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MEDIATORS BETWEEN YOGA PRACTICE AND PSYCHOLOGICAL WELL-BEING

Mindfulness, Body Awareness and Satisfaction with Body Image**

(Received: 6 February 2015; accepted: 8 October 2015)

Regular yoga practice was connected to higher levels of psychological well-being in cross-sectional and longitudinal studies. However, the psychological mechanisms of this connection are still unexplained. In the present cross-sectional questionnaire study, hypothesised mediating effects of body awareness, satisfaction with body image, and mindfulness were investigated. 203 healthy adults (183 females, mean age: 36.8 ± 10.03 years) practicing yoga at an advanced level were involved in the study. Participants completed online questionnaires assessing body awareness (BAQ), dissatisfaction with body image (BIQ), mindfulness (MAAS) and well-being (WHO-5). Body awareness, body image dissatisfaction and mindfulness showed significant correlations with the weekly frequency of yoga practice as well as with psychological well-being. Body awareness, body image and mindfulness mediated the connection between yoga practice and well-being. In the regression analysis, body image dissatisfaction and body awareness remained connected to well-being even after controlling for practice frequency, mindfulness, gender and age. According to these results, body awareness, body image satisfaction and mindfulness are mediators of the connection between yoga practice and well-being.

Keywords: body awareness, body image, body-mind, mindfulness, physical activity, well-being, yoga

Vermittler der Verbindung zwischen Yoga und dem geistigen Wohlbefinden: bewusste Präsenz, Körperbewusstsein und Zufriedenheit mit dem Körperbild: Regelmäßiges Yoga ist in zahlreichen Quer- und Längsschnittstudien mit einem höheren psychischen Wohlbefinden verbunden, zugleich sind die psychologischen Hintergrundmechanismen dieser Korrelation nicht bekannt. Bei

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** The authors express thanks to Ádám B.F. Czinege for proofreading. Research for this paper was supported by the Hungarian National Scientific Research Fund (OTKA K-109549).

der vorliegenden Querschnittsumfrage wurde die vermittelnde Wirkung des Körperbewusstseins, der Zufriedenheit mit dem Körperbild bzw. der bewussten Präsenz untersucht. In der Studie haben 203 Yoga auf fortgeschrittenem Niveau praktizierende gesunde Erwachsene (183 Frauen, Alter: 36.8 ± 10.03 Jahre) den Fragebogen online ausgefüllt, der das Körperbewusstsein (BAQ), die Zufriedenheit mit dem Körperbild (BIQ), die bewusste Präsenz (MAAS) und das Wohlbefinden (WHO-5) bewertete. Die Körperwahrnehmung, die Zufriedenheit mit dem Körperbild und die bewusste Präsenz zeigten signifikante Korrelation sowohl mit der wöchentlichen Häufigkeit der Yoga-Übungen als auch mit dem Wohlbefinden. Einzeln betrachtet vermittelten sowohl die Körperwahrnehmung als auch die Zufriedenheit mit dem Körperbild und die bewusste Präsenz eine Verbindung zwischen Yoga und Wohlbefinden. In der Regressionsanalyse blieb der Zusammenhang zwischen Zufriedenheit mit dem Körperbild bzw. Körperbewusstsein und Wohlbefinden auch nach der Kontrolle der bewussten Präsenz, der Häufigkeit der Yogaübungen, des Geschlechts und des Alters signifikant. Die vorliegenden Ergebnisse zeigen, dass Körperbewusstsein, Zufriedenheit mit dem Körperbild sowie bewusste Präsenz als Vermittler zwischen Yoga und Wohlbefinden betrachtet werden können.

Schlüsselbegriffe: Yoga, Wohlbefinden, bewusste Präsenz, Körperbewusstsein, Körperbild, Körper-Geist, Bewegung

1. Introduction

A body-mind boom may be observed in the fields of leisure, sport, (psycho)therapy and scientific discourse. One emblematic representative of this trend is yoga (HARRINGTON 2008). In this paper, the term ‘yoga’ refers to modern yoga, the newest branch that is most widely practised and researched nowadays, which includes ‘certain types of yoga that evolved mainly through the interaction of Western individuals interested in Indian religions and a number of more or less Westernized Indians over the last 150 years’ (MICHELIS 2005, 2).

Yoga practice was originally divided into five basic principles (VISHNU-DEVANANDA 2011): proper exercise, proper breathing, proper relaxation, proper diet, and positive thinking and meditation, emphasised to various extents in the different modern yoga schools. It is important to emphasise that there is a huge diversity in the literature concerning the particular yoga practice under investigation. Fortunately, the mindfulness-based stress reduction program (MBSR), which has recently attracted much scholarly attention, includes hatha yoga, which provides a standardised form of the otherwise diverse collection of different yoga protocols. Hatha yoga was found to be the strongest component of MBSR in improving mental health (CARMODY & BAER 2008). The most common effects linked to and expected from yoga practice are strength, flexibility and balance of both body and mind (IMPETT et al. 2006).¹

¹ See also ‘Sacred Balance: Yoga Poses for Strength and Flexibility’, retrieved 19 Aug 2015 from the Yoga-paws website (www.yogapaws.com/yoga-blogs-yoga-paws/bid/60972/Sacred-Balance-Yoga-Poses-for-Strength-and-Flexibility); Stephanie Watson, ‘Yoga Health Benefits: Flexibility, Strength, Posture, and More’ (14 July 2014), retrieved 19 Aug 2015 from the WebMD website (www.webmd.com/balance/guide/the-health-benefits-of-yoga); ‘Teachings’, retrieved 19 Aug 2015 from the International Sivananda Yoga Vedanta Centres website (www.sivananda.org/teachings/).

