

Characteristics of Users and Reported Effects of the Wim Hof Method – A Mixed-Methods Study

James J. Allen – s1875299

Supervisors: Christina Bode & Constance H.C. Drossaert

Abstract

Background: The Wim Hof Method (WHM) consists of a combination of cold-exposure, breathing exercises and yoga postures, designed to offer users a means to gain increased control over the physiology. Despite a growing body of research surrounding this method, the full scope of the effects of the method are still undocumented. Nevertheless, the method has attracted thousands of practitioners. This mixed-methods study aimed to study the characteristics of this group, as well as the reported effects, factors underlying these effects and possible improvements that can be made to the method.

Methods: An online questionnaire was created, and circulated on various Facebook-groups, resulting in 241 respondents filling in the questionnaire. This questionnaire contained questions regarding how respondents found out about the method; whether they tried the method; motivations or expectations for trying the method; duration and frequency of practice; positive changes; negative changes; whether they were suffering from specific complaints/conditions prior to beginning the practice; and whether they were willing to participate in follow-up interviews. Results were descriptively analyzed by the researcher. Follow-up interviews were conducted with 16 individuals using an interview schedule based on Elliott's (2008) Client Change Interview Schedule. The interviews were conducted in order to acquire additional, qualitative data regarding general information regarding their condition and experience with the method; changes; attributions; resources; limitations; helpful aspects of the method; problematic aspects of the method and suggestions for improvement. These interviews were audio-recorded, transcribed and inductively analyzed by the researcher

Results: The user group appears to be comprised primarily of North American and European men aged 30-60, motivated by health consciousness and curiosity, who learn about the WHM primarily online or by word of mouth. Most of them experienced primarily positive changes they attributed to the WHM, although some negative changes were reported as well. Most commonly reported positive changes were changes in *energy levels; mood; overall well-being; stress and anxiety; focus and awareness; respiration; a sense of spiritual connectedness to the Self; immunity; physical stress and tension; a sense of spiritual connectedness to nature; and body temperature*. The most commonly reported negative change was *difficulty sleeping*. The changes are primarily attributed to *adaptation to stress* and *increased control over the physiology*. Other factors to which the changes are attributed are *a sense of community; greater connectedness to one's own body and feelings; internal factors that promote/prevent change* (mindset; discipline; motivation; overall health; prior spiritual experiences; knowledge); *external factors that promote/prevent change* (life circumstances; Wim Hof; social resources; social barriers; availability of (sufficiently) cold water; accessibility and simplicity of the method; external stressors; immersion, language) and generally beneficial *interactions with other treatments/practices*.

Conclusions: The wide range of observed effects suggests that the WHM could be a simple and accessible tool that has possible applications in a variety of health-promotion contexts, primarily with regard to mood- and anxiety-related symptoms. This study provides a framework for future research that needs to be conducted with regard to these various effects, as well as possible negative effects. The WHM could be a useful tool for health promotion in target groups that are male and/or have a high need for self-management and/or are resistant to other forms of treatment.

Keywords: Wim Hof Method, Yoga, Meditation, Breathing exercises, Cold-exposure, Mixed-method, Online questionnaire, Interviews

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Introduction

Wim Hof is a Dutch individual, renowned for several world records in withstanding extreme circumstances. Based on his experience with yoga and cold-exposure, Hof developed a method to gain increased control of the physiology: the Wim Hof Method (WHM). The method includes deep breathing exercises, yoga postures, meditation and controlled cold exposure. Of particular significance is the emphasis on the principles of gaining increased control over the physiology, and *hormesis* (i.e. the controlled induction of a stressor that forces beneficial adaptation). These are suggested to help stabilize mood, induce a relaxation response, counter the effects of stress, and support immune system function. The method is gaining in popularity, with many anecdotal reports of its supposed benefits circulating online, despite a relative lack of scientific documentation of its effects. Due to this relative lack of understanding of the method, including both the possible risks and the reported benefits (spanning across physical, psychological, social and spiritual domains) the present study aims to investigate the characteristics of WHM-users; ways in which practitioners of the WHM experience change; what underlies these changes; and if and how the method can be adapted to better suit user needs. Below, the WHM and associated literature is discussed. Considering that the WHM consists of a combination of elements from yoga, meditation and breathing exercises, as well as cold-exposure, literature surrounding these respective elements is also discussed below.

The Wim Hof Method

What follows is a description of the practice of the method. The practice is generally performed in the morning, as it is advised to perform the breathing exercise on an empty stomach. The practitioner is encouraged to begin by performing a set of yoga postures. This is then followed by performing a breathing exercise. The basic breathing exercise involves sitting or laying down in a comfortable position, and breathing deeply. The in-breath is performed by expanding the abdomen, followed by the chest, and to imagine the breath going into the head. The out-breath is performed simply by relaxing the body and releasing the breath. The rhythm of the breathing is circular, meaning it is a continuous flow. After 30-40 cycles, the breath is fully exhaled and the practitioner ceases to breathe, with the

breath held out. During this breath-retention phase, the practitioner focuses on relaxing and being aware of the body. When the body starts to display the reflexive need to breathe in, the practitioner takes one deep breath and holds it while squeezing the body, pushing blood into the head, for 10-20 seconds. This process is repeated 3-4 times. Then, the practitioner takes a cold bath or shower, during which he or she will focus on relaxing and being aware of the body, being aware of the breath. The practitioner may visualize a source of heat inside the body, or an “inner fire.” Practitioners are encouraged to gradually increase the duration and intensity of the cold-exposure over time. There are no strict recommendations regarding the order in which the various components are performed.

While yoga postures may be incorporated, the core of the method is comprised of the breathing technique and cold exposure. Research conducted on a group trained by Wim Hof have shown that his techniques allow individuals to consciously influence the ANS and immune system by inducing a controlled stress response (Groothuis et al., 2010; Kox et al., 2014). His techniques were shown to attenuate the pro-inflammatory response in endotoxemia (upon injection with E.coli bacteria). Trained individuals performed Wim Hof's breathing exercise, resulting in lower rates of self-reported nausea, headaches, shivering and muscle and back pain when exposed to endotoxemia and elevated the expression of the anti-inflammatory response via IL-10, an anti-inflammatory cytokine (a type of protein involved in cell-signalling). Notably, however, the serum levels of cortisol in both the control group and experimental group were the same, and levels normalized more rapidly in the trained individuals. It was also shown that, despite the attenuation of the pro-inflammatory immune response, levels of leukocytes (infection-fighting immune cells) were higher in the trained individuals.

A 2018 study conducted by Muzik et al., which made use of fMRI to observe the effect of practicing his method on Wim Hof showed that the performance of forceful respiration followed by cold exposure and focused attention on one's own bodily state appears to activate primary control centers for descending pain/cold stimuli modulation, which possibly reflects a stress-induced analgesic response that produces feelings of focus and well-being. It also activates regions of the brain which are associated with self-reflection and which facilitate internal focus as well as sustained attention in the presence of aversive (e.g. cold) external stimuli.

The study showed that the practice also resulted in increased sympathetic innervation and glucose consumption in intercostal muscle, which generates heat that dissipates to lung tissue and warms circulating blood in the pulmonary capillaries which is what may allow the practitioner to prevent a drop in core body temperature.

Muzik et al. (2018) speculate that, alongside the release of endogenous opioids, the release of endocannabinoids may be responsible for some of the observed effects of practicing the techniques.

This includes the analgesic and antinociceptive effects, and feelings of well-being, but they are also involved in the regulation of emotions and cognition; vaso- and broncho-dilation; and reduction of oedema (swelling) and inflammation. The authors also note that the role of focused attention in the WHM may shift focus away from the Default Mode Network to the bodily sensation of respiration, potentially producing a relaxation-response that furthers the positive affective stimuli associated with the aforementioned endocannabinoid release.

Yoga, Meditation and Breathing

The practice of techniques related to yoga, meditation and breathing exercises have been shown to induce positive health outcomes across different measures of physical as well as psychological health. These are discussed below.

One of the key aspects of the narrative regarding the implications of the WHM is the increased level of control over otherwise involuntary physiological responses. Some of the earliest research conducted that examined this ability was the research conducted by Elmer and Alyce Green in the 1970's (Green & Green, 1977). Renowned yogi Swami Rama was able to demonstrate voluntary control over blood-flow in the hands; voluntarily induce atrial flutter to effectively stop the heart from pumping blood for 17 seconds; and induce different brain wave patterns, thus indicating that functions that were previously thought to be beyond voluntary control could be influenced.

The practice of meditation has also been shown to allow the practitioner to influence functions of the Autonomic Nervous System (ANS). Benson et al. (1974) showed that the practice of Transcendental Meditation (TM) allowed medicated hypertensive patients to significantly reduce systolic and diastolic blood pressure, and the authors conclude that it is the regular practice of the technique that elicits the relaxation response that enables this. Studies on inward-attention meditation have shown that the practice can help practitioners gain control over their parasympathetic nervous system response. Wu and Lo (2008) for example, found that the practice of inward-attention meditation allowed practitioners to push the sympathovagal balance measure (a measure for the ratio between sympathetic and vagus (parasympathetic) nerve activities) to parasympathetic predominance, thus allowing them to induce regular oscillations in heart rate, associated with a state of relaxation.

Central to the practice of yoga and meditation is control of the breath, and the practice of controlled breathing has also been shown to lead to positive health outcomes. The breathing practice

included in the WHM contains elements of yogic breathing techniques, or *pranayama*. Different kinds of pranayama were found to be effective in significantly reducing symptoms in asthma-patients (Saxena & Saxena, 2009). Patel et al. (1985) found that an intervention combining breathing techniques, meditation, relaxation and stress management education was able to effectively reduce coronary risk factors. These practices have also been shown to positively affect mood- and anxiety-related disorders. An intervention based on Sudarshan Kriya Yoga found that a breathing-based yoga intervention was able to significantly reduce depressive and anxiety symptoms in patients with Major Depressive Disorder who responded inadequately to treatment with medication (Sharma et al., 2016).

The principle of *hormesis* may also be relevant in the discussion of breathing exercises. Both hypoxic stress and oxidative stress are examples of hormetic stress (Shevchuk, 2008). This could offer a potential explanation for some of the reported benefits of Wim Hof's breathing exercise, which involves both hyperventilation (possibly inducing oxidative stress) and breath-retention (possibly inducing hypoxia).

These examples in the literature demonstrate that practices that come under the umbrella of yoga, meditation and breathing exercises can potentially induce an extensive range of positive effects on the practitioner, primarily as a means to exert conscious influence over bodily functions.

Cold Water

The research suggests that the practice of cold-exposure could have positive effects, both physically and psychologically. Exposure to cold water is one of the main components of the WHM, and the primary example of the way that the aforementioned principle of *hormesis* factors into the method.

Cold-water exposure can induce beneficial physical adaptation. Research done on winter swimmers shows that cold-water exposure can cause “body hardening,” the exposure to natural stimuli resulting in increased tolerance to stress (Siems et al., 1993). Cold-exposure and cold-adaptation were shown to have some interaction with the human immune system, although Janský et al. (1996) suggest that improved tolerance to cold may be a result of improved immune function, rather than the other way around. Furthermore, cold exposure may increase levels of Brown Adipose Tissue (BAT), which is a type of adipose tissue that can burn energy for thermogenesis. This may have positive effects on conditions like obesity, diabetes, cardiovascular disease and other conditions (Seale & Lazar, 2000; Cypess et al., 2009). According to Vaswani, Richard and Teiwani (1988) cold water exposure also increases the production of beta-endorphins, which could entail an anaesthetic effect, thus potentially

making it beneficial for those suffering from pain.

Cold water also stimulates the release of norepinephrine (Vaswani, Richard and Tejawani, 1988) as well as dopamine (Šrámek et al., 2000). In a literature review titled “The Importance of Norepinephrine in Depression,” Moret & Briley (2011) describe evidence supporting the role of norepinephrine in depression, and that reduced transmission is linked to symptoms of decreased alertness, low energy, problems of inattention, concentration, and cognitive ability. Furthermore, norepinephrine is linked to the executive function, which in turn is fundamental to regulation of emotions and other aspects of social relationships.

It has been hypothesized that cold-exposure could be beneficial in treating mood- and anxiety-related symptoms as well. Shevchuk (2008) proposed that exposure to cold water could be an effective treatment for depression, due to the effects of cold-water exposure on the sympathetic nervous system, particularly through the release of norepinephrine. He argues that depression may be partially caused by the increasing lack of stimulation on the human thermoregulatory system, controlled by the hypothalamus, as a result of the evolution of human societies. He suggests that cold-water exposure could potentially have similar benefits as electroconvulsive therapy (ECT), without the negative side-effects associated with ECT. Whether cold water has such beneficial effects on mood remains to be seen.

In summary, research on cold-exposure does suggest some physiological benefits on stress tolerance, pain and heat production, and an association with immunity. There is as of yet no firm evidence regarding the supposed psychological benefits of cold water on mood and anxiety.

The Present Study

The population of WHM-practitioners is one that is currently not well-studied, but is worth studying from a health promotion perspective. The previously discussed evidence and speculation regarding the broad range of health-effects of yoga, meditation and breathing exercises; cold exposure; and the WHM proper suggest that it could be a very versatile tool. There is also a wide range of anecdotal reports by WHM-practitioners of the health-effects that they attribute to the practice, which have been found online as well as in the author's personal interactions.

There are currently no published studies that examine the characteristics of this growing population of users of the WHM. Such a study could provide insights with regard to its potential implementation as a health intervention. First of all, information regarding the type of individual that is inclined to begin practicing the WHM, coupled with his or her motivations, could provide insights into

which target group is likely to take up the WHM. Additionally, information regarding the method is available in different formats. This includes books; live training; online courses; videos; and podcasts. Studying the different means by which the information is spread and is instructed could supplement the understanding of the target group, and how they might be influenced to take up the practice. With the growing population of practitioners, data regarding the duration and frequency of their practice can be gathered to gain an understanding of the variability that occurs in this regard, and to what extent meaningful conclusions can be drawn regarding the effects of the practice.

There is a significant online presence of WHM-practitioners. The most active WHM-Facebook group, “Wim Hof Method” consists of over 100,000 users as of the end of August, 2018. Several other active groups also exist with members from all over the world. The Wim Hof Method YouTube channel has over 93,000 subscribers, and the channel features several testimonials of practitioners who report positive impacts on health.

The real-life effects of practicing the WHM are still shrouded in speculation and relative mystery, but anecdotes include accounts of improvements in physiological as well as psychological symptoms and conditions, including diabetes; asthma; Lyme disease; fibromyalgia; rheumatoid arthritis; multiple sclerosis; depression and anxiety. Due to the inclusion of components of spiritual practices, and the possible ramifications of the practice on social functioning, the spiritual and social domains are also included. With the inclusion of elements like cold-exposure that have the potential to induce significant distress or discomfort, it is important to gain an understanding of the potential risks and contraindications associated with the method.

From a health promotion perspective, it is important to understand what users experience as the processes inherent to the method that underlie these changes, as well as other factors that promote or prevent change, particularly with reference to the symptoms of the various conditions in which users report improvements. Possible interactions with other treatments or practices should also be noted. There is also a lack of a user evaluation of the method, which could help to determine ways in which the method can be improved from a user-standpoint.

In light of the largely anecdotal nature of the reported effects of the practice, and the lack of a systematic overview of what changes could be expected in real-life and what underlies them, the present study aims to provide such an theoretical framework. Such a theoretical framework is key to determining theoretically the applications of the WHM as a health-intervention and guiding further investigation.

The present study thus aims to answer the following research questions, with associated sub-questions:

I. What characterizes the population of WHM-users?:

- In terms of demographics?
- In terms of motivations for trying the WHM?
- In terms of ways of learning about the WHM?
- In terms of duration and frequency of practice?

II. Do users of the WHM report changes? Which positive and negative changes on the following domains do practitioners report?

- In the physical domain
- In the psychological domain
- In the social domain
- In the spiritual domain

III. According to users of the WHM, what are the factors that underlie these changes?

- In terms of processes inherent to the WHM?
- In terms of factors that promote or prevent change?
- In terms of interactions with other treatments/practices?

