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# Measuring mindfulness—the Freiburg Mindfulness Inventory (FMI)

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**Abstract**

Mindfulness, a concept originally derived from Buddhist psychology, is essential for some well-known clinical interventions. Therefore an instrument for measuring mindfulness is useful. We report here on two studies constructing and validating the Freiburg Mindfulness Inventory (FMI) including a short form. A preliminary questionnaire was constructed through expert interviews and extensive literature analysis and tested in 115 subjects attending mindfulness meditation retreats. This psychometrically sound 30-item scale with an internal consistency of Cronbach alpha = .93 was able to significantly demonstrate the increase in mindfulness after the retreat and to discriminate between experienced and novice meditators. In a second study we broadened the scope of the concept to 86 subjects without meditation experience, 117 subjects with clinical problems, and 54 participants from retreats. Reducing the scale to a short form with 14 items resulted in a semantically robust and psychometrically stable (alpha = .86) form. Correlation

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with other relevant constructs (self-awareness, dissociation, global severity index, meditation experience in years) was significant in the medium to low range of correlations and lends construct validity to the scale. Principal Component Analysis suggests one common factor. This short scale is sensitive to change and can be used also with subjects without previous meditation experience.
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## 1. Introduction

The popularity of Mindfulness Based Stress Reduction (MBSR) developed by Kabat-Zinn (1991, 1994), and positive research results which demonstrate its effectiveness (Davidson et al., 2003; Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Barney, 1985, 1987; Kabat-Zinn, Massion, Kristeller, & Peterson, 1992; Kabat-Zinn et al., 1998; Majumdar, Grossman, Dietz-Waschkowski, Kersig, & Walach, 2002; Miller, Fletcher, & Kabat-Zinn, 1995) contribute to the increasing interest in mindfulness. A meta-analysis of studies testing the clinical effectiveness of MBSR found a significant effect size of $d = 0.5$ (Grossman, Schmidt, Niemann, & Walach, 2004). Dialectical Behaviour Therapy for borderline patients (Bohus et al., 2000) or Teasdale's concept of cognitive therapy (Segal, Williams, & Teasdale, 2002; Teasdale, Segal, & Williams, 1995; Teasdale et al., 2000) for depression employ mindfulness as a therapeutic concept.

The mindfulness concept is central in Buddhist teachings about the importance of consciousness (Hayes, 2003). It describes a virtue to be cultivated by meditation and practice in everyday life, and refers to an alert mode of perceiving all mental contents—perceptions, sensations, cognitions, affects. Another important element is a warm and friendly, accepting and non-judgmental attitude towards those elements of our mind. Suspending categorical judgments, which normally follow every perception rather quickly, is an integral part of mindfulness. A recent consensus description of mindfulness says:

> "We see mindfulness as a process of regulating attention in order to bring a quality of non-elaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance. We further see mindfulness as a process of gaining insight into the nature of one's mind and the adoption of a de-centered perspective... on thoughts and feelings so that they can be experienced in terms of their subjectivity (versus their necessary validity) and transient nature (versus their permanence)." (Bishop et al., 2004, p. 234).

It thus seems useful to measure mindfulness either as a target variable of clinical interventions, as a moderating variable, and perhaps even as a personality trait, and thus we constructed a measurement instrument.

Several other attempts of constructing such a scale have recently been reported, which have run in parallel to our own and unknown by us at the time of our initial work (Buchheld, 2000; Buchheld & Walach, 2001, 2002). A closer analysis of these attempts of measuring mindfulness reveals a different conceptualisation, and thus we feel confident that our own work can only stimulate research, conceptualisation and further scientific work.