The positive psychological effects of yoga on healthy adults' well-being, defined as an increased rate of calmness and a state of pleasant enthusiasm, and a decreased rate of anxiety and depressive symptoms (DANIELS 2000), were reported by a number of empirical studies (ADAIR et al. 1998; HADI & HADI 2007; HARTFIEL et al. 2011; IMPETT et al. 2006; MALATHI et al. 2000; MICHALSEN et al. 2005; OKEN et al. 2006; ROSS & THOMAS 2010; SMITH et al. 2007; WEST et al. 2004; WOOD 1993). However, no empirical research investigating the background (i.e. possible mediators) of the association between yoga practice and psychological well-being has been published hitherto. One possible candidate might be body awareness (i.e. 'perception of bodily states, processes and actions that is presumed to originate from sensory proprioceptive and interoceptive afferents and that an individual has the capacity to be aware of'; MEHLING et al. 2009, 4), which was found to be connected to psychological well-being in several empirical studies (DAUBENMIER 2005; KÖTELES 2014; TIHANYI et al. 2016).

Although elevated levels of body awareness (also called somatic awareness or embodied self-awareness; BAKAL 1999; FOGEL 2009) are often considered as harmful in medical contexts as they can lead to the amplification of the perceived symptoms and to catastrophisation (BARSKY et al. 1988; WICKRAMASEKERA 1995), body awareness has been found helpful in identifying important bodily sensations and in giving the opportunity to react to them in an adaptive way (e.g. by resting or other ways of self-care, visiting a physician, etc.; BAKAL 1999). Moreover, it was proposed that actual states of the body heavily influence the contents and processes of the brain (ÁDÁM 1998; CAMERON 2002; DAMASIO 2010), and that these so-called 'somatic markers' are indispensable for decision making and emotions (DAMASIO et al. 1996).

In more detail, body-mind psychotherapists agree that body awareness (1) facilitates the inner dialogues which govern behaviour based on need states, (2) strengthens the self-regulation in stress response, (3) helps know and respect more the self-borders and thus enables the interpersonal communication to be more effective, (4) directs the attention on 'what is' instead of 'what should be', which strengthens the skill of acceptance, (5) enhances the sense of self and self-confidence (FOGEL 2009).

The frequency of yoga practice was shown to be connected to body awareness in several studies (IMPETT et al. 2006; TIHANYI et al. 2016). In an experimental study, three months of yoga training was found to lead to higher body awareness in healthy adults compared to a non-randomised control group (RANI & RAO 1994), while only ten weeks of yoga practice increased body awareness in a randomised controlled study in colorectal patients (CRAMER et al. 2014). In summary, as body awareness is connected to both well-being and yoga practice, it may play a mediating role between the two.

According to MEHLING and colleagues (2009), body awareness is based almost exclusively on interoceptive input, whereas body image also includes exterosensory information. Hence, the latter refers to a more complex representation of the body that also incorporates attitudinal and perceptual experiences. An essential aspect of body image is subjective evaluation – that is, to what extent the individual is satisfied or dissatisfied with their physical appearance. From early childhood on, body image influences one's thoughts, behaviour, and emotions; it is one of the key elements

of self-esteem, and it predicted well-being as well (CASH & HICKS 1990; CASH & PRUZINSKY 2002; FOX 1999).

Body satisfaction and body awareness were higher among yoga practitioners than among those practicing aerobic or in the control group in a study (DAUBENMIER 2005), and members of a yoga intervention group reported less body image-related anxiety after 20 units of training than a gym-group in another research (HAFNER-HOLTER et al. 2009). However, body dissatisfaction was improved by cognitive dissonance therapy, while yoga was not more efficient than the control group, in another study (MITCHELL et al. 2007).

Body awareness is one of the key components of mindfulness (i.e. an intentional, non-elaborative, non-judgemental awareness which focuses on one's emotions, thoughts and sensations of the here-and-now; BISHOP et al. 2004; MEHLING et al. 2009; ZGIERSKA et al. 2009) – another important and recently much investigated construct that is also able to increase well-being (BROWN & RYAN 2003; KABAT-ZINN & HANH 2009). Mindfulness meditation practice was proposed to be a process toward enhanced self-regulation, consisting of the interplay of attention regulation, body awareness, emotion regulation (in form of reappraisal and extinction) and a change of perspective regarding the self (HÖLZEL et al. 2011).

Mindfulness practice was found to lead to positive outcomes in several important life domains including mental health, physical health, behavioural regulation and interpersonal relationships, and in curtailing negative functioning (BROWN et al. 2007). Moreover, mindfulness showed a positive relationship with positive affect, positive emotion, joviality, attentiveness, and vitality (BOWDEN et al. 2011; CARMODY & BAER 2008; KEUNE & PERCZEL FORINTOS 2010; RICHARDS et al. 2010), and a negative correlation with anxiety and stress (GROSSMAN et al. 2004; PRAISSMAN 2008). Although body awareness was hypothesised to lead to more self-care, mindfulness but not self-awareness mediated the relationship between the subjective importance of self-care and well-being in one study (RICHARDS et al. 2010).

The MBSR program increased mindfulness (SHAPIRO et al. 2007), even over a relatively short period of time (six weeks) (KLATT et al. 2008). Advanced hatha yoga practitioners showed higher levels of mindfulness than beginners (BRISBON & LOWERY 2011), and in a pilot study of a four-month residential yoga group, mindfulness was found to mediate the group effect on quality of life, compared to matched controls (GARD et al. 2012). In a cross-sectional study, however, no connection was found between mindfulness and frequency of yoga practice, and advanced yoga practitioners showed no higher levels of mindfulness than those practicing aerobic (TIHANYI et al. 2016).

In summary, (1) yoga practice was found to be connected to well-being, body awareness, body image and mindfulness, and (2) body awareness, body image and mindfulness were also connected to well-being. Based on these empirical and theoretical considerations, it was hypothesised in the current study that body awareness, body image and mindfulness are mediators of the relationship between yoga practice and psychological well-being (*Figure 1*).