IV. According to users of the WHM, how can the method be improved?

Method

Design

For the design of the study, a mixed-methods approach was selected, consisting of a quantitative study using an online survey, and a qualitative study for which interviews were conducted. The methods for these two studies are described separately below. A proposal for the study was submitted to the University of Twente's ethical board (application number 18122) and subsequently approved. An informed consent form was presented to survey respondents for participation in both studies simultaneously. The informed consent form can be found in appendix 1.

Study 1 – Online Survey

Participants.

For this part of the study, a digital questionnaire was circulated online on 11 Facebook groups that center around the WHM. Groups that were included (with number of members as of August 27th, 2018) were “Wim Hof Method” (100,383 members); “Wim Hof Method and Beyond” (3,183 members); “Wim Hof Method – UK” (2,447 members); “Wim Hof Method – France” (2,363 members); “Wim Hof Method - Video Courses” (2,052 members); “Wim Hof Method Australia Official” (918 members); “Wim Hof Method Scientific Love Tank” (511 members); “Wim Hof Method – Ireland” (195 members); “Wim Hof Method Accountability Group” (183 members); “Wim Hof Method – Canada” (163 members) and a Wim Hof Method women's group (unknown number of members). Selection of these groups was mostly arbitrary, with the questionnaire initially being posted only on the largest group (“Wim Hof Method”). Other groups were later included based on a need to gather more data, often being shared on the respective groups by other members. A total of 241 responses were collected.

Instruments.

For this part of the study, a digital questionnaire was created. This questionnaire was used to gather information regarding demographics; assess how the respondents found out about the WHM; their motivations for trying the method; frequency and intensity of practice; whether or not they experienced changes, and what kind of changes they experienced; whether or not they were/are suffering from specific symptoms or conditions and whether or not they experienced changes in these specific symptoms or conditions. The questionnaire contained both multiple-choice and open-ended questions. These questions can be found in appendix 2. Finally, respondents were also asked whether they would be willing to participate in the second part of the study, which is comprised of interviews.

Procedure.

Over the course of three weeks, a link to the online survey was intermittently posted to 11 different Facebook-groups that center around the WHM until sufficient data was collected.

Data analysis.

Results of the online survey were analyzed using descriptive statistics. This consisted of

calculating the respective frequencies and percentages of the responses using statistical software (SPSS), and observing which responses were most frequently selected.

Study 2 – Semi-structured interviews

Participants.

Survey results regarding characteristics of the user-group were cross-tabulated with willingness to participate in follow-up interviews in order to determine selection-criteria. The first selection-criterion that was decided on was, obviously, willingness to participate in the interviews. In total, 115 survey-respondents were willing to participate in the interviews. Second, based on the demographic information gathered from the questionnaires, the age-range for interview participants was narrowed down to the range of 30-60 years of age, as this age-range was deemed to be most representative, with 76% of respondents indicating that they were born between 1961 and 1990. Third, in order to identify how the method might bring about changes in individuals suffering from specific (psychological and/or physical) complaints and conditions and explore the method's potential as a health intervention, selection was further narrowed down to respondents who indicated in the questionnaire that they were/are suffering from specific complaints/conditions when they began practicing the WHM. The selection included participants who reported experiencing both positive and negative changes that they attributed to their practice of the WHM. Based on the limited responses from respondents who were invited to participate, gender and the nature of the specific complaints/conditions were not factored into the selection.

Out of the 49 respondents that fit these criteria, 16 confirmed their participation. The sample consisted of 5 female and 11 male participants, ranging between 29 and 55 years of age. Table 1 contains relevant information regarding the participants.

Table 1 *Participant details*

Participant	Country of Origin	Year of Birth	Sex	Complaints/conditions when beginning the practice of the WHM
A	Slovakia	1987	F	Asthma.
B	Norway	1986	M	Psoriasis, tendonitis, recovering from a shoulder surgery.
D	Russia	1975	M	Psoriasis.
E	Australia	1971	M	Chronic pain and depression caused by a grade 2 spondylolisthesis.
F	USA	1989	M	Smoking.
G	Germany	1963	F	Binge eating, Reynaud's Syndrome (undiagnosed).
I	Bulgaria	1968	M	Severe physical and mental stress.
K	UK	1967	M	Psoriasis, psoriatic arthritis, osteoarthritis, gout.
L	UK	1972	F	Progressive form of Multiple Sclerosis.
N	Netherlands	1985	F	Adrenocorticotrophic Hormone (ACTH) deficiency.
O	Switzerland	1988	M	Fear, anxiety, bad mood.
P	Netherlands	1968	M	Stress, anxiety, lack of a higher purpose.
R	USA	1980	F	Post-Traumatic Stress Disorder (PTSD), Chronic Fatigue, Fibromyalgia.
S	UK	1987	M	Depression, anxiety, asthma.
T	France	1978	M	Asthma and allergies.
U	New Zealand	1969	M	Anxiety.

Instruments.

Elliott's (2008) Client Change Interview schedule was used as a basis for developing the interview schedule. The Client Change Interview schedule is aimed at evaluating specific treatments or interventions from a client/patient point of view, thus allowing for evaluation of the WHM from the user perspective and targeting the processes underlying specific changes.

The interview schedule consisted of general questions about well-being, medication intake, motivations, intensity of practice, and experiences with the WHM; changes reported; attributions; resources (personal and environmental); limitations (personal and environmental); helpful aspects of the method; problematic aspects of the method; and suggestions for improving the method and/or research. The full interview schedule can be found in appendix 3.

Procedure.

The interviews were conducted by the researcher using software that enables digital calls.

Participants were told that they would be asked questions about their experience with the WHM based on their response to the online survey. Interviews lasted about an hour on average, conducted with or without video, and were recorded so that data could be transcribed and coded for analysis.

Data analysis.

For the analysis of the data, the interview transcripts were read by the researcher and inductively coded. Color codes were assigned to each participant. The transcripts were studied to find citations relevant to the research questions, as well as to find additional data that was deemed relevant by the researcher to report.

All relevant citations were inductively assigned a preliminary label, and were organized into broad first level category headings based on these labels. The first group contained data regarding processes underlying changes in the various domains. The categories belonging to this group were physical domain; psychological domain; social domain; spiritual domain; and multi-domain, respectively. The second group contained the categories of internal factors that promote/prevent change and external factors that promote/prevent change. Remaining categories were interactions with other treatments/practices; differences in form of the practice of the WHM; improving the WHM; and additional observations .

The coding scheme was further refined to eliminate overlap. Citations in the aforementioned first level categories were divided into second-level categories. Thus, After discussing the resulting tables with the supervisors, second-level categories were further subdivided into subthemes, and one relevant quote was selected for each subtheme to be included in the table displayed in the results section.

Results

The results of the study are characterized by a great deal of variety of data. The headings of the sections of this results section indicate whether the results displayed are gathered from the online survey or the semi-structured interviews, respectively.

1. Online Survey - What Characterizes Users?

Demographics.

Table 2 contains relevant demographic details regarding the respondents. The user-group consisted primarily of men, at about 71%. About 62% of respondents were from Europe, and about 28% were from North America. Around 76% of respondents were born between 1961 and 1990.

Table 2 *Demographics of WHM-users (N=241)*

Sex	Number (and percentage) of respondents
Male	173 (71.8%)
Female	66 (27.4%)
Not-specified	2 (0.8%)
Geographical location	
Europe	150 (62.2%)
North America	69 (28.6%)
Australia & New Zealand	20 (8.3%)
Asia	2 (0.8%)
Year of birth	
Unknown	6 (2.5%)
1951 – 1960	16 (6.6%)
1961 – 1970	57 (23.7%)
1971 – 1980	64 (26.6%)
1981 – 1990	64 (26.6%)
1991 – 2000	32 (13.3%)
2000-2010	2 (0.8%)

Ways of learning about the WHM and motivations to try it.

Table 3 contains data regarding the ways of learning about the method and motivations for trying it.

By far the most frequently reported single way by which respondents indicated having learned about the WHM was by word of mouth. Friends and family, sports-club members and even health professionals were mentioned as sources. YouTube is also an important one. Those who selected “others” named mostly online sources, primarily podcasts. This means that, when taken together, the sample found out about the method primarily through online means. Television was also mentioned a number of times.

In terms of motivations, more than one answer was possible. The most commonly cited reason for trying the WHM was health consciousness, followed by curiosity. Relief of physical and mental

problems, when taken together, were selected about equally frequently. Increased resistance to cold and improvements in (sports) performance were mentioned under “others.”

Table 3 *Way of first learning about the WHM and motivations for trying it(N=241)*

Medium	Frequency (percentage)
Word of mouth	69 (28.6%)
YouTube	49 (20.3%)
Facebook and other social media	40 (16.6%)
Books	9 (3.7%)
Others, namely ____	72 (29.9%)
Motivation	
Health consciousness	131 (54.4%)
Curiosity	118 (49.0%)
Relief of physical problems	62 (25.7%)
Relief of mental problems	60 (24.9%)
Others, namely ____	51 (21.2%)

Duration and frequency of practice.

As indicated in table 4, nearly all of the respondents continue to practice the WHM, with only four respondents (1.7%) indicating that they no longer practice the WHM.

Table 4 *Respondents who still practice the WHM (N=241)*

Still Practicing	Frequency (percentage)
Yes	237 (98.3%)
No	4 (1.7%)

Table 5 shows the duration of practice of those who indicated that they are still practicing the WHM (table 4). As can be seen in the table, there is a reasonably large proportion of respondents who are relatively new to the method, with about 20% of them being practitioners of 2-3 months. However, there is a decline in practitioners from the 2-3 month range onward, until the “A year or more” category. This could be indicative of practitioners dropping out over time, with only the more dedicated practitioners persisting into the range of a year or more of practice.

The total sample actually consist mostly of those who have been practicing a year or more, around 37%. Many of them have even been practicing for several years, at around 13%. Two

respondents indicate having been practicing the method for as long as six years. One respondent even indicates having been practicing cold exposure for at least 15 years, although this respondent indicates not having begun a daily practice until about eight months prior to responding to the survey.

The respondents that indicated no longer practicing the method make up a very small proportion of the total sample, consisting of only five respondents. The duration of practice of these respondents did not exceed the 6-7 month range.

Table 5 *Duration of practicing the WHM (N=237)*

Duration of Practice	Frequency (percentage)
0 – 1 month	23 (9.7%)
2 – 3 months	49 (20.7%)
4 – 5 months	31 (13.1%)
6 – 7 months	20 (8.4%)
8 – 9 months	15 (6.3%)
10 – 11 months	10 (4.2%)
A year or more	57 (24.1%)
Several years	32 (13.5%)

The respondents who indicated that they still practice the WHM were also asked how often they practice. The results are shown in table 6. As can be seen in the table, the majority of these respondents practice daily. A small proportion of them even practice multiple times a day. Only a small proportion of the respondents practice less than a few times a week.

Table 6 *Frequency of practicing the WHM (N=237)*

Frequency of Practice	Frequency (percentage)
Daily	129 (54.4%)
A few times a week	68 (28.7%)
Multiple times a day	19 (7.9%)
Once in a while	11 (4.6%)
Once a week	7 (3.0%)
Once/a few times	3 (1.3%)

2. Online Survey - Changes Reported as a Result of Practicing the WHM

Of the 241 respondents, about 98% indicate that they experienced changes that they attribute to their practice of the WHM.

Positive changes.

Table 7 shows the positive changes reported by respondents who indicated having experienced changes as a result of practicing the WHM. Changes that were reported by at least 50% of the respondents are considered significant, because they are represented in a statistical majority of the sample.

Physical changes were most frequently reported. Frequently reported *physical* changes, with a range of 73 % - 50% of respondents, were changes in energy levels; respiration; immunity; physical stress and tension; and body temperature.

Frequently reported *psychological* changes, with a range of 67% - 64% of respondents, were changes in mood; overall well-being; stress and anxiety; and focus and awareness.

Frequently reported *spiritual* changes were changes in a sense of spiritual connectedness to the Self, at around 60%; and a sense of spiritual connectedness to nature, at around 53%.

Changes in the *social* domain were not frequently reported.

Other positive changes that were mentioned under “others, namely ____” include reductions in allergic and inflammatory reactions, improvements in specific symptoms, deepening of yoga practice, anger management, self-confidence, and a (reportedly desirable) reduction in sexual appetite.

Around 50% of all participants reported at least one positive change in each of the four domains, and the average number of positive changes reported was 11.

Table 7 Positive changes attributed to practicing the WHM (multiple answers possible). (N=241)

Positive Changes	Frequency	Percent of cases
<i>Physical</i>		
Energy levels	174	73.40%
Respiration	145	61.20%
Immunity	138	58.20%
Physical stress and tension	136	57.40%
Body temperature	120	50.60%
Sleep	104	43.90%
Strength	103	43.50%
Circulation	89	37.60%
Flexibility	74	31.20%
Pain	74	31.20%
Balance	52	21.90%
Sex	42	17.70%
Digestion	40	16.90%
<i>Psychological</i>		
Mood	160	67.50%
Overall well-being	159	67.10%
Stress and anxiety	153	64.60%
Focus and awareness	152	64.10%
Addiction	37	15.60%
<i>Social</i>		
Social interactions	81	34.20%
Relationships with friends	74	31.20%
Relationships with family	71	30.00%
Relationships with significant others	67	28.30%
Social anxiety	63	26.60%
Community activism	30	12.70%
<i>Spiritual</i>		
Sense of spiritual connectedness to the Self	144	60.80%
Sense of spiritual connectedness to nature	127	53.60%
Sense of spiritual connectedness to others	77	32.50%
Sense of spiritual connectedness to a higher truth (God, the Universe, etc.)	58	24.50%
<i>Others</i>		
Others, namely ____	24	10.10%
None of the above	0	0 (0.0%)

Negative changes.

In total, around 15% of the sample reported at least one negative change that they attributed to practicing the method. Table 8 shows the negative changes that were reported by these respondents. The most frequently reported negative change attributed to the WHM was changes in sleep. Two of the respondents elaborated by saying that it is a result of being too energized to sleep.

There were three respondents who indicated experiencing tinnitus (ringing in the ears) that they attributed to the practice of the WHM. There were also four negative experiences that respondents reported being a result of pushing the practice of the too hard, such as a neck injury resulting from incorrect practice of the headstand pose, or pain as a result of forceful breathing. Two respondents even indicated experiencing a sense of addiction to the practice.

There were also two respondents who reported experiencing rashes or spots on their skin as a result of the practice. One of them attributed it directly to the breathing technique, possibly indicative of some kind of immune response. One respondent also mentioned fainting and heart-rate issues.

Table 8 Negative changes attributed to practicing the WHM (multiple answers possible). (N=37)

Negative Changes	Frequency	Percent of cases
<i>Physical</i>		
Sleep	8	20.50%
Physical stress and tension	3	7.70%
Immunity	3	7.70%
Sex	3	7.70%
Energy levels	2	5.10%
Pain	2	5.10%
Balance	1	2.60%
Body temperature	1	2.60%
Circulation	1	2.60%
Digestion	1	2.60%
Respiration	1	2.60%
Flexibility	0	0.00%
Strength	0	0.00%
<i>Psychological</i>		
Focus and awareness	5	12.80%
Stress and anxiety	5	12.80%
Mood	3	5.10%
Addiction	1	2.60%
Overall well-being	0	0.00%
<i>Social</i>		
Relationships with family	4	10.30%
Relationships with friends	4	10.30%
Relationships with significant others	2	5.10%
Social anxiety	2	5.10%
Social interactions	1	2.60%
Community activism	1	2.60%
<i>Spiritual</i>		
Sense of spiritual connectedness to self	1	2.60%
Sense of spiritual connectedness to others	1	2.60%
Sense of spiritual connectedness to nature	1	2.60%
Sense of spiritual connectedness to a higher truth (God, the Universe, etc.)	0	0.00%
<i>Others</i>		
Others, namely ____	21	53.80%

Complaints and conditions.

Around 41% of the sample indicated that they were suffering from specific complaints or conditions when they began practicing the WHM. A variety of different complaints and conditions were named. By far the most prevalent was stress, anxiety and depression. Arthritis, psoriasis and other autoimmune disorders were also frequent, as well as pain-related conditions like migraines. The list included a variety of other complaints and conditions as well, such as asthma, fatigue, Raynaud's and others.

Out of those who indicated that they were suffering from specific complaints or conditions when they began their practice of the method, around 84% reported that there were improvements. Around 15% of them indicated that these stayed the same, while there were no reports of worsening.