### 1.1. Other measures of mindfulness

1. Brown and Ryan (2003) presented a *Mindfulness and Attention Awareness Scale* (MAAS) with a series of thorough validation studies that testify validity and sensitivity to change, apart from good reliability. However, the scale places a focus on attention and awareness, and thus leaves out some other aspects of mindfulness, like the non-judgmental, accepting attitude, dis-identification, insightful understanding, or an attitude of having no specific goals.
2. Bishop and colleagues have developed the *Toronto Mindfulness Scale* (Bishop et al., 2003), which measures mindfulness after meditation as a state-like construct. This unidimensional scale consists of 10 items. It was validated in 270 meditators (reliability alpha .76) and is capable to discriminate between various levels of meditation experience and non-meditators.
3. Recently Baer, Smith, and Allen (2004) developed the *Kentucky Inventory of Mindfulness Scale* (KIMS). This scale is based largely on the conceptualization of mindfulness as applied in Dialectical Behavioral Therapy (DBT). The KIMS comprises 39 items and consists of four scales with each assessing one of four mindfulness skills. The internal consistency of these scales ranges from alpha .83 to .91. It was validated in two student samples and a small clinical sample. The scale does not cover all facets of the mindfulness construct. So far the scale was not tested on a sample with mindfulness experience (e.g. meditators) or a larger clinical sample.

## 2. Study 1: Development of the Freiburg Mindfulness Inventory (FMI)

### 2.1. Method

The development of the FMI is reported in detail elsewhere (Buchheld, Grossman, & Walach, 2001). Following a review of the literature, potential items describing mindfulness were presented to experts and rated by them. Items were then subjected to a conventional psychometric analysis and a Principal Component Analysis. The design of the study was a pre-post measurement of 115 individuals attending Vipassana retreats. Retreats consisted of at least 8 h meditation in silence per day.

### 2.2. Results

Psychometric analysis suggested a 30 item instrument with high internal consistency at both measurements (Cronbach's alpha = .93/.94), sufficient homogeneity (mean $r_{it} = .32/.33$), no flooring or ceiling effects, a reasonably normal distribution, and a significant mean change ($p < 0.001$; Wilcoxon test) in mindfulness from before ($m_{t1} = 77.12$; $SD_{t1} = 12.45$) to after the retreat ($m_{t2} = 89.4$; $SD_{t2} = 11.33$). Inspection of the unrotated factor matrix reveals that all items have loadings higher than .44 on the first factor at the first, and higher than .57 at the second measurement. The first factor explains more than 35% of the variance. Thus the dimensionality of the construct is questionable.

### 2.3. Preliminary conclusion

The FMI is a consistent and reliable scale. It captures several important aspects of mindfulness, which probably is one-dimensional. Further validation in a diverse sample, not necessarily informed about mindfulness through Buddhist retreats, was desirable.

## 3. Study 2: Validation and replication

The aims of this study were the following:

1. To replicate the results of the first study in a different sample of meditators.
2. To study the relation of mindfulness to potentially similar constructs, such as self-awareness or dissociation, as well as to psychological distress.
3. To find out whether the FMI can be applied successfully to persons without any theoretical knowledge of mindfulness.
4. To construct a semantically robust version of the FMI, potentially as a short form.

### 3.1. Method

We used the following instruments:

*FMI—Freiburg Mindfulness Inventory* as described above.

*SAM—Self-Awareness Questionnaire.* It measures dispositional self-awareness as a personality trait (Filipp & Freudenberg, 1989), and is a modification of the self-consciousness scale (Fenigstein, Scheier, & Buss, 1975). Self-awareness was introduced by Duval and Wicklund (1972). It describes the faculty to focus on oneself as an object and to use this information as motivation for action. In contrast to mindfulness, self-awareness refers exclusively to cognitions and meta-cognitions. This questionnaire measures self-awareness as *private self-awareness* which contains meta-cognitions regarding the own private self (e.g. "It is important for me to know my needs"), and *public self-awareness* which refers to perceiving oneself as regarding to others (e.g. "I take care to present myself well"). We hypothesized that mindfulness would correlate moderately positively with private self-awareness and that it correlates negatively with public self-awareness.

*FDS—Questionnaire of Dissociative Symptoms* (Freyberger, Spitzer, & Stieglitz, 1999). Dissociation seems to be the opposite of mindfulness, containing symptoms of amnesia, automaticity without conscious control and the dissociation of cognitive and emotional elements. This German scale measures dissociation in the four dimensions amnesia, absorption, de-realisation and conversion based on the Dissociative Experiences Scale (DES) by Bernstein and Putnam (1986). For obvious reasons we expected a negative correlation.

In addition, we used the *SCL-90—Symptom Checklist* (Derogatis, 1977) in its validated German version (Franke, 1995). This is a well-known instrument to assess psychological distress. If mindfulness is at all clinically relevant, we would expect a negative correlation between mindfulness and psychological distress.