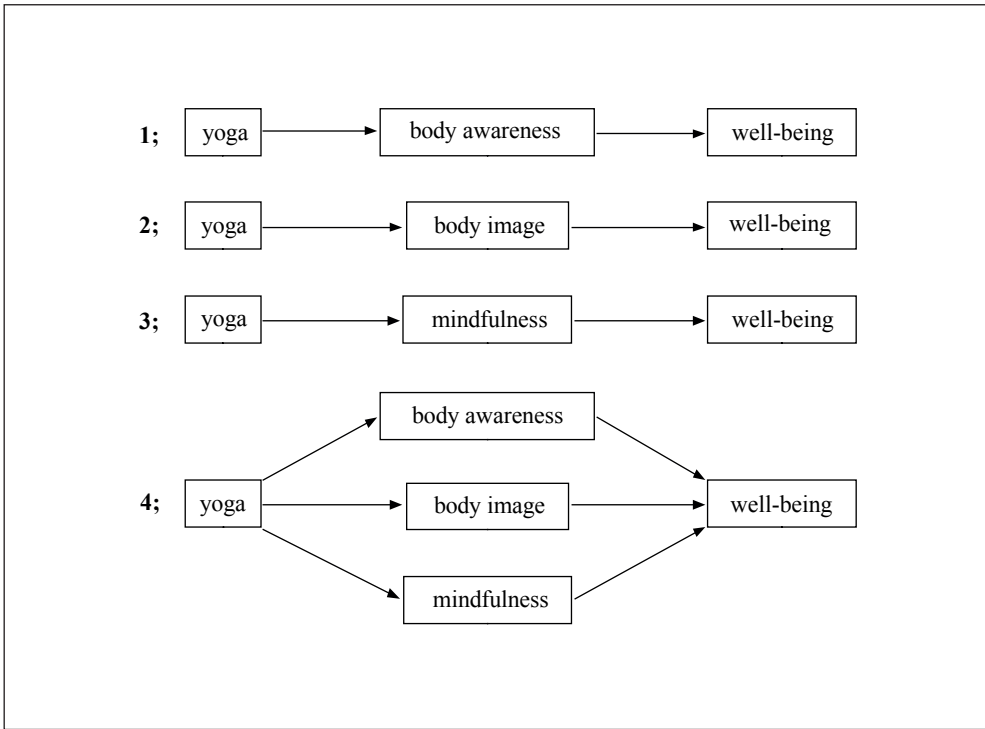


Figure 1
Hypotheses of the study

2. Methods

2.1. Participants

Overall, 203 advanced yoga practitioners (183 females; mean age = 36.8 ± 10.03 years; range: 19–68 years) participated in the study. Individuals under the age of 18 years and those who had practiced yoga for less than six months were excluded. Participants were reached through either the centres they exercised at or social media. Questionnaires were completed online, anonymously and voluntarily, and participants did not receive any reward for their participation. The study was approved by the Institutional Ethical Board of Eötvös Loránd University. All participants read and signed an informed consent form before completing the questionnaire.

2.2. Questionnaires

Body Awareness Questionnaire (BAQ) (SHIELDS et al. 1989). The questionnaire consists of eighteen statements that measure beliefs about one's sensitivity to normal non-emotive bodily processes, and the ability to anticipate bodily reactions. Agreement/disagreement is indicated on a seven-point Likert scale. The BAQ is considered a reliable and valid instrument for measuring self-reported attentiveness to normal bodily processes (MEHLING et al. 2009). The Hungarian version showed good validity and reliability in past studies (EMANUELSEN et al. 2015; KÖTELES 2014). In the present study, the internal consistency of the scale was 0.89.

Body Image Ideals Questionnaire (BIQ) was developed by CASH and SZYMANSKI (1995) and is a frequently used measure of body image. The questionnaire deals with various physical characteristics such as height, weight, chest size, facial features, and muscle definition. Twenty-two items tap the discrepancy between how subjects perceive themselves and how they wish they were (personal ideal). The importance of the personal ideal is also reported. Answers are given on a four-point Likert scale. Higher scores reflect greater discrepancies, dissatisfaction, and greater importance, respectively. Unlike other measures of body image, the BIQ measures discrepancy between the real and the ideal self, and the strength of the discrepancy will vary as a function of the subjective importance of the physical ideals. Reliability and validity is firmly established and the BIQ correlates strongly with other measures of body image such as the Body Areas Satisfaction Scale (BASS), Situational Inventory of Body-Image Dysphoria (SIBID), and the Appearance Schemas Inventory (CASH & SZYMANSKI 1995). Reliability of the Hungarian version was appropriate in a past study (EMANUELSEN et al. 2015) and also good in the present study (0.81).

Mindful Attention and Awareness Scale (MAAS) (BROWN & RYAN 2003). The fifteen-item scale measures the extent to which one is able to focus on the present moment in an open and non-judgemental way. Each of the items is stated inversely using a six-point Likert scale (from *almost always* to *almost never*) asking the respondents of how often they find themselves acting automatically, inattentively or being preoccupied. The Hungarian version had a good internal consistency (Cronbach's alpha = 0.78) in earlier studies (SIMOR et al. 2013; TIHANYI et al. 2016). In the present study, the internal consistency of the scale was 0.86.

Psychological well-being was assessed using the five-item WHO-Five scale (BECH 1990). The respondents appraised their level of energy, calmness, cheerfulness and of being interested on a four-point Likert scale. The validated Hungarian version had a good internal consistency in an earlier study (SUSÁNSZKY et al. 2006). In the present study, the internal consistency of the scale was 0.73.

Yoga practice. Current weekly frequency of practice was used to characterise participants' yoga activity. The cut-off point for advanced yoga practice was chosen based on previous results, showing that after six months significant psychological changes can be registered, such as reduction in anxiety and depression (O'ROURKE et al. 1990), rise in self-esteem and well-being (ALFERMANN & STOLL 2000) and

shift from extrinsic to intrinsic motivation (MALTBY & DAY 2001). Moreover, approximately 50% of those who join exercise programs drop out during the first three to six months (MARCUS et al. 1994).