3. Semi-structured Interviews – Processes and Other Factors Underlying Change

The following section of the results answers the third research question: “According to users, what are the factors that underlie the changes reported by practitioners of the WHM?” Factors are subdivided in terms of the processes inherent to the WHM within the respective domains; internal and external factors that prevent/promote change; and interactions with other treatments/practices. These results are based on the interview data of the 16 participants that were interviewed. Tables 9 – 16 contain a summarized overview of these results. The tables provide an example citation for each subtheme. The *n* denotes the number of participants that provided at least one relevant citation in the respective category and subtheme. Occasionally, participants may be represented in more than one subtheme, leading to an *n* that exceeds the total *n* of the category.

Processes in the physical domain.

Participants described various ways in which practicing the method helped them in the physical domain. A total of 11 different first-level categories of processes could be identified within this domain. An overview can be found in table 9.

Several participants (*n*=7) described how the practice can facilitate the *deepening of the relationship between mind and body*. Attributions fell under two subthemes. Several (*n*=4) attributed this to an increased sense of *control* over the physiology. The word “control” was frequently used in

this context (n=3), and participants described how during stressful situations, control over physiological functions could be regained, particularly heart-rate, through controlling the breath. Consciously relaxing the body, resulting in a more relaxed mind was cited (n=1), as well as visualization of heat inside the body, or of things like veins opening and closing (n=1). Several participants (n=3) attributed this deepening of the relationship between mind and body to a greater *awareness of internal cues* and using the practice to gain feedback as to their internal state. This was described in terms of the body being like a compass; the cold being like a mirror that shows the practitioner how he's feeling; and whether the breathing feels deep or not as an indicator of stress.

Other processes that were described were the ways in which the method helps with *pain and inflammation* (n=6). Attributions came under three subthemes. Firstly, the relief offered by the *cold-exposure* (n=3). In some cases, this relief was observed instantaneously (n=2). Secondly, it was attributed to anti-inflammatory effects of the *breathing exercises*, and very rapid effects were also observed (n=2). One way was the ability to relieve pain by focusing on it. Thirdly, it was attributed to a combination of the cold and breathing exercises by one participant who observed the separate and combined effects of these components on his psoriasis.

Next were the reported improvements in *energy* (n=4). Attributions came under three subthemes. Firstly, it was attributed to a combination of the *breathing exercises and cold-exposure* (n=2). One reported lower levels of MS-related, heat-induced fatigue, being able to do more around the house, and the other describing that the experience of the breath-work is like “the nervous system enters some other mode,” reducing his need for sleep, and the prospect of having a cold shower in the morning has a motivating effect. One participant theorized that hyper-oxygenation through the *breathing exercises* might help to counteract the effects of his Asperger's on the ability of the mitochondria to produce energy. One participant said it was probably the *cold-exposure* that caused her to have more energy in the morning, and explained that her energy levels are more “in balance.”

Improved *sleep* was described by several participants (n=4). Attributions came under four subthemes. Firstly, it was attributed to a reduction in MS-related *pain* by one participant, who added that she sleeps all the way through now, only needing to shift her body when she is woken up by pain. Secondly, one participant described how the *breathing exercises* enables him to sleep fewer hours, and said that it's “as if you've slept.” Thirdly, one participant described how putting his face in *cold water* helps him to calm down before bed. Fourthly, one participant attributed it to more balanced *energy-management*, being more energetic in the morning and more easily able to go to sleep at night, adding “when I'm tired I'm actually tired and then it's over too.”

Improvements in *strength, balance and endurance* were elucidated upon (n=4). Four subthemes were identified. An improved ability to walk independently was attributed to the *breathing* method strengthening the core, and doing *yoga-exercises* through the WHM and online yoga classes (n=1). This was described as a result of progressing to daily yoga from the stretches incorporated into the WHM. Secondly, it was attributed to the *cold-exposure and controlling the breath* (n=1) to be able to endure discomfort. Thirdly, it was described how the breathing can induce a sense of feeling more *focused before training* (n=1). Fourthly, the belief was stated that the method, particularly the combination of breathing exercises and pushups, causes a *reorganization of the nervous system* (n=1). This was described in terms of experiencing “only progress without any sort of feeling,” referring to the participant's sense of the progress being constant and particularly quick.

Improvements in *respiration* were described (n=3). Attributions came under two subthemes. Firstly, the *breathing exercises* (n=2), which in one case was put down to a “cleaning and strengthening of the lungs.” Second, deeper breathing was attributed to a *reduction in stress* (n=1), and it was noted that the presence of stress is reflected in more shallow breathing.

Improved *flexibility* was attributed to the practice of the yogic exercises (n=3). Rapid improvements in flexibility were observed (n=1). This was described as “[...] not incremental, it was all of a sudden like from one day to another. Much more bent backwards, like much more!”

Improvements in *circulation and cold-tolerance*, were attributed to the cold-exposure (n=3), and it was described (n=1) how practicing visualization during cold-exposure helped to gain conscious control over the circulatory and thermoregulatory systems, particularly through visualizing heat and the opening of veins.

Improvements in health and immunity as protective against the effects of *aging* was described (n=1) in terms of increased trust in the body, with the participant observing a “completely different body feeling.”

With reference to *immunity*, it was described (n=1) how the breathing exercise seemingly immediately countered the symptoms of illness. It was applied repeatedly until the symptoms of a flu had passed. In one instance, symptoms would occasionally recur before they were completely eliminated.

With reference to *physical appearance*, this was explained (n=1) in terms of weight-loss and a “glow” in the skin which was compared to the kind displayed by yoga-practitioners.

Table 9 Processes inherent to the WHM underlying change in the physical domain according to participants

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Mind and body</i>	7	Control	4	I mean that if there is something stressful happening, like meeting someone whom I don't want to meet, or getting back feedback from manager or whatever, then adrenaline comes and, you know the heart starts beating, so if I feel that my heart starts beating too quickly, or my hands are not shaking, but you know just I feel less control over my body, the deep breathing helps to get back in control very quickly like, if I concentrate on the breathing, or I don't know, 5 or 10 breaths, it really kind of helps to get back into control. - D
		Awareness of internal cues	3	It's really great, what I now do, I, with the certain exercises in there, if I sit down every morning and do some of them, it's like feeling how do I feel, in which shape I, am I today. Did I sleep enough, did I drink too much, or what happened, had I had an emotional situation. And then I feel like I can go into my body and then I can feel with the stretching like, the body being [...] Like a compass. It feels like a compass. - G
<i>Pain and inflammation</i>	6	Cold-exposure	3	I would say there was one instance in which I had a bit of a hangover and I'd done the breathing and I thought shit I just really don't wanna get in the cold today. But literally as I got into the cold, as each body part entered the cold, the inflammation and misery from my hangover disappeared. So it was a great hangover cure! Which is nice. - E
		The breathing exercises	2	Also, this week my gout kicked off in my toe, and I thought I wouldn't hit the naproxen, I thought I'd try the anti-inflammation breathing and it killed the pain, the inflammation of the gout in my toe in one day. - K
		Breathing exercises and cold-exposure	1	I started with the cold shower first, so. It's hard, at the beginning the first three weeks the psoriasis disappeared, but after, after that it came back. So I know that's something I can't do without the breathing. So the breathing was important for that one. And it's kind of the same with the tendonitis. With the cold shower, it helped to control the pain. But as I got days with pain, just not as bad as before. So I think for most of the cases that's the combination...of the cold and the breathing. - B
<i>Energy</i>	4	Breathing-exercises and cold-exposure	2	But for me, for the MS, the heat really does affect me, so I didn't, I have really bad fatigue, and that affected me over the past two days. But, being able to do the cold shower and the breathing is giving me, has been giving me a little bit more energy to manage with the fatigue inside the house [...] - L
		Cold-exposure	1	I'm more energetic in the morning too. I think that's to do with the cold shower. - N
		Breathing exercises	1	Oh, another aspect is I have Asperger's, and apparently Asperger's can affect mitochondrial function, negatively. It's actually harder for the mitochondria to produce energy. So I think the method has actually also helped my mitochondria function better, the hyper-oxygenation. - K
<i>Sleep</i>	4	Pain	1	It was the sleep, with the sleep with the MS I suffer with nerve pain and toilet urgency and things like that so my sleep pattern's always been broken, but I'm sleeping all the way through now and if I, if my MS pain is apparent and it's waking me, it's more in order for me to shift my body to a position that's not as painful, and then I go back to sleep. Whereas previously I was awake all the time and once it had woken me, I was awake. - L
		Cold-exposure	1	The other thing I found very helpful is actually putting my face in the cold water before I go to sleep each night. It's a really calming...yeah I find it really calming. - U

Table 9 (continued)

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Sleep (continued)</i>	1	Breathing exercises	1	And in the evening I'll do it again, and I would be up after a crazy day of work, I do this breathing and I'm up and I can literally say the nervous system enters some other mode, as if you slept. And I could be up until 1, 2 am and I go to bed only because I'm looking at the clock, there is no need. - I
	1	Energy-management	1	I fall asleep really easily now. Before I used to lie in bed twisting and turning, but now I'm out right away. It's all to do with my energy. I'm more energetic in the morning too. I think that's to do with the cold shower. And more also, when I'm tired now I'm actually tired and then it's over too. Somehow that's all more in balance now. - N
<i>Strength, balance and endurance</i>	4	Yoga and breathing-exercises	1	I didn't know whether that was to do with the breathing or...but I felt stronger in my core, and able to manage my self walking independently in the house. Having done a little bit further research I think that that was the strengthening the core because of the way that the breathing method works. [...] since doing the stretches through the fundamentals and then finding a yoga teacher online that I do on a daily basis, that's, I'm much stronger as far as I'm not falling at home as much as I was when...to be fair, I'm not really falling over anymore, and if I do stumble my strength is there to be able to right me. I'm able to compensate more than I was before. So I think that's obviously to do with the stretches and then progressing from that to daily yoga. - L
		Breath control and cold exposure	1	Yeah, there's been a few physical things, like last summer I went away with some friends and we stayed in a small cottage in the countryside and went hiking a few times and this one time we found like this, it was like this start of a river that came out of a mountain, so the water was fucking freezing, but it looked so beautiful and I wanted to get in it and have a swim. And I did that and there's obviously no way I could have done it without the method because it was fucking cold! So yeah I was very much like practicing it whilst in the water. And yeah, like there's been times where I've been out walking and I know that I'm like a 2-3 hour walk from home and fatigue is starting to kick in. And so I've used the breathing technique whilst walking to bring my mind away from the tiredness and the fatigue that I feel, to concentrate on the breath and restoring energy that way and maintaining focus and being able to deal with the physical and mental discomfort of having to walk for 2-3 hours when you're tired. - S
		More focus in training	1	It's really helpful and, also with every kind of training, lifting weights and everything, before I go, if I have time to do the breathing I'm feeling more focused during training as well. - B
		Reorganization of the nervous system	1	Within 3 weeks, I could do 300 [pushups], 300, and I would stop, because, I could do more. 300 over the entire day, about 120 or 140 during the practice in the morning, and then throughout the day, sets of 20, 15, 20. At the end of the day also, and I'm doing it. It added up to 300 within 3 weeks. And, and I was not even exhausted like, I was not hitting max, like failure. No. I could actually do more, just that started to be stupid. [...] And after that there was only progress without any sort of feeling. No feeling, you're just progressing more and more and more. To me, this shows some sort of reorganization of the nervous system. - I

Table 9 (continued)

Category	Total n	Subtheme	Subtheme n	Example citation
Respiration	3	Breathing exercises	2	I would put the things like the asthma down to the breathing. You know I guess it's cleaning the lungs and strengthening the lungs maybe and the respiratory system. So asthma I'd put down to breathing. - S
		Stress-reduction	1	I think that I am used to take too shallow breaths. And I expected for my breaths during the day to be deeper. And I can say that when I'm not stressed, they do become deeper, during the day. But when I'm stressed, naturally, they become shallow. - I
Flexibility	3			My flexibility increased in such a way that from one day to another, I could do some yoga you know poses, and I thought I could always do that. No! I could never do that, you know! It was not incremental, it was all of a sudden like from one day to another. Much more bent backwards, like much more. - I
Circulation and cold tolerance	3			You know when um, one of the first visualization things that you do is this idea of the veins opening when you are..when you hold the breath and you're in like a stress moment in a stretch, and you imagine the blood flow slowing down and the veins opening as you hold your breath, and from this you know you then build on things like your heart-rate and when you're in the cold you start to imagine an image, like visualize warmth and heat and stuff like that, and you begin to be able to make these influences on your body and how it reacts. - S
Aging	1			And also aging, might be scaring huh? But if you see, if you practice this, when I practice it and I see that I was in better shape than when I was 20, you don't need to be afraid any longer if you do what you need to do then you can be healthy and let the body, just trust the body, or getting sick and so is also different. Yeah it's completely different body feeling, yeah. - G
Immunity	1			In Texas we had some kind of flu, everybody got it, and it was not the usual flu, you got sick for a few weeks on end, and having a headache and not feeling well generally, not necessarily a sore throat, maybe a runny nose, maybe not, but you definitely had something. What happened, 6 times, 6. I would feel it coming in the evening, I would do the breathing, in the night I'm OK. In the morning I still feel it, I do the breathing and the cold, and within 40 minutes I feel that I'm a new man. - I
Physical appearance	1			I lost weight within 3 weeks I had no pants that would stay on me. There. You know, belly fat, around the waist is very hard to reduce. I did not change anything in my diet, in the way I work, but the way it just kept coming, you know, down. And also, your face. You look like a yoga person. I don't know if you, you must know that. If you train in a yoga studio or stand outside and just watch their faces when they come out. They just, they glow. They just glow. They're like the healthiest people. I look the same way when I can have cold. And I notice also that people look at me because I guess I'm 6'2", and I guess I have a small waist now, which makes proportions a little bit different. And I also noticed people looking at me, like wow. And it was apparently a very obvious change. - I

Processes in the psychological domain.

Participants also described various ways in which practicing the method helped them in the psychological domain, an overview of which is given in table 10.

Several participants (n=9) described improvements in *self-confidence and resilience*. Two subthemes emerged. Firstly, the effects of *overcoming challenges outside of the comfort zone* (n=8). This was often described in terms of overcoming challenges, a discovery of the capabilities of the mind

and limitations as mentally imposed, and an appreciation or even admiration of one's own capacities. Most often (n=5), this was viewed in light of learning to cope with a situation that is considered uncomfortable. The *meditative component and mental strengthening* of the WHM (n=1) was also cited.

Several participants (n=8) describe how the method improved *stress and anxiety*. Attributions fell into four subthemes. These were learning to stay relaxed during the stress of *cold-exposure* (n=3); using the *breath* to come back into control (n=2); using *visualization* to gain more control over the stress-response (n=2), as well as to the immediate stress-relief that the breathing practice can induce (n=1). It was also attributed to the ability of the breathing exercise to provide *feedback* as to one's stress-levels, in that stress is reflected in a reduced ability to breathe deeply (n=1).

Improvements in *mood* were also discussed (n=5). Five subthemes emerged. Firstly, an elevated mood-state induced by the *cold-exposure* that was described as lasting for several days, particularly when taking ice baths, or when having cold showers near 10 minutes long (n=1). It was also said to be due to a combination of the *cold-exposure and breathing practice* (n=1), and this participant explained that he and his wife no longer suffer from depressed mood during winter because the weather is no longer a limitation. Thirdly, *practicing the method in the morning* was said to bring about improved mood for the rest of the day (n=1). Improvements in mood were furthermore linked to becoming *more aware of small occurrences that bring joy* (n=1). This was described in terms of “silly things that don't mean anything but that I'm noticing.” One participant suggested that a link between depression and inflammation might reflect *anti-inflammatory effects* of the practice (n=1).

Improvements in *focus and awareness* were also described (n=4). Three subthemes were identified. The first was the effects of *cold-exposure* (n=2). Improved focus and awareness were said to occur “suddenly” and “immediately.” Another process was a reportedly improved *ability to choose where attention is focused* (n=1), “to make better decisions” in this regard. The increased awareness was also described as factoring in to a *greater sense of connectedness* (n=1). This connectedness was also associated with more appreciation for nature and an awareness of one's own feelings, and “picking up” on more things, as opposed to being “on autopilot.”

