with pain-related variables in patients with chronic pain. Mind-body interventions may positively influence both pain and body awareness.
Courtois, Cools & Calsius (2015)	Meta-analysis	Fibromyalgia and chronic fatigue syndrome	Body awareness seems to play an important role in anxiety, depression and HRQoL. Still, interpretations have to be done carefully since the lack of high quality studies.
Lööf, Johansson, Henriksson, Lindblad & Bullington (2014)	Qualitative study	Rheumatoid arthritis	Body awareness can be both positively and negatively toned. RA had caused a higher degree of negatively toned BA. Thus, the ability to shift attention from BA to activity in the outside world could sometimes be beneficial for the patient's general health.
Mehling, Gopisetty, Daubenmier, Price, Hecht & Stewart (2009)	Systematic review	-	Existing self-report instruments do not address important domains of the construct of body awareness, are unable to discern between adaptive and maladaptive aspects of body awareness, or exhibit other psychometric limitations.
Gard (2005)	Descriptive study	Fibromyalgia and chronic pain	Multidisciplinary studies have shown that Basic BAT can increase health-related quality of life and cost-effectiveness

Appendix B Used instruments

A. The Flexibiliteits Index Test (FIT-60) (Batink, Jansen, & de Mey, 2012)

Naam: _____ Geslacht: **M / V** Leeftijd: _____

Burg. staat: _____ Opleiding: _____ Datum afname: _____

In welke mate zijn onderstaande stellingen van toepassing op u?
Omcirkel het meest passende antwoord. Sla alstublieft geen stellingen over.

	Helemaal oneens	0	1	2	3	4	5	6	Helemaal eens
01 Zorgen staan mijn succes in de weg.		0	1	2	3	4	5	6	
02 Ik voel me vaak beperkt door alles wat ik van mezelf moet.		0	1	2	3	4	5	6	
03 Ik kan negatieve gedachten over mijzelf hebben en tegelijkertijd weten dat ik oké ben.		0	1	2	3	4	5	6	
04 Als ik iets wil doen, dan ga ik er voor.		0	1	2	3	4	5	6	
05 Ik ben goed in staat om lange termijn doelen op te delen in korte termijn mogelijkheden.		0	1	2	3	4	5	6	
06 Mijn leven is goed in balans.		0	1	2	3	4	5	6	
07 Ik vind het moeilijk om doelgericht bezig te blijven.		0	1	2	3	4	5	6	
08 Ik heb voldoende vrienden.		0	1	2	3	4	5	6	
09 Mijn gedachten bezorgen mij ongemak of emotionele pijn.		0	1	2	3	4	5	6	
10 Het is OK als ik me iets onaangenaams herinner.		0	1	2	3	4	5	6	
11 Ik maak regelmatig concrete plannen voor de toekomst.		0	1	2	3	4	5	6	
12 Als iets me niet lukt dan zet ik door, en probeer ik het op een andere manier aan te pakken.		0	1	2	3	4	5	6	
13 Ik ga graag naar mijn werk.		0	1	2	3	4	5	6	
14 Ik ben bereid om mijn angst volledig toe te laten.		0	1	2	3	4	5	6	
15 Ik vind het moeilijk om mijn aandacht te houden bij wat er in het hier en nu gebeurt.		0	1	2	3	4	5	6	
16 Ik ben snel afgeleid.		0	1	2	3	4	5	6	
17 Ik vind van mezelf dat ik altijd aardig moet zijn.		0	1	2	3	4	5	6	
18 Het is moeilijk voor me om de woorden te vinden die mijn gedachten beschrijven.		0	1	2	3	4	5	6	
19 Ik beseft dat mijn zelfbeeld niet zoveel over mij als persoon zegt.		0	1	2	3	4	5	6	
20 Ik observeer mijn gevoelens zonder dat ik me erin verlies.		0	1	2	3	4	5	6	
21 Als ik thuis ben voel ik me op mijn gemak.		0	1	2	3	4	5	6	
22 Ik doe mijn best om geen negatieve dingen te hoeven ervaren.		0	1	2	3	4	5	6	
23 Ik heb last van een negatief zelfbeeld.		0	1	2	3	4	5	6	
24 Als ik iets niet goed doe, dan reken ik dat mezelf aan.		0	1	2	3	4	5	6	
25 Ik beseft dat ik de dingen die ik doe, zelf heb gekozen.		0	1	2	3	4	5	6	