2.3. Data analysis

Data analysis was conducted using the SPSS v21 software. As the distribution of yoga frequency and well-being did not fulfil the criterion of normality, non-parametric analyses were used. Spearman correlation analyses were carried out to investigate the connections among weekly frequency of exercise, body awareness, body image dissatisfaction, mindfulness and psychological well-being. To investigate the independent contribution of variables to well-being, a multiple binary logistic regression analysis was conducted. First, the sample was split into two at the median of well-being scores ($n_1 = 123$, $n_2 = 80$). Second, the independent variables were entered in four steps using the ENTER method: (Step 1) participants' gender (males = 0, females = 1) and age, a binary variable referring to being a yoga instructor (0 = no, 1 = yes), and weekly frequency of yoga practice, (Step 2) mindfulness score, (Step 3) body image dissatisfaction score, and finally (Step 4) body awareness score. To check mediating effects, the bootstrapping method developed by PREACHER and HAYES (2008) was used, which does not require normal distribution for any variables. The procedure answers the same question as the widely used Sobel test, that is, is there a significant change (decrease) in the regression coefficient between the independent and the dependent variable after including one or more (mediating) variable(s)? In contrast to the Sobel test, it determines confidence intervals instead of significance levels. Four tests were conducted: three investigating the independent mediating effects of the three respective variables, and a fourth analysis where all variables were included simultaneously (*Figure 1*).

3. Results

3.1. Descriptive statistics

Descriptive statistics of the measured variables are presented in *Table 1*.

3.2. Correlation analysis

All assessed variables correlated significantly with each other. Both well-being and frequency of yoga practice were connected to body awareness, mindfulness and body image dissatisfaction (*Table 2*). The Spearman coefficients are negative in the case of body image dissatisfaction, since this construct reveals the dissatisfaction with body image.

Table 1
Descriptive statistics and normality of the assessed variables

	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>	<i>Kolmogorov-Smirnov Z</i>
<i>Age</i>	19	68	36.8	10.03	1.61*
<i>Gender</i>	0	1	0.9	0.30	7.56***
<i>Teacher</i>	0	1	0.3	0.44	6.66***
<i>Yoga Frequency</i>	1	7	3.4	1.94	3.24***
<i>Well-Being</i>	10	20	15.1	2.12	1.67**
<i>Mindfulness</i>	24	87	62.7	11.27	0.96
<i>Body Image Dissatisfaction</i>	-2.45	6.45	1.7	1.41	0.75
<i>Body Awareness</i>	31	124	95.1	15.98	0.99

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2
Two-tailed Spearman correlations among the assessed variables

	<i>Yoga Frequency</i>	<i>Well-Being</i>	<i>Mindfulness</i>	<i>Body Image Dissatisfaction</i>
<i>Well-Being</i>	0.26***			
<i>Mindfulness</i>	0.22**	0.33***		
<i>Body Image Dissatisfaction</i>	-0.21**	-0.34***	-0.40***	
<i>Body Awareness</i>	0.24***	0.39***	0.31***	-0.31***

** $p < 0.01$; *** $p < 0.001$.

3.3. Mediation analysis

According to the results of the first three mediation analyses, an indirect (mediating) effect were found (i.e. the 95% confidence interval was above zero) in the case of body awareness, body image dissatisfaction and mindfulness (for details, see *Figure 2* and *Table 3*). In the fourth analysis, where the hypothesised mediating variables were included simultaneously, the total mediating effect was also significant. However, an inspection of the individual effects of the variables revealed that the 95% confidence intervals for body awareness and body image were above zero (0.0220–0.1168 and 0.0149–0.1051, respectively), while it was not significant in the case of mindfulness (–0.0038–0.0935).