Improvements in *health behavior* were attributed to the desire to progress in the practice of the WHM, leading giving up smoking (n=1). However, this participant indicates not being a particularly heavy smoker in the first place.

Reports of improvements in *cognition* were observed (n=1). Cognitive issues had arisen as a result of progressive MS. The participant reported that speech became less slurred, and although symptoms have not subsided, she said that her memory appeared to be better than over a year ago.

Table 10 Processes inherent to the WHM underlying change in the psychological domain according to participants

Category	Total n	Subtheme	Subtheme n	Example citation
<i>Self-confidence and resilience</i>	9	Overcoming challenges outside of the comfort zone	8	But I think that at the moment you actually push yourself in something you're not good at or you're scared of, cold or whatever, then automatically because you're pushing yourself out of your comfort zone, you automatically know better who you are. So you get a renewed appreciation for your own body or for yourself. And when you know yourself better, you can know others better. - N
		Meditation and mental strengthening	1	[...] and also that meditative strengthening, mental strengthening, OK then I don't feel great but it's only today. It's not tomorrow or the next day. So my outlook on things have changed very much so as well. And I think that's to do with the meditation. So yeah, it's all good! - L
<i>Stress and anxiety</i>	7	Cold-exposure	3	I think it's mostly the cold showers. That's in principle a huge stress-moment for your body, and if I tell other people what I'm doing...the cold shower, it causes so much stress, and by remaining calm under it you learn to deal with stress. And actually the other stress-factors that used to bother me so much now...you kind of unlearn it. It kind of puts everything in perspective I guess. - P
		Controlling the breath	2	I don't remember which situation it was , I would normally have freaked out completely. And here I just could like hold on my breath, just breathing, and know that I can hold on it. So I felt like completely safe, anything which can happen, now I know that I can cope. I can hold on the breath. - G
		Visualization	2	with walking into a situation which is started to make me feel a bit tense, I can visualize myself putting my foot into the water and going through that process of slight panic and then, and into calm. - U
		Feedback from the body	1	Also, the breathing, the way you do it is a great indicator of how stressed you are. If you want an iPhone app to see how stressed you are, you don't need it. You just need to lay down on your back and start to take deep breaths, you will now. I feel stressed because they don't feel deep. And even after three sets of 30, 40. I usually do actually 4 sets. You still know that's not the range of deep breathing that I'm familiar with when I'm calm. It tells you every time, you're too stressed. - I
<i>Mood</i>	5	Cold-exposure	1	No, the mood is quite interesting because, especially after an ice bath. The first ice-bath I ever did last year October. The rest of the week – that was on a Sunday – the rest of a week I was on a high. It was very strange. [With cold showers it's] only if I go near or to the 10 minute mark. Anything after about 7-8 minutes, then for the rest of the day I can feel a difference. - K

Table 10 (continued)

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Mood (continued)</i>		Breathing and cold-exposure	1	It's not like there's a lot of changes you can see on the outside, but it's mostly my psychological condition that's much more stable than it was before. And well, the combination of the cold and the breathing exercises, I would say that's the cause of it. – P
		Morning practice	1	When I practice this Wim Hof Method in the morning, I practice it, then I begin my day already with such a open mind or joyful thing, that I think then my life changes also and I change from the inside, and all the relationships change also so. Yeah. My life is completely changed. Completely changed, yes. For much better yeah. - G
		Awareness of small-occurrences	1	I don't know whether it's just really a strange thing that good things seem to happen, quite a lot. Just, maybe it's that I'm noticing the good things are happening, rather than you know when something bad happens you have a tendency to really focus on that through the day. - L
		Mood and inflammation	1	You know as much as anyone there's a lot of research at the moment into how, perhaps depression is more linked to inflammation than was thought before or whatever. And it's thought the method has, you know anti-inflammatory benefits. So perhaps that's got a lot to do with that. - S
<i>Focus and awareness</i>	4	Cold exposure	2	And, I focused better on things, like for example, I woke up and I've started to feel like, what I have to do today, and then I took the cold shower, or I would go into the water before work, outside. And, I suddenly had clear mind, and I was focused like, OK I'm going to do this, and this. And I sort of figure out what are the most important things to do, when I finished with the cold water. And it helped me begin to find a focus, what I want to do, and I felt less overwhelmed, with so many things. I started to take things one at a time. - A
		Attentional control	1	...it allows me to make better decisions on where I focus my attention. Is about as good as I can put it into words.- F
		Connectedness	1	It's...well you feel more connected to everything. You feel more connected to yourself, you feel...you appreciate like the nature and everything more. And you...I don't know how to say but...you feel more...you just feel more connected to your own feelings. Instead of just going in that mode of every day do the same, same...I don't know, like autopilot. You, you pick up on more things and feelings, you notice more. You become more aware. So yeah. - B
<i>Health behavior</i>	1			...so I've never been like a heavy smoker, cigarette smoker. But it came to the point where it was like, OK. You gotta choose, you're either gonna have to take deep breaths in, or smoke your cigarettes. - F
<i>Cognition</i>	1			My speech started to change so I wasn't as slurred as I was before. I was having cognitive issues, I was a head teacher before but then I was off on long-term sick and I've recently put in an application for retirement so, an ill-health retirement which has been granted. But the cognitive issues that were affecting me, massively, seemed to have along with the method seemed to have, not subsided cause I'm still finding it difficult with word-finding and things like that, but my memory seems to be better than it was over a year ago. - L

Processes in the social domain.

Table 11 contains an overview of the ways in which participants describe how the method helped them in the social domain.

Participants said that the WHM can provide a sense of *community* (n=6). There were two subthemes. Firstly, participants (n=4) described how *real-world interactions* in the context of the WHM improved their sense of community, primarily through attending WHM-events. Examples were through taking friends and family along during practice (n=1); and finding a community of people who “really want to connect with each other” through becoming a WHM-instructor, coupled with a sense that interactions that take place within the context of the WHM tend to be “honest and direct” (n=1). Another source of community was the *online WHM-community* (n=3). The Facebook groups were even described as an “oasis,” (n=1) that offers hope in light of “where the world is going” (n=1), referring to the positive nature of the interactions that take place there.

Several participants (n=6) described how the method helps them in *connecting*. Two subthemes emerged. Firstly, (n=4) an increased *tolerance of discomfort* and more control over the stress-response, which was said allows for more ease in connecting to others, in particular through a lessening of social anxiety. One participant adds that another factor is more in general, that includes being “more accepting of others as they are, rather than wanting them to be a certain way.” An improved ability to connect to others was also attributed to *improved mood and energy* levels (n=2).

Table 11 Processes inherent to the WHM underlying change in the social domain according to participants

Category	Total n	Subtheme	Subtheme n	Example citation
Community	6	Real-world	4	And the connecting with others, especially within the group of instructors, the international group, that's just so much fun, and people really want to connect with each other. We are social animals after all, so to find your own group of people, who are so great, so open, so supportive, you know. That's super cool. And I still notice that I really enjoy connecting with that group, to have a chat or to do something fun. - N
		Online	3	And also the group, the Facebook group, how many days this Facebook group made my life brighter, because I was following and reading. And also when you post something in this group, you always get so so so so kind answers, it's just incredible. And was very good to have a group like this, not that I would be in groups with hate or things, but this is such a special atmosphere around this Wim Hof Method, Wim Hof and, but this is really like you can trust again in human beings, that this is all possible. - G
Connecting	6	Tolerance of discomfort	4	And that experience and that being able to feel like you have an influence or control over these physical systems in the body, I think when I was anxious, when I was in a social situation that caused anxiety, I had more awareness of and influence over things like my breathing, my heart-rate, and I felt like I could slow these down and have a control over them. And when you can intervene in the physical manifestation of anxiety, that obviously has a knock-on effect of the mental side of things. And from doing like the focus and meditation exercises involved in the method, was able to calm myself. - S
		Improved mood and energy	2	Because you feel good, you bring the energy, you look good. They're happy to see you - I

Processes in the spiritual domain.

Table 12 contains an overview of the ways in which participants indicate that the method helped them in the spiritual domain.

Nearly all participants (n=12) describe how the practice helped bring about more *connectedness to Self*. Attributions fall under four subthemes. Firstly, participants (n=8) described how the practice helped them become more *connected to thoughts and feelings*. They said that this occurs through an increased awareness of coping mechanisms and feelings, mostly through the breathing exercise. Some participants (n=3) also indicated experiencing a kind of emotional release, in the form of “convulsions” “as if you're having an orgasm” (n=1); crying (n=1) and dry-heaving (n=1). Secondly, participants (n=2) said that the method helps them to feel more grounded in and spiritually *connected to the body*, thus helping them to feel more present to and confident in themselves and less prone to using certain coping mechanisms that contribute to a sense of un-groundedness and avoiding certain emotions. Thirdly, participants (n=2) attributed spiritual connectedness to the self to the *breathing and meditative states* accessed through the practice. Fourthly, it was remarked (n=1) that the practice of the method instilled a sense of *purpose and direction* in that it is a way to self-improve and potentially help others self-improve.

Half of the participants (n=8) indicated that the method helped them to experience more *connectedness to nature*. Attributions came under three subthemes. Firstly, participants (n=4) said that the practice motivated them to *go out into nature* more frequently. Examples of how this was related to the method were through an increased tolerance of discomfort when out in nature, and the practice of the breathing exercises highlighting the connectedness of humans to the ecosystem through the role that oxygen plays in our bodies, leading to a greater interest in exploring natural environments. Several participants (n=3) described experiencing a *spiritual connection to natural forces*, such as the cold itself, which was described as a “spirit.” There were also accounts (n=2) of a *connection with nearby animals*, in which it appeared to participants that animals were responding to their altered state of mind.

In terms of a sense of *connectedness to a Higher Truth*, participants (n=2) described how the breathing exercises opened them up to the “spiritualness” of the universe (n=1) and led to a sense of realization and epiphany (n=1) which was often “profound” and grew over time with the practice.

Table 12 Processes inherent to the WHM underlying change in the spiritual domain according to participants

Category (n)	Total n	Subtheme	Subtheme n	Example citation
<i>Connectedness to the self</i>	13	Connection to thoughts and feelings	8	And, because of what the method, I also feel more connected to my self, I understand myself better now. And I can feel and work with, the feelings that I got, to understand how, what I'm going through, and with the coping mechanisms as well, when something comes up. - A
		Connection to body	2	.And with the method, so I went into this empty space, but together with my body. I don't know if I explain this well, so it's not disconnected from my body but discovering really the magic, how well it is, as if the body is part of this sort of spirituality, it was for me not part of it...so this is the really magic connection which I never had. - G
		Breathing and meditative state	2	as I said before about the peacefulness within the breathing. That transcends everything. I think all put together, is great, but I don't think that without the breathing method, and the clarity in the meditation part of that, the retentions, you wouldn't have I don't think that you would have the effect of mind over matter that you would if you didn't have that breathing method. I think the breathing method enables you to have that, that it transcends into everything. - L
		Purpose and direction	1	Like, I've found something now that's completely for myself, and now that I turn 50 I will become a better version of myself [...] if I could do this as well, and first of all take myself to a higher plan, then maybe train other people and maybe make that my job, or as a fun hobby. That does gives me a sense of direction! - P
<i>Connectedness to nature</i>	8	Going out into nature	4	one of the first things I did when I started to practice the method more seriously was put a bunch of plants in my room to maybe improve the oxygen or whatever. And having those plants and you know cultivating them and their life, I think led me to be more interested in the plants that I was seeing when I was out walking my dogs and that led to wanting to cultivate a deeper connection to where I live, do you know what I mean? - S
		Spiritual connection to natural forces	3	[...] when you step outside in the cold, you feel the spirits. [...] and it happens especially when you're still, when you don't move. Still and relaxed. [...] the cold, the cold is just something you start to feel it like it's a presence, so strong. There is an expression, the spirit of the earth. Very true, it's, it's in the air, it's in the trees, it's in the ground, in the dirt. It's in the grass, it's in the wind, yes, especially the wind. And I thought, you know, this must be these opioids he talks about and all that. - I
		Spiritual connection to animals	2	I might just imagine it but I'm not sure, every time I went to swim in this outside swimming pool, we have the, some birds and I had the impression that the birds, they came because perhaps I'm in a different energy level or something. Always the same birds came to look and sing. - G
<i>Connectedness to a Higher Truth</i>	2	Breathing exercises	2	I think it's, a little bit related to the nature. And...I think it's more about the feeling that I got. I'm not sure if I'm able to really describe it. But, it's all connected with the spiritualness, and these things, and...I, I can feel like there, there are things going on in the Universe, with the energy, and with things like these, and...I don't really like, believe in the God, but I more believe that there is some energy in the Universe, and that there are things happening for a reason, and that from each situation there is something to learn, about ourselves, or others, or...what you're supposed to take from it. - A

Multi-domain processes.

Several processes underlying change were not specifically categorizable to any of the four domains, and spanned across several domains. Table 13 gives an overview. Two subthemes emerged.

Participants (n=5) often explained the various changes they experienced across all or several of the domains as being primarily attributable to *physiological effects* of practicing the method. This often came down to speculation or assumption, and participants tended to use words like “likely” and “probably.” However, it was also remarked that the various effects of the practice highlight the *inter-relatedness* of the various aspects of health (n=1).

Table 13 Processes inherent to the WHM underlying change in multiple domains according to participants

Category	Total n	Example citation
<i>Physiological effects</i>	5	Very simple phrase, reorganization of the nervous system. It starts to function at a different mode. Most likely, it creates new physical connections, definitely physiological changes, but most likely actual physical changes. - I
<i>Inter-relatedness</i>	1	I was in such bad, such a bad state of mental and physical health, that it was damaging all of the other aspects of my life that once were quite healthy. And so once I started to get my health back, all of those other things began to improve with it. So, they were all correlated. - R

Internal factors that promote/prevent change.

Participants described various factors that they said promote or prevent change which occur internally, to which they attribute change through their practice of the WHM. Table 14 contains an overview.

Most participants (n=10) talked about *mindset* as a factor that promotes change through their practice of the WHM. Four subthemes emerged. Firstly, several participants (n=6) talked about the importance of being focused and *mindful* during the practice, letting go of expectations and not rushing the practice or being overly perfectionistic. Secondly, several participants (n=5) mentioned that a naturally *curious disposition and open mind* helps them to pick up and persist in the practice. Thirdly, it was remarked (n=1) that the study of *philosophy*, particularly Stoicism helped to improve the practice and manage symptoms of depression. Fourthly, instilling in oneself a can-do mindset and *mentally preparing* oneself before the practice was described as helpful (n=1). This was described in terms of “feeling like a warrior.”

Most participants (n=10) highlighted the importance of *discipline* in the practice. Several participants (n=6) said that being disciplined in their practice helped them, and a few participants (n=4)

said that their occasional lack of discipline can be an obstacle. One participant mentioned that his chronic pain would begin to come back when there was a lapse in his discipline.

A number of participants (n=5) cited their *motivation* for practicing the WHM as a supportive factor. Their statements come under three different subthemes. A few participants (n=4) said that a *strong desire to overcome their symptoms* is a factor that promotes change, in that it promotes discipline and persistence. Two participants cited a *need to self-manage symptoms*, and two participants stated that a *lack of results from other forms of treatment* motivated them to seek out and practice the WHM.

A few participants (n=3) cited other factors that negatively influence *overall health* as showing up in the practice, in that retention times or cold-tolerance can be lowered. This includes things like lack of sleep, drinking too much or being stressed.

For two participants, *prior experiences* with spirituality acted as a kind of reference point that helped them reap the spiritual benefits of practicing the WHM, in that it was like “a door” that had already been opened before.

One participant cites having an instructor's *knowledge* of the WHM and human physiology as beneficial to her practice.