*3.1.1. Samples*

Participants were invited to participate by personal presentation and in writing. If they consented they were handed out a package of questionnaires and filled them in individually at their convenience (duration about 20 min). Questionnaires were later collected or mailed back. Owing to the ethnic situation in Freiburg only participants of Caucasian race are included.

*3.1.2. Participants in retreats*

We recruited 85 participants in Vipassana retreats, 29 men and 56 women. The mean age was 43.6 years (SD 9.32), with an average meditation intensity of 2–3 times per week and an average of 85 months of experience with meditation. Sixty five of them also filled in the post-questionnaire after the retreat.

*3.1.3. Participants from the general population*

Eighty-five subjects were recruited in public lectures, creative courses, in seminars offered by the adult education institutions and by word of mouth. Forty-seven of them were female, 38 were male, with a mean age of 34.4 years (SD 12). Eight of these persons had meditation experience. Care was taken to not only include students in the study, but also subjects from the normal population.

*3.1.4. Clinical sample*

Altogether 117 subjects from diverse clinical backgrounds participated; due to the special conditions in clinical settings, socio-demographic data were only available for 66 patients. Of these 52 were women and 14 were men. Among them were 28 borderline patients from the respective inpatient program of the psychiatric university hospital, as well as patients from other in- and out-patient facilities of psychotherapy programs and psychiatric hospitals with a mix of diagnoses, excluding psychotic patients. Subjects of the clinical sample only filled in the SCL-90 in addition to the FMI, but not the other questionnaires. This was due to the concern of participating institutions about burdening patients with questionnaires. It was also not possible to collect diagnostic information.

Average education was at least 13 years of schooling in the samples of retreat participants and participants from the general population, while it was 10 years in the clinical sample.

*3.2. Results*

*3.2.1. Psychometric analysis*

Results of the psychometric analysis are given in Table 1. We found that when considering the full sample some items did not separate well (correlation between item and scale $r_{it} < .30$). Thus we dropped six items and repeated the analysis, which yielded acceptable results (Table 1). If the sample that has no meditation background is analysed separately, some items emerge, which lower the reliability of the scale. When all items are removed that do not have acceptable item statistics in the general sample, excluding subjects with meditation experience, a short form consisting of 14 items emerges, which seems semantically robust and statistically sound (Table 1). If this 14 item version is again analysed in the full sample (Table 1, fourth column) the scale exhibits acceptable

Table 1
Statistical properties of the scale in Study 2: full scale and reduced versions

| | Full scale (30 items) | Reduced scale (24 items) | Short form (14 items) | Short form (14 items) | Short form (14 items) |
|---|---|---|---|---|---|
| Sample | Full | Full | Normal | Full | Clinical |
| $N$[a] | 225 | 232 | 74 | 246 | 103 |
| Mean | 75.06 | 60.02 | 37.24 | 34.52 | 31.17 |
| SD | 11.38 | 10.59 | 5.63 | 6.77 | 7.18 |
| Kurtosis | −.24 | −.23 | .08 | −.13 | .36 |
| Skewness | −.33 | −.31 | −.4 | −.32 | −.32 |
| Range (theoretical) | 46–103 (30–120) | 35–85 (24–96) | 25–51 (14–56) | 18–52 (14–56) | 18–52 (14–56) |
| Cronbach's alpha | .87 | .89 | .79 | .86 | .86 |
| Mean item-inter-correlation | .18 | .26 | .21 | .30 | .31 |

[a] Only first measurement; data sets without missing data.

psychometric properties. These properties do not change when analysed only in the clinical sample or the subjects with meditation experience (data not shown).

This robust short form is displayed in Appendix A (for the full form see Buchheld et al., 2001). Its 14 items can be considered the core of the mindfulness construct. Correlation of this short form with the long 30 item version is $r = .95$. Reliability is alpha = .86.