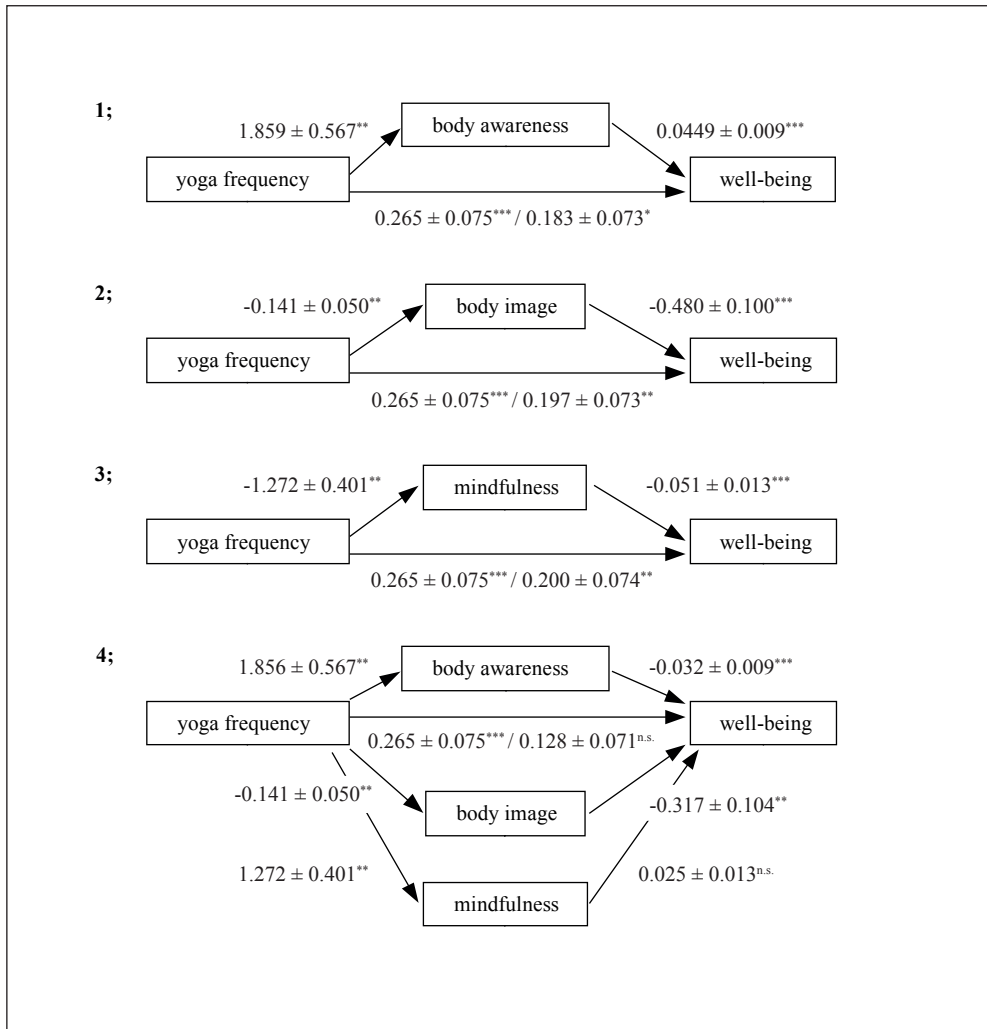


Figure 2

Regression coefficients and standard errors between (1) yoga practice and mediator(s), (2) mediator(s) and well-being (with the control of yoga practice), and (3) yoga practice and well-being (direct effect before / after including the mediator(s))

Table 3
 Descriptive statistics (mean, 95% confidence intervals, standard error)
 of the indirect effect calculated from 1000 bootstrap samples for the four mediation analyses

<i>Mediating Variable</i>	<i>Mean of the Indirect Effect</i>	<i>95% CIs</i>	<i>SE</i>
<i>A; BAQ</i>	0.0299	0.0399–0.1493	0.0059
<i>B; BIQ</i>	0.0679	0.0253–0.1305	0.0264
<i>C; MAAS</i>	0.0657	0.0180–0.1362	0.0293
<i>D; BAQ & BIQ & MAAS</i>	0.1381	0.0707–0.2142	0.0361

3.4. Regression analysis

The first step of the multiple linear regression analysis revealed a significant connection between frequency of yoga practice and well-being even when the effects of age, gender and being a yoga instructor were controlled for (*Table 3*). In the second step, mindfulness and weekly frequency of yoga practice were connected to well-being. The third step of the analysis revealed a significant connection between body image dissatisfaction and well-being, while the contribution of mindfulness became non-significant. In the last step, practice frequency, body image dissatisfaction and body awareness remained significantly connected to well-being. The final equation explained 17.9% of the total variance of well-being ($p < 0.001$) (*Table 4*).

Table 4
 Results of the binary logistic regression analysis (Exp(B) coefficients
 with 95% confidence intervals) predicting well-being score

	<i>Step 1</i> <i>Cox & Snell R² =</i> <i>0.073; p < 0.01</i>	<i>Step 2</i> <i>Cox & Snell R² =</i> <i>0.111; p < 0.001</i>	<i>Step 3</i> <i>Cox & Snell R² =</i> <i>0.156; p < 0.001</i>	<i>Step 4</i> <i>Cox & Snell R² =</i> <i>0.179; p < 0.001</i>
<i>Age</i>	1.009 [0.980, 1.039]	1.003 [0.973, 1.033]	1.010 [0.979, 1.042]	1.011 [0.979, 1.043]
<i>Gender</i>	1.155 [0.418, 3.190]	1.201 [0.428, 3.370]	1.474 [0.505, 4.306]	1.396 [0.485, 4.018]
<i>Yoga Instructor</i>	1.573 [0.777, 3.188]	1.412 [0.686, 2.904]	1.051 [0.490, 2.256]	1.010 [0.466, 2.190]
<i>Frequency of Yoga Practice</i>	1.267** [1.076, 1.491]	1.228* [1.039, 1.451]	1.231* [1.036, 1.463]	1.199* [1.006, 1.429]
<i>Mindfulness</i>		1.043** [1.013, 1.074]	1.027 [0.996, 1.059]	1.021 [0.990, 1.054]
<i>Body Image Dissatisfaction</i>			0.648** [0.492, 0.854]	0.678** [0.512, 0.897]
<i>Body Awareness</i>				1.027* [1.004, 1.051]

* $p < 0.05$; ** $p < 0.01$.

4. Discussion

In this cross-sectional questionnaire study, body awareness, body image dissatisfaction and mindfulness were connected to both the frequency of yoga practice and psychological well-being in a sample of healthy adults practising yoga at an advanced level. Moreover, body awareness, body image dissatisfaction and mindfulness mediated the connection between yoga practice and well-being. In the regression analysis, body image dissatisfaction, body awareness and weekly frequency of yoga practice remained connected to well-being even after controlling for mindfulness, gender and age.

Our results are in accordance with previous findings on the positive connection between the frequency of yoga practice and well-being (HARTFIEL et al. 2011; MALATHI et al. 2000; ROSS & THOMAS 2010). As our data was cross-sectional, these relations might be explained in two ways. On the one hand, practicing yoga may improve well-being, on the other hand, good mood and energy may have a positive impact on practice. Nevertheless, existence of the former connection in other sports (i.e. exercise as a cause of improved well-being) was supported by longitudinal and intervention studies (NETZ et al. 2005).

Body awareness, body image dissatisfaction and mindfulness were connected to yoga practice, which is also supported by former results (BRISBON & LOWERY 2011; DAUBENMIER 2005; IMPETT et al. 2006; TIHANYI et al. 2016). Our results are also in accordance with previous findings showing a connection between body awareness, body image dissatisfaction, and mindfulness and well-being (CARMODY & BAER 2008; CASH & HICKS 1990; DAUBENMIER 2005; KÖTELES 2014; TIHANYI et al. 2016).