Table 14 *Internal factors that promote/prevent change through the WHM according to participants*

Category	Total n	Subtheme	Subtheme n	Example citation
Mindset	11	Mindfulness	6	...I suppose initially I suppose I went through a plateau stage in the beginning when you kinda get excited and the placebo effect hits you cause you think you've found the wonder-cure for all your problems and you realize, well actually nothing is a wonder-cure for all your problems. It's a process to work through, to find yourself, to stabilize things, to move forward and to understand. [...] I actually did a Wim Hof thing yesterday, and the thing that actually came out of that was actually [...] looking for too much out of it rather than being a little bit more present and into it. - U
		Curiosity and open-mindedness	5	And besides I am a naturally, you know, curious person, I mean I always had some hobbies and I still have and I consider that as a hobby. So it's a, not difficult, easy to stick with it if you consider it as a hobby. And it makes it fun. - D
		Philosophy	1	Yeah and at the same time as practicing the method I also spend a lot of time reading and studying different philosophy and stoicism is something that's become quite important to me and my mindset and my way of thinking and I'm sure that's had a knock-on effect on my depression as well. Yeah I think that's kind of the main ones. - S
		Mental preparation	1	Before the cold I always do this mindset, preparing of the mindset, like feeling like a warrior. And like for me it really feels like, and then I feel very grateful for my body. So it changes completely, it's something very interesting to do. - G

Table 14 (continued)

Category	Total n	Subtheme	Subtheme n	Example citation
<i>Discipline</i>	10			I think that making a commitment to do it everyday. Especially in the initial stages, because if I wasn't, if I didn't practice every day like if we went traveling for a couple of weeks, I would tend not to do the method and then I would notice, especially the pain coming back, which is quite depressing in itself. So just that regularity, routine of practice was very, very important. And that sort of set me up every day. - E
<i>Motivation</i>	5	Desire to overcome symptoms	4	I was desperate, in pain, in physical and emotional pain, and I felt like my life was unraveling, and I needed something to save me. And nothing was, and so I was willing to try anything at that time. So it was the second I heard, within the hour of watching his videos I went and did some breathing and got in a cold shower, because I needed something. I needed something to get me out of physical and emotional pain. I needed some level of relief. - R
		Need to self-manage symptoms	2	It's been great to feel a little bit more in control. It's great to have something to help yourself. That you can do. And it doesn't involve putting on running shoes and going for a half hour run. [...] Had tried lots of other things and it was the first thing that I felt I could actually use to help myself rather than rely on somebody else to help me - U
		Lack of result from other forms of treatment	2	I did see the doctor and two different psychologists, and I found them to be spectacularly unhelpful in their approach. Spectacularly. And one guy in particular, I, after my, I think my 5 th session with him, I left and I went into the car and I sat there and cried for 20 minutes. Not because of how I felt but because of what he had done in there. I was like, fuck this shit! I'm not going down there anymore you know it was just ridiculous. So that was very, very disappointing actually. But on the flip-side it did strengthen my resolve to find something else. Which I did, so that was good. - E
<i>Overall health</i>	3			I think it's, it's different each time you go into the water like how you're, how well you slept, how you feeling in the morning and, and it all reflects afterwards when you go into the water. - A
<i>Prior experiences</i>	2			I've done holotropic breathwork, and I've done a lot of breathwork. I actually got invited into yogic breathwork when I was 20, and I've done a lot of breathwork methods, and I go to a rebirthing center and I do breathwork, so that's something I was already doing prior to starting the method. But I think it, when you put the breathwork and the cold together, it definitely opened that door for me again. Because I guess that door had been closed, because I wasn't really able to meditate, and I wasn't really able to do yoga, so I fell off of the breathing aspect as well without even realizing it. - R
<i>Knowledge</i>	1			My ex, with whom I was together until last month, he was an osteopath. [...] So to have someone who is very much in that profession, with whom I was together, that really helped me to make more sense of it, to better understand how the hormonal system works, what kind of influence does it have, how can I work with that myself, and if I do this what does it do, and if I do that, what does it do. So to kind of get an overview of how the body is put together. - N

External factors that promote/prevent change.

Participants described various factors that prevent or promote change that occur externally, to which they attribute change through their practice of the WHM. Table 15 contains an overview.

Most participants (n=10) described *life circumstances* and how they could affect change through

the method. Three subthemes could be distinguished. Nearly half of the participants (n=7) cited *sufficient free time* to practice the WHM as an important factor. Work, family and hospital appointments were cited as possible impediments to having sufficient time. A few participants (n=3) cited *financial stability* as protective and conducive to beneficial change through the method. One participant cited *experiencing satisfaction in her career* as conducive to achieving a greater sense of well-being while practicing the WHM.

Most participants (n=10) also described how *Wim Hof* himself affects their own change through the practice, and these descriptions can be subdivided in two ways. In a *positive* sense, many participants (n=8) considered Wim Hof to be a source of inspiration and encouragement, who presents his achievements as being within anybody's capacity, and relates to his audience authentically. Two participants cited a *negative* effect, considering Wim Hof's way of relating to his audience to lack seriousness (n=1) or that the tendency to overly hype the effects of the WHM could lead to heightened expectations (n=1).

Most participants (n=9) cited *social resources* as a factor, which could be subdivided in two ways. Several participants (n=5) cited the motivational effect of *practicing together with others*, of whom two mentioned only real-life interactions, and three mentioned Facebook groups as well. Secondly, a few participants (n=3) considered the ability to *self-disclose and communicate* one's struggles and needs to their social environment to be an important factor.

Two participants discussed *social barriers*, which could be subdivided in three ways. Firstly, a few participants (n=3) talked about receiving *pressure to practice the WHM* from their social environment, particularly family. This was either due to reservations regarding the practice itself (n=2), or due to a spouse who felt that the practice was taking away from spending time together (n=1). Secondly, a couple of participants (n=2) described the negative impact of *negativity from people in one's social environment*, in terms of either a social circle or in terms of a negative response to depressive symptoms from a spouse. Thirdly, one participant expressed said that Western *cultural expectations* and definitions of success contribute to stress and anxiety.

A number of participants (n=5) described *climate* as a contributing factor. They stated that climate can be an impediment to the practice, because of the relative lack of (sufficiently) cold water in warmer climates or seasons. One participant described solving this problem by buying a freezer to sit in.

A few participants (n=4) discussed the *ease and accessibility* of the method as a contributing

factor. Four subthemes were identified. Firstly, the WHM was described as being extremely *simple* (n=1). Secondly, the WHM breathing techniques were described as being *less controlled* in comparison to other breathing techniques that are taught for managing depression and anxiety (n=1). Thirdly, when compared to holotropic breathwork, an advantage of the WHM that was cited was that it can be performed in a *short period of time and without supervision* (n=1). Fourthly, the practice was described as *not costing anything*, save the initial investment for the course (n=1).

A few participants (n=3) cited *stress* as an obstacle to change through the practice. This occurred in two ways. In terms of *effects on the practice*, stress was identified as making it more difficult to do their WHM-practice with enough focus and motivation (n=2). In terms of *stress as an obstacle to results*, one participant said that he believes he would have seen more benefits from his practice if it hadn't been for external stressors in his life.

One participant said that the *immersion* offered by the WHM-instructor training made it easier for her to form the habit of the practice, particularly with reference to the cold-exposure, due to the intensity and consistency with which it was practiced.

One participant said that the lack of availability of WHM-resources in certain *languages* could be a barrier to those who don't speak English.

Table 15 External factors that promote/prevent change through the WHM according to participants

Category	Total n	Subtheme	Subtheme n	Example citation
Life circumstances	10	Time	7	And since maybe a month or two I haven't practiced much due to my like family schedule and work schedule. And, the month I started I actually practiced every morning, from 5 to 7 mornings in the week. And I practiced usually from 5, 5:30 till 6:30 in the morning, when I wake up. Actually I started waking up much earlier to actually be able to practice. And through that I felt amazing amount of energy, etcetera, and I felt extremely good. And, but then with the time I'm waking up very early, it was also making me more tired in the evening and then I could do less things in the evening, family matters and stuff so then it got complicated etcetera and that's why I now, I actually haven't practiced for a while. - T
		Financial stability	3	Something else that has made it you know possible is that we make enough money to make it. - I
		Career satisfaction	1	I work with passion at the work I love, and this of course contributes a lot to general well-being I would say and connection and so on. - G

Table 15 (continued)

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Wim Hof</i>	10	Positive effect	8	And I found that's something that, you know, watching the vice documentary about Wim and seeing this guy that could fucking swim under arctic ice and all this shit, and him saying that it was something that anybody could do, he wasn't a freak of nature. That for me was like, you know, if it's gonna have all these benefits then why the fuck am I not gonna apply myself to this? And so I felt very determined to make this work, and I think that determinism has rolled over into other things that I apply myself to in life now you know. - S
		Negative effect	2	I suppose I'm a little surprised that it hasn't been better. I think I expected more, but I'm pleased with what's happening and where it's gonna go. I think part of that is, you know, Wim's very good at hyping the whole kind of, how great it is, and that it's a wonder-cure to everything and that when you're feeling crappy just breathe and make some happy hormones, that it's that simple but yeah. - U
<i>Social resources</i>	9	Practicing together with others	5	So there were some conversations I had on the group site, and I ended up making, one in particular, really good friend. [...] we message each other every day, just to keep each other going and to make sure we don't fall out of the practice. We're both getting better so it's encouraging. And yeah there's some really good places where you can communicate with other people who are going through similar things. So that also helps as well. So I think that helps, that's a strategy. - R
		Self-disclosure and communication	4	I'm really good at vulnerability, and resilience. So I'm not one to like, I hide things where I have to. Like you don't go into work, where you're supposed to make money and tell everyone all of your problems you know that's not what you're there for. But when it comes to interpersonal relationships I'm really good at being honest about things. - R
<i>Social barriers</i>	6	Pressure related to WHM-practice	3	...in the beginning when I told them that I went to the ice water, my mom didn't speak with me for two days. [...] when I first followed the instructor go swimming in the Danube, and I told about this at home as well and my mom was like, don't you dare go in there with him. [...] And it's all fine now, but it was difficult in the beginning, when I told her. Or when I told people in general that I'm going to the cold water - A.
		Positive social environment	2	[..] I wasn't getting enough sleep. I was working too much. I was in pain all the time. I didn't have time for self-maintenance. I think all of that significantly caused a crumbling, but, and then my partner's negative reaction to my negative feelings. So I felt, I felt sort of quite rejected at the time. - E
		Cultural expectations	1	it's a general problem I think in our way of living, Western culture, to do more, and you are nobody if you don't do anything you know. Yeah in France it's really present, with every president we have who says, if you don't have a Rolex when you are 50 you are nothing. So. Stuff like that, it's probably my life but of course not only mine. - O
<i>Climate</i>	5			I was living in Spain, and it's just not very cold there. So that's also difficult then to actually have a cold bath or, like when you live in the north of Canada and you step outside and your feet are in the snow and you can walk right into an ice-bath, then of course it's different from when you live in Spain and the sea is still 14 degrees in the winter there, and it doesn't get colder than 10 degrees either, so it's quite difficult. - N
<i>Accessibility and simplicity of the method</i>	4	Simplicity	1	It is just so simple that at first I didn't even understand I'm like Ok what else? You know. The simplicity of it. - I
		Not as controlled	1	And then the breathing, you know I've always struggled with breathing cause I've tried a lot of breathing things to help with my depression and anxiety. And a lot of it has been a little too controlled. Count your breaths, 3 in, 2 out, that kind of stuff. It all feels a little bit too controlled compared to this. It's a little bit more free-flowing. - U

Table 15 (continued)

Category	Total n	Subtheme	Subtheme n	Example citation
Accessibility and simplicity of the method (continued)		Time and self-reliance	1	But also holotropic breathwork is for a really long period of time and so is re-birthing, you're doing it for like an hour, whereas it never really occurred to me to do like 5 to 10 minutes of that every day, if you do it every day would be beneficial. So they really packaged it in a way that it can have lasting benefits that are more easily accessible for people. And you're also not going, you're not releasing so many chemicals that you need someone to sit and watching or that it's dangerous for you. Yeah, it's really beautiful, breathe every day for 5 to 10 minutes or more depending on what I wanna do and not have to sit down and do it with a group or to pay someone to do it, it's something free that can just be accessed in your own bedroom, so I think that's really cool.- R
		Cost-effectiveness	1	...and with the Wim Hof Method it's mostly worth it because it's free [...] I paid for the course but anyways it's gone and after that you know the cold shower is free, the breathing is free, so why not do that. - D
Stress	3	Effects on the practice	2	And it has been very hard psychologically because if you're high pressure all day, you can not just sit down and breathe nicely. You can not do anything after your high pressure day. - I
		Obstacle to results	1	I suppose yes the anxiety's still there, yes the depression's still there but if I wasn't doing the WHM, I suspect I'd be doing significantly worse. And if I didn't have all the external stressors in my life still, I think I would have seen more benefit from the Wim Hof. I've got a lot more happening in my life than a lot of people potentially, you know it's a slower process - U
Immersion	1	Immersion as a factor promoting habit formation		Well when you start with the cold showers that's kind of a shock yeah. And now I do it every day with pleasure, but that took me some time. And actually since I went to Poland in January, that's when it became a habit. While before that, I was often fighting the cold, while now I just accept it much more. - N
Language	1	Language as a barrier		Of course I speak English, it's such a pity that it's not yet in French. I'm talking to people, some of them don't speak English, so. Yeah. - G

Interactions with other treatments and practices.

Participants also described their experiences regarding interactions between their practice of the WHM and other treatments and practices. Table 16 contains an overview.

A number of participants (n=7) described interactions with *medication*. These descriptions fell into two subthemes. Several participants (n=5) described a *reduced need for medication intake*, particularly asthma medication (n=3). A couple (n=2) said that *medication intake can interfere with the practice*, citing the dulling effects of SNRI anti-depressants (n=1), and the subjective experience of smoking marijuana leading to the practice disproportionately affecting the mind, relative to the body (n=1)., “the mind getting there before the body.”

A number of participants (n=6) described the interaction between *diet* and their practice of the WHM. This could be categorized into three subthemes. Firstly, a few participants (n=4) mentioned that adopting a more vegetarian or *plant-based diet* helped them to facilitate positive changes in health and

well-being, out of whom one participant recalls how during a detox-diet, while drinking only green smoothies, she noticed a significant increase in her retention times during the breathing exercises, which subsided after discontinuing the diet. She did not mention otherwise following a plant-based diet. Secondly, one participant believed that making changes to his diet impacted his psoriasis *more significantly than practicing the WHM*. Thirdly, one participant described a negative impact of discontinuing his intake of omega-3 and probiotic *supplements*, particularly on his mental state.

Several participants (n=5) described their usage of *other techniques/practices* alongside the WHM. These can be categorized into four subthemes. Firstly, using *ACT and the Alexander technique* (a technique that focuses on retraining habitual movement patterns) was described as being very helpful alongside the practice of the WHM, particularly in that the latter helps with learning to accept discomfort (n=1). Secondly, one participant described using a *device that measures oxygen levels in the blood* during his breathing practice to determine how long he needs to hold his breath to stave off the symptoms of his psoriasis. Thirdly, one participant explained that, alongside the WHM and changes to her diet, she has made a lot of *general changes to her lifestyle* and habits in order to improve her health. Fourthly, one participant described using the *Buteyko method* (a breathing protocol) alongside the WHM, for a more calming effect, noting that practicing the WHM-method may have caused him to “overbreathe” during the rest of the day.

A couple of participants (n=2) described practicing other forms of *exercise* alongside the WHM. One of these participants described how the WHM helped him recover from his chronic pain and the associated anxiety and depression to a point where he could begin practicing Pilates, which then helped him further the recovery process. One participant said that he was using HIT-training to manage his prediabetic condition, and that although he has stopped doing the HIT-training, his blood sugar seems to be normal since doing the WHM.

A couple of participants (n=2) described using *yoga and meditation* alongside the WHM to improve their results. One of them said that her yoga practice gave her more strength and stability, while doing transcendental meditation, particularly in conjunction with the WHM breathing helped her access deeper states of calm.