### 3.2.2. Dimensionality

A Principal Component Analysis was calculated across all 30 items in 156 participants in retreats combined from both studies at measurement 1 with complete data. A four factor version with 51.2% explanation of variance after Varimax rotation emerges (eigenvalues: 9.4, 2.3, 2.2, 1.5; for loadings and factor association see Table 2). The original pattern is only approximately reproduced (Table 2, last column). Especially those items contained in the short version are not readily separable and have considerable second loadings (Table 2, items in italics). This speaks in favour of one general factor and against a clear dimensionality of the construct. We therefore also conducted a hierarchical-oblique rotation (Table 2, shaded columns). All factors load comparatively high on the common component (loadings between .34 and .60), while loadings on the specific, primary factor are below .60 for all but one item. Correlations between the factors are between $r = .48$ and $r = .60$. The factors can be tentatively identified as "Mindful Presence", "Non-judgemental Acceptance", "Openness to Experiences", and "Insight". However, due to the comparatively high inter-correlations of the factors, the high secondary loadings on the common factor, and ten substantial double loadings in the orthogonal solution, we do not recommend splitting the construct into distinct components. The same can be found when analysing the short version (Table 2, shaded columns, loadings after oblique rotation in brackets). Thus, the analysis of dimensionality shows that we must see mindfulness as a general construct that has some interrelated facets.

### 3.2.3. Validation of the construct

Results of construct validation were according to our hypotheses and are presented in Table 3.

Table 2
Principal Component Analysis of all 30 items in the sample of 156 participants in Vipassana meditation retreats

| Item | Factor | Factor loading after orthogonal rotation | Secondary (common) factor loading after oblique rotation | Primary (specific) loading after oblique rotation | Deviations against first analysis |
|---|---|---|---|---|---|
| **18. I perceive my feelings and emotions without having to react to them** | **F1/P1** | **.72** | **.60** | **.53** | |
| 9. I easily get lost in my thoughts and feelings | F1/P1 | .67 | .39 | .55 | |
| 11. I watch my thoughts without identifying with them | F1/P1 | .67 | .53 | .51 | |
| *25. I watch my feelings without getting lost in them* | F1/P1 | .64 | .56 (.57) | .46 (.41) | |
| 13. I let my thoughts run away with me | F1/P1 | .63 | .42 | .49 | |
| 12. I observe how my thoughts come and go | F1/P1 | .62 | .34 | .51 | |
| 14. I am aware how brief and fleeting my experience is | F1/P1 | .62 | .44 | .48 | F4 |
| 23. I observe how experiences arise and fade away | F1/P1 | .61 | .49 | .46 | F4 |
| *29. I am impatient with myself and with others* | F1/P1 | .59 | .38 (.47) | .47 (.55) | F2 |
| 2. I know that I am not identical to my thoughts | F1/P1 | .50 | .45 | .36 | |
| 10. I notice that I don't need to react to whatever pops into my mind | F1/P1 | .51 | .57 | .33 | F4 |
| | F4 | .43 | | | |
| *4. When I notice an absence of mind, I gently return to the experience of the here and now* | F1/P1 | .52 | .53 (.58) | .35 (.45) | |
| | F3 | .41 | | | |
| **19. I accept myself as I am** | **F2/P2** | **.80** | **.48** | **.63** | |
| **5. I am able to appreciate myself** | **F2/P2** | **.76** | **.52 (.54)** | **.58 (.43)** | |
| **24. I am friendly to myself when things go wrong** | **F2/P2** | **.75** | **.57 (.63)** | **.55 (.55)** | |
| *17. I see my mistakes and difficulties without judging them* | F2/P2 | .63 | .47 (.53) | .47 (.43) | |
| *1. I am open to the experience of the present moment* | F2/P2(P1) | .50 | .57 (.56) | .30 (.34) | |
| *26. In difficult situations, I can pause without immediately reacting* | F2/P2 | .43 | .55 (.55) | .24 | F1 |
| | F1(P4) | .32 | | (.37) | |
| *28. I experience moments of inner peace and ease, even when things get hectic and stressful* | F2/P2 | .40 | .56 (.59) | .20 | F3 |
| | F1/P1 | .34 | | .16 | |
| | F3(P4) | .25 | | (.59) | |

(*continued on next page*)