We found significant mediating effects of body awareness, body image dissatisfaction and mindfulness between yoga practice and well-being, which is a novel finding to our knowledge. One possible interpretation of this mediating effect is that (1) frequent practice of yoga increases body awareness and mindfulness, and decreases dissatisfaction with body image; and (2) higher consciousness towards the body's signs, higher satisfaction with the body and higher present-oriented attention all lead to higher well-being. On the other hand, the opposite direction of causation is also a possible explanation of these findings, that is, (1) higher well-being increases the probability of turning to bodily perception and accepting it, of being satisfied with the body and of staying in a non-judgemental awareness, (2) and these factors might lead to more frequent yoga practice. Since only advanced yoga practitioners were involved in the study, these mediating effects could also be interpreted as a reflection of a 'yoga personality', that is, those who are characterised by high levels of body awareness, body image satisfaction and mindfulness tend to practice yoga more frequently and experience higher well-being, with no causal link between the latter two.

Body image satisfaction had the strongest independent connection to well-being, and body awareness also showed a significant connection after controlling for age, gender, frequency of yoga practice, and mindfulness. Body image might play an

important role in enhancing well-being in our sample of yoga practitioners in at least two parallel ways: (1) through the change of cognitive perception, evaluation and acceptance of the body (DAUBENMIER 2005), and (2) through the physical change of the body itself (e.g. body weight, muscle strength) (RAUB 2002; TRAN et al. 2001).

Further factors can be hypothesised to mediate the link between the frequency of yoga practice and well-being. Paying attention to the bodily signals may actually be just the first step towards well-being; the tendency to let the bodily sensations influence behaviour and enhance self-caring, that is, body responsiveness, may also be required (DAUBENMIER 2005). The term ‘body intelligence’ was also used for the synthesis of body awareness, body knowledge and body responsiveness, a construct to be later examined in yoga research (ANDERSON 2006; GAVIN & MOORE 2010). The stress-reductive and physiological effects of yoga could also lead to higher well-being, independently of body awareness, body image and mindfulness (MICHALSEN et al. 2005; WEST et al. 2004). The supporting personal connection to a yoga group and an instructor may also enhance well-being, while practising yoga at home may strengthen the subjective impression of control and self-esteem – two factors later to be examined in similar studies.

The most important limitation of the present cross-sectional study is that it could not reveal the causal direction of the reported connections, that is, the possible interaction between practicing yoga, psychological well-being and the suggested mediators. Moreover, our sample was not representative, thus the generalisability of the results is limited. Participants completed the questionnaire online, therefore the conditions of answering were not controlled, and data from different classes, studios and yoga schools were pooled.

To our knowledge, this study was the first to show the mediating effect of body awareness, body image dissatisfaction and mindfulness between frequency of yoga practice and well-being. These results can encourage further studies to explore the causal link between yoga and well-being, and can give an example of how to examine and describe the positive mental effects of other body-centred methods. Exploring the mediators between modern yoga and its mental benefits can help practitioners and teachers make use of this technique, develop this newest branch of yoga, which has both Eastern and Western roots, and adopt it to different cultural and personal needs.

References

- ADAIR, R.K., R.D. ASTUMIAN & J.C. WEAVER (1998) ‘Detection of Weak Electric Fields by Sharks, Rays, and Skates’, *Chaos* 8, 576–87.
- ÁDÁM, G. (1998) *Visceral Perception: Understanding Internal Cognition* (New York: Plenum).
- ALFERMANN, D. & O. STOLL (2000) ‘Effects of Physical Exercise on Self-Concept and Well-Being’, *International Journal of Sport Psychology* 31, 47–65.
- ANDERSON, R. (2006) ‘Body Intelligence Scale: Defining and Measuring the Intelligence of the Body’, *The Humanistic Psychologist* 34, 357–67.

- BAKAL, D.A. (1999) *Minding the Body: Clinical Uses of Somatic Awareness* (New York: Guilford).
- BARSKY, A.J., J.D. GOODSON, R.S. LANE & P.D. CLEARY (1988) 'The Amplification of Somatic Symptoms', *Psychosomatic Medicine* 50, 510–19.
- BECH, P. (1990) 'Measurement of Psychological Distress and Well-Being', *Psychotherapy and Psychosomatics* 54, 77–89.
- BISHOP, S.R., M. LAU, S. SHAPIRO, L. CARLSON, N.D. ANDERSON, J. CARMODY, Z.V. SEGAL, S. ABBEY, M. SPECA, D. VELTING & G. DEVINS (2004) 'Mindfulness: A Proposed Operational Definition', *Clinical Psychology: Science and Practice* 11, 230–41.
- BOWDEN, D., C. GAUDRY, S.C. AN & J. GRUZELIER (2011) 'A Comparative Randomised Controlled Trial of the Effects of Brain Wave Vibration Training, Iyengar Yoga, and Mindfulness on Mood, Well-Being, and Salivary Cortisol', *Evidence-Based Complementary and Alternative Medicine* 2012, Art Nr. 234713.
- BRISBON, N.M. & G.A. LOWERY (2011) 'Mindfulness and Levels of Stress: A Comparison of Beginner and Advanced Hatha Yoga Practitioners', *Journal of Religion and Health* 50, 931–41.
- BROWN, K.W. & R.M. RYAN (2003) 'The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being', *Journal of Personality and Social Psychology* 84, 822–48.
- BROWN, K.W., R.M. RYAN & J.D. CRESWELL (2007) 'Mindfulness: Theoretical Foundations and Evidence for Its Salutary Effects', *Psychological Inquiry* 18, 211–37.
- CAMERON, O.G. (2002) *Visceral Sensory Neuroscience: Interoception* (New York: Oxford UP).
- CARMODY, J. & R.A. BAER (2008) 'Relationships between Mindfulness Practice and Levels of Mindfulness, Medical and Psychological Symptoms and Well-Being in a Mindfulness-Based Stress Reduction Program', *Journal of Behavioral Medicine* 31, 23–33.
- CASH, T.F. & K.L. HICKS (1990) 'Being Fat versus Thinking Fat: Relationships with Body Image, Eating Behaviors, and Well-Being', *Cognitive Therapy and Research* 14, 327–41.
- CASH, T.F. & T. PRUZINSKY, eds. (2002) *Body Image: A Handbook of Theory, Research and Clinical Practice* (New York: Guilford).
- CASH, T.F. & M.L. SZYMANSKI (1995) 'The Development and Validation of the Body-Image Ideals Questionnaire', *Journal of Personality Assessment* 64, 466–77.
- CRAMER, H., B. POKHREL, F. GASS, C. EISENMANN, R. LAUCHE, B. MEIER, M.K. WALZ, G. DOBOS & J. LANGHORST (2014) 'Hatha Yoga for Patients with Colorectal Cancer: A Randomized Controlled Mixed-Methods Study', *The Journal of Alternative and Complementary Medicine* 20, A52–A53.
- DAMASIO, A. (2010) *Self Comes to Mind: Constructing the Conscious Brain* (New York: Pantheon).
- DAMASIO, A.R., B.J. EVERITT & D. BISHOP (1996) 'The Somatic Marker Hypothesis and the Possible Functions of the Prefrontal Cortex [and Discussion]', *Philosophical Transactions of the Royal Society of London: Series B: Biological Sciences* 351, 1413–20.
- DANIELS, K. (2000) 'Measures of Five Aspects of Affective Well-Being at Work', *Human Relations* 53, 275–94.
- DAUBENMIER, J.J. (2005) 'The Relationship of Yoga, Body Awareness, and Body Responsiveness to Self-Objectification and Disordered Eating', *Psychology of Women Quarterly* 29, 207–19.
- EMANUELSEN, L., R. DREW & F. KÖTELES (2015) 'Interoceptive Sensitivity, Body Image Dissatisfaction, and Body Awareness in Healthy Individuals', *Scandinavian Journal of Psychology* 56, 167–74.
- FOGEL, A. (2009) *The Psychophysiology of Self-Awareness: Rediscovering the Lost Art of Body Sense* (New York & London: Norton).