Table 16 *Participants' experiences regarding interactions with other treatments and practices*

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Medication</i>	7	Reduced medication intake	5	I had antibiotics, when I was ill, now. And apart from that, I have asthma. So I've got spray that I'm using. But it's, it's only the lightest version at the moment. So I was having, what was it called. I had spray for asthma, but more strong. And this one is the lightest version only. And during the winter-time, I tried few months without it, completely. So it's getting better as well. - A
		Interference with practice	2	But I was concerned that medication might have been dulling me too much to the point that I couldn't get into the method properly. You know, but I think that it's certainly, that it was a help to getting me to turn into, doing it my own way. - U
<i>Diet</i>	6	Plant-based	4	Oh yes it was very interesting. I did a detox-cure two years ago when I just started with the WHM, and just drinking green smoothies. 21 days. SO not eating, but just green smoothies all the day. And my retention time at the end was 3 minutes, and it really had an influence on how my, and I did the Wim Hof every day also. So it was really, and it has never been up like this again. But very interesting, I see that there is really, it's important what I eat. - G
		Greater effect than WHM	1	Yeah actually no changes with regards [to the psoriasis]...well there were some subtle changes I would say, improvements in one place and probably a bit worse in others. So, but it's not...since practicing the Wim Hof Method I've been watching my nutrition, and that might affect stuff more, probably. I haven't seen any changes from Wim Hof. - D
		Supplementation	1	I take some natural medicines, I'm taking some omega 3 and some probiotics and things cause I do believe a lot of what I'm going through is tension stuck in the body but also this inflammation. And it's interesting, I've, the probiotics I was taking I've finished taking them 2 weeks ago, recommendation from the lady I'm working with. But I've noticed that my mental state isn't quite as good since stopping those, so I think that's been good. - U
<i>Other techniques /practices</i>	4	ACT and Alexander technique	1	And also, everything I learned, like meditation, and other things like ACT therapy. I don't know if you know that. ACT therapy helped me a lot. And the Alexander technique - O
		Measuring blood-oxygen levels	1	I measured with this, I had this device that measured oxygen level in the blood. Now I know how long or how long I have to hold my breath to get low enough. And I've also seen that if I don't get a long enough retention, I can start feeling, after a few days, I can start feeling the itch of the psoriasis. But now I can do it in like 6-7 minutes I get retention time I need. - B
		Buteyko	1	So I went to a Buteyko guy in Auckland a few weeks ago and did a breathing test with him which shows that I'm puffing up far too much carbon dioxide and I'm over-breathing. You know, and obviously the WHM is wanting you to over-breathe and wanting you to do that. And I think, you know, has it caused me to overbreathe throughout the rest of my day, I don't know. But I'm incorporating them both at the moment. I've actually started to do a lot more shallow, calming breaths and being more conscious during the day of my over-breathing. And I think that's working quite well with Wim Hof at the moment. - U
		General lifestyle changes	1	I really think that I've gained a greater confidence in my body. And that's, yeah a big part of that is due to the method, but like I said, I was also looking for improvement, so I've also been working on my diet, I've also been working on my habits, when I get up, routine, those things. But the fact that I trust that my body can handle it, I owe that completely to the Wim Hof Method. - N
<i>Exercise</i>	2			I didn't get immediate relief, but it sort of, literally each time I do a practice, which was every day, it was like a layer of the onion was peeling away. So layer by layer I was... first my mental condition improved dramatically, over the course of about 6 months. And then the chronic pain started to resolve dramatically. And then I could start to, from a Pilates instructor, and I've been doing that for a really long time, I could start to use that practice to start to heal my body as well, whereas before the pain would just interfere too much. - E
<i>Yoga and meditation</i>	2			And I started doing the yoga and the stretches through the fundamentals, and I carried on doing that, furthering that with my own research into other yoga methods, so I now incorporate that and the Wim Hof, and meditation as well. - L

4. Semi-structured Interviews - Improving the WHM

This section of the results is aimed at answering the fourth and last research question: “According to users of the WHM, how can the method be improved?” Participants gave several suggestions with regard to how the method can be improved. An overview can be found in table 17.

Several participants (n=7) expressed a need for more *clarity of information*. Three subthemes could be identified. Firstly, participants (n=4) expressed a need for a more *clarity regarding the proper practice of the breathing techniques*. This was with reference to how to breathe properly and when to breathe in after the retention (n=2), and a need for more clarity regarding the usage of different specific breathing techniques (n=2). Secondly, there was a demand for a *clear overview of the benefits* of the practice and of specific elements of the practice (n=2). Thirdly, one participant expressed a *need for more thorough safety warnings* regarding not having a hot shower after an ice-bath.

A few participants (n=2) expressed a need for more *variety* in terms of the course content. One participant expressed a need for more variety in terms of breathing exercises, particularly breathing exercises that aid sleep. He did mention not having done the Fundamentals course. One participant describes the practice of the WHM as becoming repetitive, leading to a need to attend the winter training in Poland to see if it offers him anything more outside of the courses. One participant said that he would like to see more variety in terms of different types of cold exposure (e.g. air, water), and information regarding heat-exposure training.

Regarding the participants that talked about *instructors* (n=3), two subthemes emerged. Participants (n=2) talked about *obstacles to becoming an instructor*. One participant talked about the imposed limitations for Dutch nationals to become a certified instructor, and one participant suggested providing more opportunities for those who have a lower bracket income to take the instructor course. A *general need for more instructors* was also expressed (n=1) in order to make the WHM more widely accessible.

In terms of *tailoring*, (n=2), one participant expressed a need for a program tailored to those who are particularly anxious and prone to over-exertion, adding that such individuals may find it much more difficult to “listen to their body” and pace themselves accordingly. One participant mentioned that the yoga posture known as “the shelf” may be anatomically impossible for many women to perform.

Table 17 *How the WHM can be improved according to participants*

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>Clarity of information</i>	7	Clarity regarding breathing techniques	4	Wim could really explain things a bit better. [...] even now having done this for about 8-9 months, I'm still unsure. And I've been to a couple of courses as well and I'm unsure how long to hold your breath. Do you hold your breath till you're twitching and struggling or do you just kind of hold it 15 seconds into feeling the need to breathe or what? It's very strange, he really could explain it better. - K
		Clear overview of benefits	2	There's so much information and reasons why it's good, it would be good to have a kind of, one-two-three list of benefits. Like with the breathing exercises, they're good because, one-two-three. And with the cold showers, it's good because, one-two-three. Because right now there's so much information that it's sometimes maybe kind of overkill. And I notice with the workshops, that people ask me, yeah yeah ok, but why was this good to do again? And that they're really looking for one or two things. - N
		Safety	1	What I perhaps did not read or did not know is, if you go to the cold water and you manage perfectly to stay in this ice bath for 3 minutes and you feel fine and so, you should not go to the hot shower. And also, so I did not know. Perhaps I skipped the information but it must be an important information I think, because then you can really faint, I think. Because I really, normally I don't get these issues but I really had to sit down because I felt like, whoops! And like I'm fainting. - G
<i>Variety</i>	3			If you can vary the exposure to cold maybe you can alternate showers and cold air and ice, you know, to get different angles, just like weight-lifting and everything else. Maybe just a little bit of variation and most likely Wim Hof will tell you this, yes of course, if you can but you know. So and also, I think that he doesn't stress the opposite side, the exposure to heat. He, he does it you know, the desert run and all that. But he doesn't really, you know, teaches it. It's like, I'm like, coming hot in Texas, I'd like to know more about the heat. - I
<i>Instructors</i>	3	Obstacles to becoming an instructor	2	This is an idea that I thought about for the method right. Like, I would love to become an instructor. And to help people that are in a similar financial situation to myself, where they can't maybe afford to go to the current days. [...] But to become an instructor in the first place you need like 2 grand, and I understand that, obviously the method needs to make money to put into its research, to put into its facilities and everything like that. And I also understand that maybe that price is almost a deterrent for people that aren't serious about it. But for someone like me to be able to afford that cost, to give you an example man my rent here, my rent and bills, electricity and water included is 85 euros a month. And on a good month, I probably make 500 euros. So for me to save 2000 euros would take probably a couple of years of serious savings... - S
		A need for more instructors	1	I wish, and this will happen, but I wish there were more people that were teaching it and instructing it, so that... I mean I had all that I needed in order to do the method, but I'm just disappointed that it took me, and I should not...disappointed isn't the word. I just realize that it should be easier and more accessible for people. And it would be really cool if we get to that point where there are like practitioners everywhere that can help people. Because I really wish I would have known about it a lot sooner. - R
<i>Tailoring</i>	2			I can kind of overdo it easily. You know I can kind of want to run before I can walk, and that can get me into trouble. And it would be quite nice to see a bit more research into anxiety and depression I suppose, in the sense that, more of a tailored program. You know, so that you feel comfortable with maybe actually 5 days a week, a little less intense might be better for a while than 7 days a week, kind of, 30-40 minute breathing every time you know what I mean? So I feel a little bit kind of...yeah I mean you also kind of gotta go with your intuition. It can take a while for people to be able to get in touch with your intuition because of where they are, their mental state. [...] the Fundamentals were great, but I feel like if there was a Fundamentals tailored to someone with my issues. To get you, to move you through a little bit more slowly and a little bit more gently, and to try to hold you back. It's a process that will take time and perhaps you might miss some valuable steps if you try and run too quickly. - U

5. Semi-structured Interviews - Additional Observations

This section of the results contains an overview of additional relevant observations. Overviews of these results are given in tables 18-21.

Positive experiences.

Table 18 contains an overview of additional observations based on positive experiences that were reported by participants.

A few participants (n=5) reported increased rates of *recovery*. Two participants said that practicing the WHM provided them near-complete relief of injury-related chronic pain and associated anxiety and depression, after finding no relief using both traditional and alternative forms of treatment. One participant described being completely free from asthma after practicing the WHM, and one participant described recovering from a shoulder injury unexpectedly quickly, although he was not sure whether to attribute it to the WHM or not. One participant described a very significant improvement in various symptoms of progressive MS, including an improved ability to walk and improvements in memory.

Participants (n=2) described having *dream-like visions* or re-experiencing memories during the breathing practice. In one case, this was a recurring dream that became longer with every session, in the other case, re-experiencing memories and associated physical sensations as if they were taking place in the present.

Table 18 Additional observations – positive experiences reported by participants

Category	Total n	Example citation
<i>Recovery</i>	5	I've got spondylolisthesis, a fairly serious back injury, which I've suffered from for probably about 12 years now. It took, probably 2 or 3 years for the pain to get as bad as it was going to get, and then I was just in, like in a chronic pain condition for quite a long time. I saw all sorts of medical practitioners, alternative medical practitioners [...] Standard Western medicine, acupuncture, structural integration, massage...everything, pretty much. Pretty much wasn't getting any relief from the pain. [...] probably I've been doing WHM now for about three years, and...so that time, I've managed to, I wouldn't say cure but totally resolve my depression, and anxiety as it turned out. And almost entirely control my chronic pain, despite still having a very, seemingly serious physical deficit in my back.. - E
<i>Dream-like visions</i>	2	[...] I would have, every day, during the breathing, during the retention times, between the rounds of breathing I would have almost like a recurring dream. I wouldn't call it a hallucination, but it was like I was dreaming for a moment. And every day it would get a bit longer and a bit more would be added on. It was very much like a dream that it wasn't continuous, it was very sporadic and kind of distorted and didn't make much sense - S

Uncomfortable experiences.

Table 19 contains an overview of additional observations with regard to uncomfortable experiences reported by participants.

Several participants (n=7) reported having uncomfortable experiences with *the cold*. A few participants (n=3) said that the cold-exposure can be a generally uncomfortable experience. A couple of participants (n=2) had a particularly frightening or debilitating experience with the cold. One of them reported a few experiences of almost fainting after too much cold-exposure. The other reported extremely low energy for three weeks after strong cold-exposure, adding that he considered this to be a necessary learning experience that came as a result of generally having too much stress and overexerting himself. One participant described an ice-bath with ice-cubes as being an almost claustrophobic experience. One participant, who is also a WHM-instructor, expressed that he finds it unfortunate that many people have a bad reaction to the cold, stating that the benefits come with the pain.

A number of participants (n=7) said that *the breathing exercises* can potentially cause uncomfortable experiences. These descriptions come under two subthemes. In terms of *general discomfort*, several participants (n=5) described general discomfort that can occur during the breathing practice as a result of strange sensations or fear. Another potentially uncomfortable experience was the *resurfacing of emotions* (n=2). One participant described this experience as a process of releasing blocked trauma from the stomach area through experiencing nausea and dry-heaving, which gradually subsided with the practice. She added that she considers it a good thing to have gone through this process.

A couple of participants (n=2) mentioned uncomfortable experiences as a result of *pushing too hard*. One participant reported that doing strenuous stretching exercises without warming up led to stiffness and tension, and recalled having a few experiences in the beginning of his practice during which he pushed himself too hard while doing pushups during the breath-retention, and had what he described as “minor seizures.” Another participant recalled how he used the method to allow himself to work harder, but that this eventually led to more fatigue.

One participant described experiencing *frustration* with herself and the speed of her progress while doing the practice.

Table 19 *Additional observations - uncomfortable experiences*

Category	Total <i>n</i>	Subtheme	Subtheme <i>n</i>	Example citation
<i>The cold</i>	7			It was just too much, and I felt it like, like I was out, just completely burned. And it was general problem in my life, so not only the WHM, but really to go in the cold when I was really, I had a lot of stress. [...] I took three weeks to recharge my battery. And probably more to be like I am now, it's OK. I really stopped. During this time I went to a Wim Hof workshop in Barcelona. And during the cold, the ice bath, it was the same. When I went out I was just completely out. [...] Yeah, just say stop it, stop everything, and I stopped everything because I could not, I couldn't continue anything. So yeah, I don't know, now I'm probably better than before, before this problem. - O
<i>The breathing exercises</i>	7	General discomfort	5	I don't like doing the breath holds. They're uncomfortable. Not very nice at all! Especially when you start to build up the CO2 in your body and you've got to breathe. It's not very pleasant at all. - K
		Resurfacing of emotions	2	When I first started the breathing...I was getting a little bit nauseous. [...] I started to get this awareness that there was probably something there, probably something emotional in my chakras. And so I just, I was just like OK you know what I'm just going to do this. And I'm just going to see what happens. So I did the breathing normally and I was actually dry-heaving. It was really loud and it was really disturbing, and it's good that no one was home, because people would have heard me. And what happened was I just kept forcing myself to, I know they say don't force but I was like I think this needs to be done and this needs to be purged, and I think I was like crying and emoting and it was just really intense. And each day it was like barely noticeable, but maybe a slight amount less until eventually after about, I don't know if it was like 2 weeks or 3 weeks, eventually I wasn't doing that anymore. And then that was all gone and I could just breathe normally. So that was hard to push through. [...] So I think when you have trauma sometimes, you have these areas that need to be worked through. And the breath really does target them, in a different way. So I had that. But it was a good thing that I did that. - R
<i>Pushing too hard</i>	2			When I first started I did what, I guess probably a lot of people do and I pushed myself a bit too hard, and during that time I had a few experiences, had a couple of seizures, small minor seizures just where I think I just pushed myself to the point of almost blacking out, and the one time it happened that was quite bad, it didn't, it wasn't like, it didn't deter me from the method, it just made me realize to stop pushing myself too hard...was during the pushups, when the retention of breath..and yeah I had like a small seizure and lost control of my arms and smashed my face off my floor, and the room that I do it in is like a stone tile floor so I busted my lip and my nose a bit. - S
<i>Frustration</i>	1			There's been things where I've been frustrated in myself, specifically in things like, initially to begin with retentions. And I think that everybody finds that frustrating, that all of a sudden their retentions just drop. But then moving on with the method and realizing it's not a personal competition. It's not a competition with anyone else. And after a certain amount of time you don't need to time yourself anymore. It's much, all of the issues I've had have more been about frustrations with myself. About with the stretches, initially starting those, the frustration with not being able to balance, not being able to do things with my eyes closed and that was my own frustration, whereas with continued practice I've got much better. - L

Form of the WHM.

Table 20 contains an overview of additional observations regarding the form of the practice described by participants.

Most participants (n=11) described some amount of variety in terms of the *components practiced*. A few participants (n=3) reported not practicing the stretches at all. A couple of participants (n=2) said they practice the stretches “intuitively” or just where there is noticeable stiffness. The remaining participants all reported various different dosages of their practice of the various components of the WHM.

A couple of participants (n=2) described variety in terms of the *mode of instruction* as well. One said she learned how to practice the WHM from an instructor, and received a great deal of additional support from this instructor, and the other explained that he learned to do the WHM from reading information online and watching videos. However, most of them learned the practice through one of the online courses, but these are also quite distinct from one another in many ways.