Table 2 (*continued*)

| Item | Factor | Factor loading after orthogonal rotation | Secondary (common) factor loading after oblique rotation | Primary (specific) loading after oblique rotation | Deviations against first analysis |
|---|---|---|---|---|---|
| 7. I remain present with sensations and feelings even when they are unpleasant or painful | F3/P3 | .68 | .39 | .64 | |
| 6. I notice how my emotions express themselves through my body | F3/P3 | .67 | .53 | .51 | F1 |
| 20. I examine unpleasant, as well as pleasant, sensations and perceptions | F3/P3 | .67 | .54 | .50 | |
| *22. I accept unpleasant experiences* | F3/P3 | .47 | .60 (.56) | .28 (.28) | F3 |
| | F4 | .30 | | | |
| 27. I avoid unpleasant feelings | F3/P3 | .40 | .45 | .25 | F3 |
| | F2/P2 | .37 | | .22 | |
| | F1 | .30 | | | |
| *21. I feel connected to my experience in the here-and-now* | F3/P3 | .57 | .52 | .40 | F1 |
| | F1(P1) | .35 | (.57) | (.40) | |
| | F2 | .34 | | | |
| *3. I sense my body, whether eating, cooking, cleaning or talking* | F3/P3 | .52 | .51 | .36 | F1 |
| | F1(P4) | .27 | (.51) | (.36) | |
| *8. I pay attention to what's behind my actions* | F3/P3 | .44 | .37 (.26) | .33 (.82) | F3 |
| | F4/P4 | .44 | | .33 | |
| **16. I see how I create my own suffering** | **F4/P4** | **.72** | **.47** | **.58** | F3 |
| 15. I consider things from different perspectives | F4/P4 | .55 | .45 | .41 | |
| *30. I am able to smile when I notice how I sometimes make life difficult* | F4/P4 | .56 | .51 | .40 | F2 |
| | F2/P2 | .43 | (.52) | .25 (.47) | |

Bold: marker items with loadings of >.70; Italics: items contained in the short version; F = factor after orthogonal rotation; P = primary (i.e. specific) factor after oblique rotation; Shaded columns: results of oblique rotation (in brackets: loadings of analysis of short form); items sorted according to factor loadings after orthogonal rotation; numbers refer to sequence in the questionnaire.

Thus, private self-awareness is part of, but certainly not fully identical with, mindfulness. Dissociation is, as expected, one aspect of being not mindful, but again is not exhaustive. All those constructs cover only maximally 10% of the common variance and thus show some overlap, but no redundancy. Apart from that, the correlations are nearly identical for the short and the long version of the FMI. Subjects who meditate frequently have higher mindfulness scores than those that meditate less or not at all ($p = .013$; Kruskall Wallis). Subjects from the clinical sample (FMI

Table 3
Correlations of FMI with other constructs, full sample

| | Full version | Short version |
|---|---|---|
| SAM private self awareness | .33* | .29* |
| SAM self knowledge | .57* | .55* |
| SAM public self awareness | −.16 | −.18 |
| DES amnesia | −.05 | −.08 |
| DES absorption | −.31* | −.31* |
| DES derealisation | −.31* | −.33* |
| DES conversion | −.26* | −.26* |
| DES full | −.28* | −.29* |
| FDS | −.30* | −.31* |
| GSI (SCL 90) | −.33* | −.40* |
| Meditation experience in years | .31* | .28* |

SAM = self awareness scale; DES = dissociative experiences scale; FDS = sum scale of DES; GSI = sum score of symptom checklist 90 (SCL 90).
* $p < .05$.

score full: 69; short version: 31) are different from normal subjects (79/37) and from participants in retreats (79/36.5) ($p < .001$, Kruskall Wallis). FMI sum scores change significantly after meditation retreats, from 36.4 to 42.2 for the short version and from 78.3 to 89.4 for the full version.

### 3.3. Discussion

The validation study shows that the FMI is a useful, valid and reliable questionnaire for measuring mindfulness. We have also presented a robust short 14 item version, which is semantically independent from a Buddhist or meditation context. The fact that this short version correlates nearly perfectly with the full scale speaks to its usefulness. These 14 items still cover all aspects of mindfulness.

Principal Component Analysis has shown that the construct is holistic. Mindfulness can be looked at from different angles, and then reveals a cognitive component, a process component, one that relates to the acceptance of experience and one that involves a non-judgmental stance. Yet these aspects are intimately interrelated.

The indicators of validity demonstrate construct validity. Mindfulness is related to but not completely absorbed by self-awareness and dissociation. Longer meditation experience, more frequent meditation, as well as the increase in mindfulness by a retreat, can be demonstrated by the scale. Psychological distress is lower in subjects with higher mindfulness scores. Mindfulness is not redundant. It remains a task for further elucidation of the construct to what extent it is related to such constructs as absorption, hypnotisability, or flow experience.