- FOX, K.R. (1999) 'The Influence of Physical Activity on Mental Well-Being', *Public Health Nutrition* 2, 411–18.
- GARD, T., N. BRACH, B.K. HÖLZEL, J.J. NOGGLE, L.A. CONBOY & S.W. LAZAR (2012) 'Effects of a Yoga-Based Intervention for Young Adults on Quality of Life and Perceived Stress: The Potential Mediating Roles of Mindfulness and Self-Compassion', *The Journal of Positive Psychology* 7, 165–75.
- GAVIN, J. & M. MOORE (2010) 'Body Intelligence: A Guide to Self-Attunement', *IDEA Fitness Journal* 7:11, retrieved 19 Aug 2015 from www.idealife.com/fitness-library/body-intelligence-a-guide-to.
- GROSSMAN, P., L. NIEMANN, S. SCHMIDT & H. WALACH (2004) 'Mindfulness-Based Stress Reduction and Health Benefits', *Journal of Psychosomatic Research* 57, 35–43.
- HADI, N. & N. HADI (2007) 'Effects of Hatha Yoga on Well-Being in Healthy Adults in Shiraz, Islamic Republic of Iran', *Eastern Mediterranean Health Journal* 13, 829–37.
- HAFNER-HOLTER, S., M. KOPP & V. GÜNTHER (2009) 'Effects of Fitness Training and Yoga on Well-Being Stress, Social Competence and Body Image', *Neuropsychiatrie: Klinik, Diagnostik, Therapie und Rehabilitation: Organ der Gesellschaft Österreichischer Nervenärzte und Psychiater* 23, 244–48.
- HARRINGTON, A. (2008) *The Cure Within: A History of Mind-Body Medicine* (New York & London: Norton).
- HARTFIEL N, J. HAVENHAND, SB. KHALSA, G. CLARKE & A. KRAYER (2011) 'The Effectiveness of Yoga for the Improvement of Well-Being and Resilience to Stress in the Workplace.', *Scandinavian Journal of Work, Environment & Health* 37, 70–76.
- HÖLZEL, B.K., S.W. LAZAR, T. GARD, Z. SCHUMAN-OLIVIER, D.R. VAGO & U. OTT (2011) 'How does Mindfulness Meditation Work? Proposing Mechanisms of Action from a Conceptual and Neural Perspective', *Perspectives on Psychological Science* 6, 537–59.
- IMPETT, E.A., J.J. DAUBENMIER & A.L. HIRSCHMAN (2006) 'Minding the Body: Yoga, Embodiment, and Well-Being', *Sexuality Research & Social Policy* 3, 39–48.
- KABAT-ZINN, J. & T.N. HANH (2009) *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (New York: Random House).
- KEUNE, P.M. & D. PERCZEL FORINTOS (2010) 'Mindfulness Meditation: A Preliminary Study on Meditation Practice during Everyday Life Activities and Its Association with Well-Being', *Psiholojske teme* 19, 373–86.
- KLATT, M.D., J. BUCKWORTH & W.B. MALARKEY (2008) 'Effects of Low-Dose Mindfulness-Based Stress Reduction (MBSR-ld) on Working Adults', *Health Education & Behavior* 36, 601–14.
- KÖTELES, F. (2014) 'A Testi Tudatosság Kérdőív magyar verziójának (BAQ-H) vizsgálata jogász és fiatal felnőtt kontroll mintán', *Mentálhigiéné és Pszichoszomatika* 15, 373–91.
- MALATHI, A., A. DAMODARAN, N. SHAH, N. PATIL & S. MARATHA (2000) 'Effect of Yogic Practices on Subjective Well Being', *Indian Journal of Physiology and Pharmacology* 44, 202–06.
- MALTBY, J. & L. DAY (2001) 'The Relationship between Exercise Motives and Psychological Well-Being', *Journal of Psychology* 135, 651–60.
- MARCUS, B.H., C.A. EATON, J.S. ROSSI & L.L. HARLOW (1994) 'Self-Efficacy, Decision-Making, and Stages of Change: An Integrative Model of Physical Exercise', *Journal of Applied Social Psychology* 24, 489–508.
- MEHLING, W.E., V. GOPSETTY, J. DAUBENMIER, C.J. PRICE, F.M. HECHT & A. STEWART (2009) 'Body Awareness: Construct and Self-Report Measures', *PLoS ONE* 4:5, e5614 (DOI: 10.1371/journal.pone.0005614).