Table 20 Additional observations – Form of the WHM

Category	Total n	Example citation
<i>Components practiced</i>	11	Normally I do [the stretches], depends on the days. I can do breathing, the pushups, and stretching, then the cold shower, or no stretching and then I do the stretching, the stretches in the evening. I used to stretch already a lot before, so it's not like, it's not new for me. And I've been practicing before, etcetera. I don't feel strong added value from the breathing or the stretching. I think it's, what make the stretching progress is more the regularity of the practice, more than the breathing and exercising it. - T
<i>Mode of instruction</i>	2	I had individual lessons with an instructor as well, and we had talks where we went to the water and we did the breathing and everything. And it helped me a lot to go more deep with the method, and also to look on the issues from some other side as well. - A

Future Studies

There were also suggestions for *future studies* (n=2). Table 21 contains an overview. One participant suggested using the WHM mobile app for data collection. One participant expressed a need for longitudinal, double-blind studies, rather than only having “snapshots” of the effects of the WHM.

Table 21 *Additional observations – Suggestions for future studies made by participants*

Category	Total <i>n</i>	Example citation
<i>Future studies</i>	2	I have it in, here in the application in the telephone. I don't know if I could share with you the statistics or something, but perhaps it would help you if you see the statistics of people, if they are encoding the times, so you have an idea of the retention times and so on and so forth, because then you can evaluate the level of people who are doing it. - G

Discussion

The study aimed to determine 1) what characterizes the population of WHM-users in terms of demographics, motivations, ways of learning about the WHM, and duration/frequency of practice; 2) whether users report changes, and what kind of changes they report (in physical, psychological, social and spiritual domains); 3) to what factors users attribute these changes (processes, factors that promote/prevent change, and interactions with other treatments/practices); 4) and how the method can be improved, according to users.

Characteristics

With regard to the characteristics of the sample in general, it is difficult to say whether the observed demographic characteristics represent the population of WHM-practitioners at large. Alternatively, the present study may have primarily attracted members of this group. It can not be assumed however, that the sample is representative of the overall population of WHM-practitioners. Certain practitioners may not be inclined to join Facebook groups, or to respond to the survey. The interview participants, especially, may represent a certain section of users who are more prone to participate. Participants who report negative changes, for example, are under-represented among interview participants when considering the survey data. The observation that the primary means of learning about the method is the internet could be linked to the fact that the sample was recruited online, which could mean that the sample consists of more avid internet users. What is notable though, is that “word of mouth” is such a common means. What might explain this is unclear.

Considering the predominance of women in the population of yoga-practitioners (Park, Siegel & Braun, 2015) and as participants in health interventions in general, the predominance of male

practitioners in the sample is an interesting observation. Some participants point out this could be related to the “macho” appeal associated with the practice of cold-exposure. This could be a positive factor in terms of attracting more men to a health intervention, but at the same time might act as a deterrent in terms of attracting female practitioners. It is also significant when considering the disparity between men and women with regards to health behavior and health risk factors. Courtenay (2000) points out that in the United States, women are more likely than men to practice health protective behaviors, and that men are more likely to engage in health risk behaviors and suffer increased risk of injury, disease and death. He argues that men's predisposition towards health risk behaviors are indeed linked to social constructions of male gender. If social constructions of masculinity can affect health behavior negatively, then perhaps it could act as a positive influence on health behavior as well. Another influence could be that means by which information regarding the method spread, such as Joe Rogan's podcast, primarily appeal to male audiences. The concentration of respondents in North America and Europe could be associated with factors such as internet connectivity rates in these areas, North American and European media attention for Wim Hof, and the Dutch origins of the method itself.

What should also not be overlooked is the possible influence of the persona of Wim Hof and his various media appearances on the popularity of the method. When considering the method as a potential health intervention, this factor could attract participants, but could also deter them when met with cynical reactions that may have formed in response to media appearances.

With the focus of the research and marketing surrounding the WHM being on health, it is not surprising that health consciousness is the primary motivation according to survey respondents, followed by the relief of physical and psychological problems. The possibility can therefore not be ruled out, that the expectation of improving health factors through the method may account for some amount of placebo-effect. It is also possible that those who are motivated to practice the WHM for health purposes are more likely to seek out the support of other practitioners through online communities such as the Facebook groups from which respondents were sampled. Considering the fad-like nature of the way in which the popularity of the WHM has increased, the high incidence of “curiosity” as a motivation is also not surprising.

Most of the respondents indicated practicing the method daily, or at least a few times a week. However, the observed gap in terms of length of practice (a decline after the 2-3 week mark, spiking at the year or more mark) could perhaps reflect a tendency towards dropping out of practicing the method, over time, with only the more dedicated practitioners persisting. A possible explanation is that the practice of the method requires some amount of discipline and involves discomfort. Thus, when

considering the application of the WHM as a health intervention, it is likely that it is only applicable in groups that are high in *intrinsic motivation* to perform such health behavior in spite of the associated discomfort. However, just over a third (37%) of the sample had been practicing for over a year, which is no small number. Furthermore, in light of the observation that some participants experienced social barriers as a factor that can prevent change, those who are likely to engage in the practice of the WHM may be individuals who are not as susceptible to *social norms* as others.

Changes

In terms of the positive changes that were reported by the sample, these include a wide range of changes across physical, psychological, social and spiritual domains. It should, however, be duly noted that these effects and their attribution to the WHM is based on self-reported data, and the influence of a placebo-effect can not be ruled out. The extent to which all of the various changes can actually be attributed to the method, and to what aspect of the method, is not entirely clear. Participants' attributions were often quite speculative, using terms like “perhaps” and “maybe.” This warrants further investigation into the possible causality of the method with regard to the reported effects.

The research conducted *specifically on the WHM* suggested potential positive effects on immunity (Groothuis et al., 2010; Kox et al., 2014); pain, stress, mood and feelings of well-being, circulation, respiration and the reduction of inflammation (Muzik et al., 2018). One participant pointed out the relationship between inflammation and depression as well, which is supported by research (Raison & Miller, 2017). This represents a possible pathway through which the WHM could affect mood. All of the aforementioned effects were reported by respondents, suggesting that they may represent actual real-life benefits of practicing the method. This is promising in that it suggests that the WHM could be a tool that is incredibly versatile in its application as a tool for health intervention.

The research studying *yoga, meditation and breathing* discusses the role of increased control over the physiology (Green & Green, 1977), allowing for a voluntary induction of a relaxation response (Benson et al. 1974; Wu and Lo, 2008). Frequently reported improvements in respiration, particularly asthma, corresponded with research indicating that controlled breathing can relieve asthmatic symptoms (Saxena & Saxena, 2009). Positive effects on mood and anxiety were also associated with these practices. (Sharma et al., 2016). This correlates strongly with interview participants' attributions of the effects of practicing the method to the same factors. The attribution of the reported effects to increased control over the physiology are particularly interesting, in that it represents what is likely one

of the two main pathways through which the WHM could induce positive changes on health, and is particularly of interest when considering interventions targeting anxiety and stress-related symptoms.

The research conducted with *cold water exposure* describes how it can lead to increased stress-tolerance (Siems et al., 1993) and relief of pain (Vaswani, Richard and Teiwani 1988). This also corresponds with participants' attributions, and represents the second of the two main pathways through which the WHM could positively affect health. The relationship with immunity is as of yet speculative (Janský et al., 1996). Cold exposure also facilitates the release of norepinephrine, which is believed to have positive effects on regulating emotions, and on symptoms of decreased alertness, low energy, problems of inattention, concentration, and cognitive ability, which were among some of the effects reported by respondents. Positive effects of cold exposure on mood and anxiety are also mostly speculative as of yet (Shevchuk, 2008; Jedema, 2008, Moret & Briley, 2011), although some participants did attribute these effects directly to the cold, in part to training their ability to relax under stress, thus combining cold-exposure with inward-attention. The reported effects on pain-relief by two participants who were suffering from chronic pain and the associated psychological distress, suggest that cold-exposure could be a potent tool for this target group. However, the present study highlights the possible effects of the combined application of controlling the stress-response while exposed to cold water through inward-attention and breath-control, potentially posing a more potent tool for various health-intervention applications than these isolated elements.

The relative lack of changes in the *social* domain were not frequently reported, which is unsurprising, considering that the method does not directly address this domain. With reference to the social domain, what is perhaps most interesting from a health promotion perspective is the reported increased self-confidence associated with overcoming challenges through the practice, and the aforementioned increased levels of control over the stress response can have a carry-over effect into social interactions. This suggests that the WHM could be a valuable tool for treating social anxiety.

Effects in the *spiritual* domain are not often addressed within the context of research surrounding the WHM but were frequently reported. These not entirely surprising, considering the incorporation of elements of yoga and meditation, which are first and foremost spiritual practices. On the other hand, it is not unlikely that a predisposition towards spirituality may influence individuals to seek out the WHM. Indeed, prior experience with spiritual practices was cited as a factor that promotes positive change in this regard. Spiritual experiences could be related to the release of beta-endorphins, which are released as a result of cold-exposure. Besides their effect on mood, higher levels of beta-endorphins have been observed during meditative, spiritual experiences as well (Mohandas, 2008) .

Participants attributed the spiritual benefits of the practice mostly to the practice of the breathing techniques. Thus, it could be rewarding to conduct studies that determine how the WHM breathing exercises can induce spiritual experiences. Such studies could combine subjective reporting and neuro-imaging, and could offer insight into the nature of spiritual experiences in general. The connection between breath and spiritual experiences is not recent, as exemplified by yogic practices of *pranayama*. These experiences do, however, correspond with some of the experiences reported in some of the research conducted with holotropic breathwork (Puente, 2014), which indicates that the practice of breathwork can lead to experiencing transcendent states of consciousness. Many participants reported that the practice of the WHM makes them more *aware* of their own inner world, particularly physically and emotionally. They indicated not only leads to a greater sense of spiritual connectedness, but makes them more aware of the effects of stress on the body as well. This could be significant, in that such awareness could prompt individuals to adopt more health-protective behaviors in the face of stress.

In terms of negative changes, a minority (15%) of respondents reported negative effects of practicing the method. However, these should not be overlooked. The most frequently reported negative change was difficulty falling asleep, which could be associated with the release of norepinephrine. Other negative experiences are related to injury resulting from pushing the practice too hard. This includes seizures; tinnitus; a sense of addiction to the practice; rashes or spots on their skin as a result of the practice and a single report of fainting and heart-rate issues. These reports of seizures, fainting and heart rate issues are particularly disconcerting, and the occurrence of these negative effects warrant further investigation in order to determine how safety can be ensured in the practice of these techniques. There were almost no negative changes reported by the individuals that participated in the interview phase of the study, but most of the negative changes that these participants did report were also attributed to pushing too hard in the practice. What is also notable is that discomfort and other obstacles that practitioners may encounter, while potentially being perceived as negative, are also indicated by many participants to be an essential and even necessary aspect of the method. As a health intervention, however, the fact remains that this may be an obstacle to uptake of and persistence in practicing the techniques.

What was notable regarding what participants identified to be factors that prevent or promote change was that individuals who have a need to self-manage their symptoms were particularly motivated to pick up and persist in their practice of the method. This could make the WHM an applicable health intervention for this target group. Especially when symptoms are treatment-resistant, individuals may be more likely to persist in the practice. The other factors that were cited by

participants - the significance of mindset, life circumstances and social factors - suggest that, as an intervention, it should be integrated into a lifestyle that promotes change through the practice and takes these factors into account.

Limitations

A number of limitations of the study should be mentioned, besides the limitations that are inherent to self-reported data and to the sampling procedure.

Firstly, while interview-participants were selected based on the presence of symptoms/conditions, the eventual sample consisted of participants with a relative degree of variety in terms of these symptoms/conditions, making it even more difficult to arrive at generalize-able conclusions regarding how the practice affects individuals suffering from the respective symptoms/conditions. Observations should thus be considered as means to guide future inquiries.

Secondly, there are other irregularities that characterize the sample, that may well reflect irregularities in the total population, such as individual differences in mode of instruction and differences in terms of the form and frequency with which the various components of the method, (cold-exposure, breathing exercises and yoga-exercises) are practiced, and if they are even practiced at all. Also, the practice was often supplemented with other practices, such as different forms of exercise, changes in diet, other yoga and meditation practices and other techniques. This means that it is difficult to define operationally what the WHM means in the context of this study, and subsequently, to arrive at definitive conclusions regarding the effects of the practice and what underlies them.

Strengths

In terms of the study's *strengths*, firstly, while much of the current research into the effects of Wim Hof's techniques are momentary snapshots of acute effects, the richness of data accumulated through this study can be incorporated into a theoretical framework that can be used to guide further research into the various possible effects of the WHM and its underlying mechanisms.

The mixed-methods approach is another strength, in that data gathered through quantitative means is supplemented with qualitative data to broaden the study's perspective. For example, participants in the interviews elaborate on the factors to which they attribute the changes they reported, including when they are not entirely sure if and to what extent they can attribute the effects to the

WHM. This also gives a voice to individuals who do report particularly significant impact from practicing the method, such as two participants (E and R) who describe a particularly remarkable rate of recovery and relief from injury, pain and associated psychological symptoms and conditions. Another example is the participant (L) who reports an equally remarkable rate of recovery from symptoms of progressive MS. These examples suggest that it could be well worth investigating the efficacy of the WHM in treating such symptoms, particularly as the practice is accessible, cost-effective, and medication-free, allowing for a large degree of self-management. This also make a proper assessment of the risks of the practice even more important.

Furthermore, the study has yielded insights into how the method can be improved from a user standpoint, namely to fulfill the need for more clarity, consistency and completeness in the information (particularly with reference to proper practice of the breathing technique, and the respective applications of the different breathing practices); more variety in the course content; tailoring programs to specific needs, particularly of those who are particularly prone to anxiety and over-exertion; and making it easier for individuals to become instructors.

Finally, the observation made through the present study - that the method could have observable impact across the physiological, psychological, social and spiritual domains – suggests that the WHM could be a very versatile tool, highlighting how physiology, psychology, social relating and spirituality act as interconnected, integral parts of human health.

Theoretical Framework

Based on the findings of the present study, a theoretical framework was developed in order to guide future research into the WHM. Tables 22, 23 and 24 display this framework with reference to the processes, internal and external factors that prevent/promote change, positive/negative interactions with other treatments and practices, as well as negative or uncomfortable experiences respectively. In terms of processes, due to the multitude of results, only the most important ones are incorporated into the framework.

Table 22 *Theoretical framework of the processes inherent to the WHM underlying change*

Processes	First-level outcomes	Second-level outcomes
Cold Exposure	Tolerance of Discomfort and mental strengthening	Lowered stress and anxiety Lowered social anxiety Improved confidence Improved cold-tolerance
	Control	Lowered stress and anxiety Lowered social anxiety Improved confidence Improved strength and endurance Improved cold-tolerance
	Pain relief/lowered inflammation	Improved sleep Improved mood Improved overall well-being
	Endorphin and Endocannabinoid release	Improved mood and sense of well-being Reduced pain and inflammation Better circulation and respiration due to vaso- and broncho-dilation Improved regulation of emotions
	Norepinephrine release	Improved mood Improved focus and awareness leading to more awareness of emotions, thoughts and bod, attentional control and possibly spiritual connectedness to self and nature as well Improved cognition Improved energy levels Improved executive function leading to better social functioning
Visualization	Control	Lowered stress and anxiety Lowered social anxiety Improved confidence Improved strength and endurance Improved cold-tolerance
Breathing exercises	Improved mood	Improved mood
	Spiritual experiences	Connectedness to Self, Nature and a Higher Truth
	Pain-relief/lowered inflammation	Improved sleep Improved mood
	Control	Lowered stress and anxiety Lowered social anxiety Improved confidence
Yoga-exercises	Improved strength	Improved mobility
	Improved flexibility	Improved mobility
	Awareness of the body	Feedback on stress-levels
Social interactions – online and offline		Sense of community

Table 23 *Theoretical framework of the factors that prevent/promote change according to participants*

Factors that promote change		Factors that prevent change	
Internal	External	Internal	External
Mindfulness	Financial stability	(High) expectations	Lack of time
Discipline	Career satisfaction	Lack of discipline	Wim Hof (-)
Motivation	Ability to rely on social resources	Overall health (-)	Social barriers (pressure, negativity, cultural expectations)
Overall health (-)	Wim Hof (+)		Climate (lack of sufficiently cold water)
Prior spiritual experiences	Accessibility of the method		Language
Knowledge of WHM/human physiology	Simplicity of the method		
	Time-efficiency of the method		
	Cost-effectiveness of the method		

Table 24 *Theoretical framework of positive and negative interactions with other treatments/practices according to participants*

Positive interactions	Negative interactions
(Plant-based) diet Supplementation ACT Alexander technique Buteyko method Lifestyle changes Exercise Yoga and meditation	Medication (SSNI's and marijuana)

Table 25 *Negative or uncomfortable experiences and their attributions according to participants*

Attribution	Outcome
Being too energized	Lack of sleep
Pushing too hard	Seizures Stiffness and soreness in the body Injury Exhaustion (Almost) fainting
Emotions resurfacing	Release (crying, dry-heaving, convulsions) Discomfort
Cold exposure	Discomfort
Breathing exercise	Fear Uncomfortable sensations
Unknown	Tinnitus Rashes Heart-rate issues

Conclusions

The WHM could be a useful tool for health promotion, in that it appears to attract primarily men, whereas most health interventions tend to attract females. The relationship between social constructions of masculinity and the uptake of health behavior poses relevant questions for future research to take into account. Motivation to practice the WHM out of health consciousness and curiosity could reflect its status as a health fad, and motivation to practice the method out of a need to manage certain symptoms and conditions, particularly severe ones, might contribute to positive outcomes through the practice. The WHM could be useful when targeting groups that are characterized by a need to self-manage are resistant to other forms of treatment.