In welke mate zijn onderstaande stellingen van toepassing op u? Omcirkel het meest passende antwoord. Sla alstublieft geen stellingen over.	0	1	2	3	4	5	6	
	oneens	Helemaal				eens	Helemaal	
26 Als ik pijnlijke gevoelens toelaat, dan ben ik bang dat ze niet meer verdwijnen.	0	1	2	3	4	5	6	
27 Er zijn een aantal dingen die ik doe, die ik belangrijk vind.	0	1	2	3	4	5	6	
28 Ik heb last van het gevoel dat ik door de bomen het bos niet meer zie.	0	1	2	3	4	5	6	
29 Ik heb de neiging mijn pijn erger te maken met mijn gedachten.	0	1	2	3	4	5	6	
30 Ik vind het makkelijk om mijn gedachten van een andere kant te bekijken.	0	1	2	3	4	5	6	
31 Mijn pijnlijke ervaringen en herinneringen maken het me moeilijk om een waardevol leven te leiden.	0	1	2	3	4	5	6	
32 Als iemand een vervelende opmerking maakt, kan ik daar nog lang last van hebben.	0	1	2	3	4	5	6	
33 Ik hoef dingen niet altijd goed te doen van mezelf.	0	1	2	3	4	5	6	
34 Mijn werk en / of studie speelt een belangrijke rol in mijn leven.	0	1	2	3	4	5	6	
35 Gedachten die bij me opkomen moet ik onder controle houden.	0	1	2	3	4	5	6	
36 Ik kan goed beschrijven wat ik voel.	0	1	2	3	4	5	6	
37 Ik vind mijn leven waardevol.	0	1	2	3	4	5	6	
38 Ik geloof dat sommige van mijn gedachten abnormaal of slecht zijn en dat ik niet zo zou moeten denken.	0	1	2	3	4	5	6	
39 Sommige woorden kunnen mij heel hard raken.	0	1	2	3	4	5	6	
40 Ik ben onderweg om mijn doelen en dromen te bereiken.	0	1	2	3	4	5	6	
41 Ik besteed regelmatig tijd aan mijn hobby's.	0	1	2	3	4	5	6	
42 Ik heb de neiging erg sterk te reageren op mijn eigen negatieve gedachten.	0	1	2	3	4	5	6	
43 Ik keur mezelf af als ik rare gedachten heb.	0	1	2	3	4	5	6	
44 Ik kan makkelijk mijn overtuigingen en meningen onder woorden brengen.	0	1	2	3	4	5	6	
45 Emoties (zoals boosheid, verdriet) veroorzaken problemen in mijn leven.	0	1	2	3	4	5	6	
46 Ik sta los van mijn omgeving.	0	1	2	3	4	5	6	
47 Ik doe meerdere dingen die ik belangrijk vind.	0	1	2	3	4	5	6	
48 Ik vind het leuk om nieuwe uitdagingen aan te gaan.	0	1	2	3	4	5	6	
49 Ik kan goed beschrijven wat ik ervaar met mijn zintuigen, zoals wat ik hoor, zie en ruik.	0	1	2	3	4	5	6	
50 Ik vind steun bij de mensen in mijn omgeving.	0	1	2	3	4	5	6	

In welke mate zijn onderstaande stellingen van toepassing op u?
 Omcirkel het meest passende antwoord. Sla alstublieft geen stellingen over.

	Helemaal oneens							Helemaal eens
51 De gedachten die ik over mijzelf heb, bepalen niet wie ik ben.	0	1	2	3	4	5	6	
52 Ik schrik soms van de gedachten die ik heb.	0	1	2	3	4	5	6	
53 Ik ben bang voor mijn gevoelens.	0	1	2	3	4	5	6	
54 Mijn gedachten en gevoelens staan de manier waarop ik wil leven niet in de weg.	0	1	2	3	4	5	6	
55 Ik vind familie en / of vrienden belangrijk.	0	1	2	3	4	5	6	
56 Wanneer ik mezelf vergelijk met andere mensen, lijkt het dat de meesten onder hen hun leven beter in de hand hebben dan ik.	0	1	2	3	4	5	6	
57 Het is erg moeilijk om verontrustende gedachten los te laten, zelfs wanneer ik weet dat los laten mij zou helpen.	0	1	2	3	4	5	6	
58 Van sommige gedachten raak ik van streek.	0	1	2	3	4	5	6	
59 Ik ben erop uit om nieuwe dingen te doen.	0	1	2	3	4	5	6	
60 Ik denk dat mijn emoties soms slecht of ongepast zijn en dat ik ze niet zou moeten voelen.	0	1	2	3	4	5	6	

Heeft u alle stellingen ingevuld? Hartelijk dank voor het invullen van deze lijst!

B. Scale of Body Connection (SBC; Van der Maas, Köke, Bosscher, Hoekstra & Peters, 2014)

Lichaamsbewustzijn

Instructie: Deze vragenlijst bevat vragen over hoe bewust u zich bent van uw lichaam en hoe u reageert op dat bewustzijn. Omcirkel het cijfer dat het best weergeeft hoe u zich over het algemeen voelt. Er zijn geen juiste antwoorden, antwoord zo eerlijk mogelijk.