- MICHALSEN, A., P. GROSSMAN, A. ACIL, J. LANHORST, R. LÜDTKE, T. ESCH, G.B. STEFANO & G.J. DOBOS (2005) 'Rapid Stress Reduction and Anxiolysis among Distressed Women as a Consequence of a Three-Month Intensive Yoga Program', *Medical Science Monitor* 11, 555–61.
- MICHELIS, E. De (2005) *A History of Modern Yoga: Patanjali and Western Esotericism* (London: Continuum).
- MITCHELL, K.S., S.E. MAZZEO, S.M. RAUSCH & K.L. COOKE (2007) 'Innovative Interventions for Disordered Eating: Evaluating Dissonance-Based and Yoga Interventions', *International Journal of Eating Disorders* 40, 120–28.
- NETZ, Y., M.-J. WU, B.J. BECKER & G. TENENBAUM (2005) 'Physical Activity and Psychological Well-Being in Advanced Age: A Meta-Analysis of Intervention Studies', *Psychology and Aging* 20, 272–84.
- OKEN, B.S., D. ZAJDEL, S. KISHIYAMA, K. FLEGAL, C. DEHEN, M. HAAS, D.F. KRAEMER, J. LAWRENCE & J. LEYVA (2006) 'Randomized, Controlled, Six-Month Trial of Yoga in Healthy Seniors: Effects on Cognition and Quality Of Life', *Alternative Therapies in Health and Medicine* 12, 40–47.
- O'ROURKE, A., B. LEWIN, S. WHITECROSS & W. PACEY (1990) 'The Effects of Physical Exercise Training and Cardiac Education on Levels of Anxiety and Depression in the Rehabilitation of Coronary Artery Bypass Graft Patients', *International Disability Studies* 12, 104–06.
- PRAISSMAN, S. (2008) 'Mindfulness-Based Stress Reduction: A Literature Review and Clinician's Guide', *Journal of the American Academy of Nurse Practitioners* 20, 212–16.
- PREACHER, K.J. & A.F. HAYES (2008) 'Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models', *Behavior Research Methods* 40, 879–91.
- RANI, N.J. & P.V.K. RAO (1994) 'Body Awareness and Yoga Training', *Perceptual and Motor Skills* 79, 1103–06.
- RAUB, J.A. (2002) 'Psychophysiologic Effects of Hatha Yoga on Musculoskeletal and Cardiopulmonary Function: A Literature Review', *The Journal of Alternative and Complementary Medicine* 8, 797–812.
- RICHARDS, K., C. CAMPENNI & J. MUSE-BURKE (2010) 'Self-Care and Well-Being in Mental Health Professionals: The Mediating Effects of Self-Awareness and Mindfulness', *Journal of Mental Health Counseling* 32, 247–64.
- ROSS, A. & S. THOMAS (2010) 'The Health Benefits of Yoga and Exercise: A Review of Comparison Studies', *The Journal of Alternative and Complementary Medicine* 16, 3–12.
- SHAPIRO, S.L., K.W. BROWN & G.M. BIEGEL (2007) 'Teaching Self-Care to Caregivers: Effects of Mindfulness-Based Stress Reduction on the Mental Health of Therapists in Training', *Training and Education in Professional Psychology* 1, 105–15.
- SHIELDS, S.A., M.E. MALLORY & A. SIMON (1989) 'The Body Awareness Questionnaire: Reliability and Validity', *Journal of Personality Assessment* 53, 802.
- SIMOR, P., Z. PETKE & F. KÖTELES (2013) 'Measuring Pre-Reflexive Consciousness: The Hungarian Validation of the Mindful Attention Awareness Scale (MAAS)', *Learning & Perception* 5, 17–29.
- SMITH, C., H. HANCOCK, J. BLAKE-MORTIMER & K. ECKERT (2007) 'A Randomised Comparative Trial of Yoga and Relaxation to Reduce Stress and Anxiety', *Complementary Therapies in Medicine* 15, 77–83.

- SUSÁNSZKY, É., B. KONKOLY THEGE, A. STAUDER & M. KOPP (2006) 'A WHO Jól-lét kérdőív rövidített (WBI-5) magyar változatának validálása a Hungarostudy 2002 országos lakossági egészségfelmérés alapján', *Mentálhigiéné és Pszichoszomatika* 7, 247–55.
- TIHANYI T., B., A. SÁGI, B. CSALA, N. TOLNAI & F. KÖTELES (2016) 'Body Awareness, Mindfulness, and Affect: Does the Kind of Physical Activity Make a Difference?' *European Journal of Mental Health* 11, 97–111.
- TRAN, M.D., R.G. HOLLY, J. LASHBROOK & E.A. AMSTERDAM (2001) 'Effects of Hatha Yoga Practice on the Health-Related Aspects of Physical Fitness', *Preventive Cardiology* 4, 165–70.
- VISHNU-DEVANANDA, S. (2011) *The Complete Illustrated Book of Yoga* (New York: Three Rivers).
- WEST, J., C. OTTE, K. GEHER, J. JOHNSON & D.C. MOHR (2004) 'Effects of Hatha Yoga and African Dance on Perceived Stress, Affect, and Salivary Cortisol', *Annals of Behavioral Medicine* 28, 114–18.
- WICKRAMASEKERA, I.E. (1995) 'Concepts, Data, and Predictions from the High Risk Model of Threat Perception', *The Journal of Nervous and Mental Disease* 183, 15–23.
- WOOD, C. (1993) 'Mood Change and Perceptions of Vitality: A Comparison of the Effects of Relaxation, Visualization and Yoga', *Journal of the Royal Society of Medicine* 86, 254–58.
- ZGIERSKA, A., D. RABAGO, N. CHAWLA, K. KUSHNER, R. KOEHLER & A. MARLATT (2009) 'Mindfulness Meditation for Substance Use Disorders: A Systematic Review', *Substance Abuse* 30, 266–94.