In general, users do experience changes that are mostly positive and that they attribute to their practice of the WHM. They mention a very wide variety of noted positive effects, and attributed these effects primarily to an increased ability to tolerate discomfort and exercise control over their

physiology, particularly the stress-response. The reported physical and psychological effects appear mostly consistent with existing research. The most frequently reported negative change was a negative impact on *sleep*, although other uncomfortable symptoms like tinnitus, rashes, heart-rate issues and even seizures were reported. These require further research before considering its application as a health intervention.

The present study has incorporated the findings into a theoretical framework to help guide future research. There is a need for high-quality studies to explore the various effects reported by practitioners, and particularly their underlying processes. Of particular interest would be comparative studies regarding the effects of the method on anxiety and mood disorders. For example, a study that compares the effects of inward-attention by itself, with a combination of cold-exposure and inward-attention on the ability to voluntarily induce a relaxation response could yield important insights.

When studies measure the effects of the WHM, there is a clear need to have a solid operational definition of what “the WHM” consists of, and to take into account the effects of other practices, particularly when they overlap significantly (e.g. when other breathing techniques or yoga/meditation practices are incorporated). This means defining clearly which components are practiced, how they are practiced and how frequently. However, it may also prove valuable to evaluate the effects of the various components of the method separately, and in varying dosages, including the type and intensity of the cold-exposure. It is likely that the method's ability to effect change relies on an interplay between its elements. A potentially valuable tool for gathering data in future research is the WHM's mobile application, which can be used to gather user-data.

Finally, the observation made through the present study, that the method could have observable impact across the physiological, psychological, social and spiritual domains suggests that it could be a versatile tool for health interventions, influencing the physiological; psychological; social; and spiritual domains that combine to constitute human health.

References

- Benson, H., A. Mazetta, B., A. Rozner, B., & M. Klemchuk, H. (1974). Decreased Blood Pressure in Pharmacologically Treated Hypertensive Patients Who Regularly Elicited the Relaxation Response. *The Lancet*, 303(7852), p. 289–291.
- Cheung, S.S., Daanen, H.A. (2012). Dynamic Adaptation of the Peripheral Circulation to

- Cold Exposure. *Microcirculation*, 19(1). p. 65-77.
- Courtenay, W.H. (2000). Constructions of Masculinity and Their Influence on Men's Well-Being: A Theory of Gender and Health. *Social Science & Medicine*. 50 (2000). p. 1385-1401.
- Cypess, A. M., Lehman, S., Williams, G., Tal, I., Rodman, D., Goldfine, A. B., . . . Kahn, C. R. (2009). Identification and Importance of Brown Adipose Tissue in Adult Humans. *New England Journal of Medicine*, 360(15), p. 1509–1517.
- Green, E., Green, A. (1977). *Beyond Biofeedback. Chapter II: Self-Regulation: East and West*, pp. 197-218. Knoll Publishing Co.
- Groothuis, J.T., M. Eijsvogels, T., R. Scholten, R., H. Thijssen, D., & T. Hopman, M (2010). Can meditation influence the autonomic nervous system? A case report of a man immersed in crushed ice for 80 minutes.
- Janský, L., Pospíšilová, D., Honzová, S., Uličný, B., Šrámek, P., Zeman, V., & Kamínková, J. (1996). Immune system of cold-exposed and cold-adapted humans. *European Journal of Applied Physiology and Occupational Physiology*, 72-72(5-6), 445–450.
- Kang, J., Jeong, D., & Choi, H. (2016). Effect of exhalation exercise on trunk muscle activity and oswestry disability index of patients with chronic low back pain. *Journal of Physical Therapy Science*, 28(6), 1738–1742.
- Kox, M., Van Eijk, L. T., Zwaag, J., Van den Wildenberg, J., Sweep, F. C. G. J., Van der Hoeven, J. G., & Pickkers, P. (2014). Voluntary activation of the sympathetic nervous system and attenuation of the innate immune response in humans. *Proceedings of the National Academy of Sciences*, 111(20), 7379–7384.
- Kox, M., Stoffels, M., Smeekens, S. P., Van Alfen, N., Gomes, M., Eijsvogels, T. M., . . . Pickkers, P. (2012). The Influence of Concentration/Meditation on Autonomic Nervous System Activity and the Innate Immune Response. *Psychosomatic Medicine*, 74(5), 489–494.
- Miller, A. H., & Raison, C. L. (2016). The role of inflammation in depression: from evolutionary imperative to modern treatment target. *Nature Reviews Immunology*, 16(1), 22–34.
- Mohandas, E. (2008). Neurobiology of Spirituality. *Mens Sana Monographs*, 6(1), 63–80.
- Moret, C., & Briley, M. (2011). The importance of norepinephrine in depression. *Neuropsychiatric Disease and Treatment* 7.Suppl 1 (2011): 9–13.
- Murchison, C. F., Zhang, X., Zhang, W., Ouyang, M., Lee, A., & Thomas, S. A. (2004). A Distinct Role for Norepinephrine in Memory Retrieval. *Cell*, 117(1), 131–143.
- Muzik, O., Reilly, K. T., & Diwadkar, V. A. (2018). “Brain over body”—A study on the willful regulation of autonomic function during cold exposure. *NeuroImage*, 172, 632–641.

- Park, C. L., Braun, T., & Siegel, T. (2015). Who practices yoga? A systematic review of demographic, health-related, and psychosocial factors associated with yoga practice. *Journal of Behavioral Medicine*, 38(3), 460–471.
- Patel, C., G. Marmot, M., Carruthers, M., Hunt, B., & Patel, M. (1985). Trial of relaxation in reducing coronary risk: four year follow up. *British Medical Journal (Clinical Research Ed.)*, 290(6475), 1103–1106.
- Puente, I. (2014). Holotropic Breathwork Can Occasion Mystical Experiences in the Context of a Daylong Workshop. *Journal of Transpersonal Research*, Vol. 6 (2), 40-50.
- Saxena, T., & Saxena, M. (2009). The effect of various breathing exercises (pranayama) in patients with bronchial asthma of mild to moderate severity. *International Journal of Yoga*, 2(1), 22-25.
- Seale, P., & Lazar, M. A. (2009). Brown Fat in Humans: Turning up the Heat on Obesity. *Diabetes*, 58(7), 1482–1484.
- Sharma, A., Barrett, M. S., Cucchiara, A. J., Gooneratne, N. S., & Thase, M. E. (2016). A Breathing-Based Meditation Intervention for Patients With Major Depressive Disorder Following Inadequate Response to Antidepressants. *The Journal of Clinical Psychiatry*, 78(01), 59–63.
- Shevchuk, N. A. (2008). Adapted cold shower as a potential treatment for depression. *Medical Hypotheses*, 70(5), 995–1001.
- Siems, W. G., Van Kuijk, F. J., Maass, R., & Brenke, R. (1994). Uric acid and glutathione levels during short-term whole body cold exposure. *Free Radical Biology and Medicine*, 16(3), 299–305.
- Srámek, P., Simecková, M., Janský, L., Savlíková, J., & Vybíral, S. (2000). Human physiological responses to immersion into water of different temperatures. *European Journal of Applied Physiology*, 81(5), 436–442.
- Vaswani, K. K., Richard, C. W., & Tejawani, G. A. (1988). Cold swim stress-induced changes in the levels of opioid peptides in the rat CNS and peripheral tissues. *Pharmacology Biochemistry and Behavior*, 29(1), 163–168.
- Wu, S., & Lo, P. (2008). Inward-attention meditation increases parasympathetic activity: a study based on heart rate variability. *Biomedical Research*, 29(5), 245–250.

Appendices

Appendix 1 - Informed Consent

Introduction

The present study is an inquiry into the effects of practicing the WHM. It consists of two phases, and participation in both phases is completely optional and may be withdrawn at any time.

The first phase consists of a survey that consists of a few questions about your practice of the WHM, and your experiences with the method, as well as how it has affected you.

If you so choose, you may also choose to participate in the second phase of the research, which consists of a single interview that will take about 1 hour. This can be conducted through Skype or other online means of communication. During this interview, we will discuss more in-depth about your experience of the possible changes you have experienced as a result of your practice of the WHM. If you are willing to participate, please indicate so in the survey and provide your contact details so that we can schedule the interview, should you meet the inclusion criteria.

Note that the data you provide will be kept confidential, and should they be used in scientific publications or made public in any other manner, they will be made completely anonymous. Your personal data will not be disclosed to third parties without your express permission.

Informed Consent

‘I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research as described above. My questions have been answered to my satisfaction. I agree out of my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from the experiment at any time. If my research results are to be used in scientific publications or made public in any other manner, then they will be made completely anonymous. My personal data will not be disclosed to third parties without my express permission. If I request further information about the research, now or in the future, I may contact:

Jamie Allen

Telephone: +31 6 49954194

E-mail: j.j.allen@student.utwente.nl

If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente:

Drs. L. Kamphuis-Blikman

P.O. Box 217, 7500 AE Enschede (NL)

Telephone: +31 (0)53 489 3399

E-mail: l.j.m.blikman@utwente.nl.

Signed in duplicate:

.....

Name subject Signature

I have provided explanatory notes about the research. I declare myself willing to answer to the best of my ability any questions which may still arise about the research.'

.....

Name researcher Signature

Appendix 2 – Online Survey

For the purpose of this study, here is a brief survey about your experience with practicing the WHM.

Your answers will be kept anonymous.

1. How did you hear about the WHM?

Word of mouth; YouTube; Facebook and other social media; Books: Other media, namely ____

2. Have you tried the WHM?

Yes; No

3. What were your motivations or expectations for trying the WHM?

*Relief of physical/mental problems; Curiosity; Health consciousness; A specific goal, namely ____ ;
none of the above*

4. How long have you been practicing the WHM for?

Have not tried it yet; 0 – 1 month; 2-3 months; 4-5 months; 6-7 months; 8-9 months; 10-11 months; a

year or more; Several years, namely ____

5. How often do you practice the WHM?

Not at all; Once in a while; Once a week; A few times a week; Daily; Multiple times a day

6. Have you experienced any changes as a result of practicing the WHM?

Yes; No

7. Have you experienced any **positive** changes that you can attribute to your practice of the WHM on the following? Please tick any that apply:

Sleep; Digestion; Circulation; Respiration; Energy levels; Strength; Flexibility; Balance; Body temperature; Immunity; Physical stress and tension; Pain; Sex; Mood; Focus and awareness; Stress and Anxiety; Addiction; Overall well-being; Relationships with friends; Relationships with family; Relationships with significant others; Social interactions; Social anxiety; Community activism; Sense of spiritual connectedness to the Self; Sense of spiritual connectedness to others; Sense of spiritual connectedness to Nature; Sense of spiritual connectedness to a higher truth (God, the Universe, etc.); Others, namely ____; None of the above

8. Have you experienced any **negative** changes that you can attribute to your practice of the WHM on the following? Please tick any that apply:

Sleep; Digestion; Circulation; Respiration; Energy levels; Strength; Flexibility; Balance; Body temperature; Immunity; Physical stress and tension; Pain; Sex; Mood; Focus and awareness; Stress and Anxiety; Addiction; Overall well-being; Relationships with friends; Relationships with family; Relationships with significant others; Social interactions; Social anxiety; Community activism; Sense of spiritual connectedness to the Self; Sense of spiritual connectedness to others; Sense of spiritual connectedness to Nature; Sense of spiritual connectedness to a higher truth (God, the Universe, etc.); Others, namely ____; None of the above

9. Were/are you suffering from any specific complaints/conditions prior to beginning your practice of the WHM? If yes, please specify:

Yes, namely ____;No

10. Would you be willing to participate in a Skype interview about your experience with practicing the WHM ? This interview will last about an hour can be scheduled at your convenience within the next 2 months.

Yes;No

(If the respondent answers “yes” to question 10, he or she will be asked to fill in an e-mail address so that they can be contacted).

Appendix 3 – Interview Schedule

Thank you very much for your willingness to participate. This interview will last about an hour to an hour and a half. The major topics of this interview are any changes you have noticed you began practicing the WHM, what you believe may have brought about these changes, and helpful and unhelpful aspects of the method. The main purpose of this interview is to allow you to tell me about your experience with the method in your own words. This information will help me to understand better how the method works; it may also help me to give suggestions for improving the method. The information you give me will not be shared with anyone without your permission. This interview is recorded for later transcription. Please provide as much detail as possible. Are there any questions before we begin?

1. General Questions: [about 5 min]

1a. How are you doing now in general?

1b. How has it been for you since you began practicing the WHM?

1c. What medications are you currently on? (interviewer: record on form, including dose, how long, last adjustment, herbal remedies) If none, were you on medications before you began practicing the WHM?

1d. What made you begin practicing the WHM? What goals did you have in mind?

1e. How regularly do you practice the method? What components do you practice?

2. Changes: [about 10 min]

2a. In your response to the survey, you have listed the following positive changes as a result of your practice of the WHM [Here, the interviewer reads out the list of positive changes as indicated by the participant on his/her response to question 6 of the survey]

Is there anything you would like to add to this list?

2b. You also reported the following negative changes

[Here, the interviewer reads out the list of negative changes as indicated by the participant on his/her response to question 7 of the survey]

Is there anything you would like to add to this list?

2c. You have also mentioned that you were or are suffering from the following [Here, the interviewer reads out the list of responses to question 8 of the survey]

Is there anything you would like to add to this list?

2e. Is there anything that you wanted to change that hasn't since you began your practice?

3. Attributions: [about 5 min] In general, what do you think has caused the various changes you described? In other words, what do you think might have brought them about? (Including things both part of practicing the method and not part of the method)

4. Resources:

4a. What personal strengths do you think have helped you deal with problems and obstacles since you began your practice of the method? (what you're good at, personal qualities)

4b. What things in your current life situation have helped you deal with your problems and obstacles since you began your practice? (family, job, relationships, living arrangements)

5. Limitations:

5a. What things about do you think have made it harder for you to deal with problems and obstacles since you began practicing the method? (things about you as a person)

5b. What things about your environment have made it harder for you to deal with your problems and obstacles since you began practicing the method? (family, job, relationships, living arrangements)

6. Helpful Aspects: [about 10 min] Looking back on your practice of the WHM, what would you

say was helpful about your practice? Please give examples. (*For example, general aspects, specific events*)

7. Problematic Aspects: [about 5 min]

7a. Looking back on your practice now, is there anything about the method that you would say was hindering, unhelpful, negative or disappointing for you? (*For example, general aspects. specific components*)

7b. Were there things in the practice of the method that were difficult or painful but are now OK or perhaps helpful? What were they?

7c. Was anything missing from the method? (*What would have made the method or your practice of it more effective or helpful?*)

8. Suggestions: [about 5 min] Do you have any suggestions for me, regarding the research or the method itself? Do you have anything else that you want to tell me?