Twee vragen hebben betrekking op seksuele activiteit; daaronder vallen alle vormen van seksuele activiteit, dus ook zelfbevrediging. Als u op geen enkele wijze seksueel actief bent, hoeft u deze vragen niet te beantwoorden.

Uw antwoord moet betrekking hebben op de afgelopen twee maanden.

1. Als er spanning in mijn lichaam is, ben ik me bewust van deze spanning

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

2. Ik kan mijn emoties moeilijk herkennen

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

3. Ik merk dat mijn ademhaling oppervlakkig wordt wanneer ik nerveus ben

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

4. Ik ben bewust van mijn emotionele reactie wanneer iemand mij op een zorgzame manier aanraakt

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

5. Mijn lichaam voelt tijdens ongemakkelijke situaties verstijfd aan, alsof het verdoofd is

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

6. Ik merk hoe mijn lichaam verandert als ik boos ben

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

7. Ik heb het idee alsof ik van buitenaf naar mijn lichaam kijk

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

8. Tijdens seksuele activiteit ben ik me bewust van wat ik daarbij voel

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

9. Ik kan mijn adem door mijn lichaam voelen stromen als ik diep uitadem

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

10. Ik voel me niet verbonden met mijn lichaam

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

11. Het is moeilijk voor mij om bepaalde emoties te uiten

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

12. Om te begrijpen hoe ik me voel maak ik gebruik van wat ik in mijn lichaam waarneem

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

13. Wanneer ik mij lichamelijk ongemakkelijk voel, ga ik na wat de oorzaak van het ongemak zou kunnen zijn

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

14. Ik luister naar informatie van mijn lichaam over mijn emotionele toestand

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

15. Wanneer ik gestrest ben, ben ik me bewust van deze stress in mijn lichaam

helemaal niet	niet	soms	regelmatig	Altijd
1	2	3	4	5

16. Ik leid mezelf af van gevoelens van lichamelijk ongemak

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

17. Wanneer ik gespannen ben, let ik erop waar in mijn lichaam de spanning zich bevindt

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

18. Ik merk dat mijn lichaam anders aanvoelt na een rustgevende ervaring

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

19. Ik voel me niet verbonden met mijn lichaam tijdens seksuele activiteit

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

20. Het is moeilijk voor mij om aandacht te besteden aan mijn emoties

helemaal niet	niet	soms	regelmatig	altijd
1	2	3	4	5

C. Patient Health Questionnaire-15 (PHQ-15; Kroenke et al., 2002)

Gedurende de voorbije 4 weken, hoe vaak heb je last gehad van een van de volgende problemen?

	Helemaal geen last	Een beetje last	Veel last
Buikpijn	0	1	2
Rugpijn	0	1	2
Pijn in armen, benen of gewrichten (knieën, heupen etc)	0	1	2
Menstruele krampen of andere menstruele problemen (enkel vrouwen)	0	1	2
Hoofdpijn	0	1	2
Pijn in de borst	0	1	2
Duizeligheid	0	1	2
Episodes van flauwte	0	1	2
Bonzend hart of hartkloppingen	0	1	2
Kortademigheid	0	1	2
Pijn of problemen tijdens seksueel contact	0	1	2
Verstopping, slappe stoelgang of diarree	0	1	2
Misselijkheid, winderigheid of spijsverteringsmoeilijkheden	0	1	2
Gevoel van vermoeidheid of weinig energie	0	1	2
Slaapproblemen	0	1	2

D. RAND-36 (VanderZee, Sanderman, Heyink, & de Haes, 1996).

In deze vragenlijst wordt naar uw gezondheid gevraagd.

Wilt u elke vraag beantwoorden door het juiste hokje aan te kruisen? Wanneer u twijfelt over het antwoord op een vraag, probeer dan het antwoord te geven dat het meest van toepassing is.

1. Wat vindt u, over het algemeen genomen, van uw gezondheid?

- uitstekend
- zeer goed
- goed
- matig
- slecht

2. In vergelijking met een jaar geleden, hoe zou u nu uw gezondheid in het algemeen beoordelen?

- veel beter dan een jaar geleden
- iets beter dan een jaar geleden
- ongeveer hetzelfde als een jaar geleden
- iets slechter dan een jaar geleden
- veel slechter dan een jaar geleden

3. De volgende vragen gaan over dagelijkse bezigheden. Wordt u door uw gezondheid op dit moment beperkt bij deze bezigheden? Zo ja, in welke mate?

	ja, ernstig beperkt	ja, een beetje beperkt	nee, helemaal niet beperkt
a. Forse inspanning zoals hardlopen, zware voorwerpen tillen, inspannend sporten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. <i>Matige inspanning</i> zoals het verplaatsen van een tafel, stofzuigen, fietsen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Tillen of boodschappen dragen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. <i>Een paar</i> trappen oplopen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. <i>Eén</i> trap oplopen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Buigen, knielen of bukken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. <i>Meer dan een kilometer</i> lopen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Een halve kilometer lopen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Honderd meter lopen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Uzelf wassen en aankleden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Had u, ten gevolge van uw lichamelijke gezondheid, de afgelopen 4 weken één van de volgende problemen bij uw werk of andere bezigheden?