The fact that mindfulness seems to be predictive of lower psychological distress fits into the picture expected. Some clinical concepts (Bohus et al., 2000; Linehan, 1994; Segal et al., 2002) use mindfulness either as a therapeutic vehicle or to mediate therapeutic effects directly. Thus, one could hypothesize that if therapeutic interventions are effective this is accompanied or

mediated by an increase in mindfulness. Additionally, it needs to be clarified, whether the effects of mindfulness based interventions are indeed due to or mediated by an increase in mindfulness, or whether these effects are non-specific and more general. The data from our validation study indicate that an increase in mindfulness is related to a decrease in psychological symptoms.

Further work is needed: we have only limited evidence as to whether mindfulness is indeed a stable construct and how long increases in mindfulness after a retreat last. We have purposefully left the time frame for considering the items open. In our primary study we used a fourteen day retrospective period and for the post-measurement after retreats the last few days. It is an open question, whether mindfulness is more trait or state-like. It seems reasonable to assume that, like with anxiety, one can measure a state- and a trait-like component depending on the suggested time-frame. Also, determination of retest-reliability of the instrument and the stability of the construct is desirable.

Parallel to our developing the FMI, and unknown to us, other groups developed instruments for assessing mindfulness (see Section 1). It can be assumed that all instruments capture some aspects of mindfulness, while leaving out others. An analysis of all instruments in parallel would be desirable. This was not possible at the time we conducted our studies, because the instruments were not published then, let alone in a valid German version. Meanwhile some positive experiences with our instrument in English speaking populations are available (Leigh, Bowen, & Marlatt, 2005; Salstrom, O'Mahen, & Michels, 2004).

In conclusion, our studies have demonstrated that it is possible to measure mindfulness in a semantically rich and yet unequivocal way with our instrument. For research purposes in mindfulness contexts proper we recommend the full 30 items version. In generalised contexts, where knowledge of the Buddhist background of mindfulness cannot be expected, the short form is more suitable. Our data suggest that a broader application of this construct, both in clinical and differential research contexts might be interesting.

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## Appendix A. Freiburg Mindfulness Inventory (FMI)

The purpose of this inventory is to characterize your experience of mindfulness. Please use the last ___ days as the time-frame to consider each item. Provide an answer the for every statement as best you can. Please answer as honestly and spontaneously as possible. There are neither 'right' nor 'wrong' answers, nor 'good' or 'bad' responses. What is important to us is your own personal experience.

**Thanks very much for all your effort!**

| | Rarely | Occassionally | Fairly often | Almost always |
|---|---|---|---|---|
| 1. I am open to the experience of the present moment. | ☐ | ☐ | ☐ | ☐ |
| 2. I sense my body, whether eating, cooking, cleaning or talking. | ☐ | ☐ | ☐ | ☐ |
| 3. When I notice an absence of mind, I gently return to the experience of the here and now. | ☐ | ☐ | ☐ | ☐ |
| 4. I am able to appreciate myself. | ☐ | ☐ | ☐ | ☐ |
| 5. I pay attention to what's behind my actions. | ☐ | ☐ | ☐ | ☐ |
| 6. I see my mistakes and difficulties without judging them. | ☐ | ☐ | ☐ | ☐ |
| 7. I feel connected to my experience in the here-and-now. | ☐ | ☐ | ☐ | ☐ |
| 8. I accept unpleasant experiences. | ☐ | ☐ | ☐ | ☐ |
| 9. I am friendly to myself when things go wrong. | ☐ | ☐ | ☐ | ☐ |
| 10. I watch my feelings without getting lost in them. | ☐ | ☐ | ☐ | ☐ |
| 11. In difficult situations, I can pause without immediately reacting. | ☐ | ☐ | ☐ | ☐ |
| 12. I experience moments of inner peace and ease, even when things get hectic and stressful. | ☐ | ☐ | ☐ | ☐ |
| 13. I am impatient with myself and with others. | ☐ | ☐ | ☐ | ☐ |
| 14. I am able to smile when I notice how I sometimes make life difficult. | ☐ | ☐ | ☐ | ☐ |

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