- | | ja | nee |
|--|--------------------------|--------------------------|
| a. U heeft minder tijd kunnen besteden aan werk of andere bezigheden | <input type="checkbox"/> | <input type="checkbox"/> |
| b. U heeft <i>minder bereikt</i> dan u zou willen | <input type="checkbox"/> | <input type="checkbox"/> |
| c. U was beperkt in het <i>soort</i> werk of het soort bezigheden | <input type="checkbox"/> | <input type="checkbox"/> |
| d. U had moeite met het werk of andere bezigheden (het kostte u bijvoorbeeld extra inspanning) | <input type="checkbox"/> | <input type="checkbox"/> |

5. Had u, ten gevolge van een emotioneel probleem (bijvoorbeeld doordat u zich depressief of angstig voelde), *de afgelopen 4 weken* één van de volgende problemen bij uw werk of andere dagelijkse bezigheden?

- | | ja | nee |
|--|--------------------------|--------------------------|
| a. U heeft <i>minder tijd</i> kunnen besteden aan werk of andere bezigheden | <input type="checkbox"/> | <input type="checkbox"/> |
| b. U heeft <i>minder bereikt</i> dan u zou willen | <input type="checkbox"/> | <input type="checkbox"/> |
| c. U heeft het werk of andere bezigheden niet zo zorgvuldig gedaan als u gewend bent | <input type="checkbox"/> | <input type="checkbox"/> |

6. In hoeverre heeft uw lichamelijke gezondheid of hebben uw emotionele problemen u *de afgelopen 4 weken* belemmerd in uw normale sociale bezigheden met gezin, vrienden, burens of anderen?

- helemaal niet
- enigszins
- nogal
- veel
- heel erg veel

7. Hoeveel pijn had u de afgelopen 4 weken?

- geen
- heel licht
- licht
- nogal
- ernstig
- heel ernstig

8. In welke mate heeft pijn u de afgelopen vier weken belemmerd bij uw normale werkzaamheden (zowel werk buitenshuis als huishoudelijk werk)?

- helemaal niet
- een klein beetje
- nogal
- veel
- heel erg veel

9. Deze vragen gaan over hoe u zich de afgelopen 4 weken heeft gevoeld. Wilt u bij elke vraag het antwoord aankruisen dat het beste aansluit bij hoe u zich heeft gevoeld?

Hoe vaak gedurende *de afgelopen 4 weken*:

	voort- durend	meestal	vaak	soms	zelden	nooit
a. voelde u zich levenslustig?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. voelde u zich erg zenuwachtig?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. zat u zo erg in de put dat niets u kon opvrolijken?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. voelde u zich kalm en rustig?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. voelde u zich erg energiek?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. voelde u zich neerslachtig en somber?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. voelde u zich uitgeblust?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. voelde u zich gelukkig?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. voelde u zich moe?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Hoe vaak hebben uw lichamelijke gezondheid of emotionele problemen gedurende de afgelopen 4 weken uw sociale activiteiten (zoals bezoek aan vrienden of naaste familieleden) belemmerd?

- voortdurend
 meestal
 soms
 zelden
 nooit

11. Wilt u het antwoord kiezen dat het beste weergeeft hoe juist of onjuist u elk van de volgende uitspraken voor uzelf vindt?

	volkomen juist	grotendeels juist	weet ik niet	grotendeels onjuist	volkomen onjuist
a. Ik lijk gemakkelijker ziek te worden dan andere mensen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Ik ben net zo gezond als andere mensen die ik ken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Ik verwacht dat mijn gezondheid achteruit zal gaan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Mijn gezondheid is uitstekend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix C

Assumptions

Prior to interpreting the results of the multiple regression analyses, several assumptions were evaluated. First, stem-and-leaf plots and boxplots indicated that each variable in the regression was normally distributed. Second, inspections of the normal probability plot of standardized residuals as well as the scatterplot of standardized residuals against standardized predicted values indicated that the assumptions of normality, linearity and homoscedasticity of residuals were met. Third, both the Mahalanobis distance and the Cook's distance did not exceed the critical value for any cases in the data file, indicating that multivariate and bivariate outliers were not of concern. Fourth, relatively high tolerances for both predictors in the regression model indicated that multicollinearity would not interfere with the ability to interpret the outcome of the multiple regression analyses.