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REVIEW

A Critical Review of the Monitor and Acceptance Theory of Mindfulness

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Abstract

In 2017, Lindsay and Creswell proposed the Monitor and Acceptance Theory (MAT) of mindfulness, which proposed a unified and testable framework for interpreting and predicting different mindfulness effects on attention, affective reactivity, emotion regulation, and health-related variables. MAT identifies two basic mindfulness skills: attention monitoring and acceptance. The theory is articulated in two main tenets, affirming that attention monitoring increases present-moment awareness and emotional reactivity (Tenet #1) while acceptance regulates the affective experience (Tenet #2). Therefore, MAT proposes that monitoring per se could also have a negative psychological outcome, while it should lead to positive outcomes when combined with acceptance. Even though MAT is founded on a reasonable basis and is apparently supported by the existing literature, we identify four main issues in the literature cited in support of MAT. In particular, the main issues regard the way in which MAT skills were defined and measured (Issue #1), the inconsistent effect of monitoring alone on emotional reactivity (Issue #2), the inconsistent moderation effect of acceptance on monitoring in determining (positive) health-related outcomes (Issue #3), and the current absence of substantial testing on MAT Tenet 2, considering the effect of acceptance alone on mindfulness interventions (Issue #4). In this manuscript, we review the main contributions to each of these points and show a number of results that do not support MAT or contrast its tenets. In particular, we focus on the recent intervention studies aiming at dismantling the effect of mindfulness on mental health. After a close analysis, we concluded that they failed in testing the MAT tenets and thus provide only insubstantial or incomplete evidence in favor of or against MAT. While we support the aim of MAT theory and its tentative systematization of the vast literature on mindfulness, we would like to highlight its weak or controversial points so to further promote its development and testing with more compelling methods.

Keywords Monitor and Acceptance Theory · Monitoring · Acceptance · Emotional reactivity · Mindfulness interventions

For more than 2000 years, mindfulness teachings spread into the world. In recent decades, they have been integrated into Western medicine and thus investigated with the scientific method of the natural and psychological sciences. In particular, Jon Kabat-Zinn (1982) is credited as the first scientist to conduct rigorous scientific investigation on the effect of mindfulness meditation on mental health. Since that time, many experimental and scientific studies have been conducted on the effect of mindfulness on psychological and physical well-being (DeVibe et al., 2012; Lomas et al., 2019), and the neurofunctional (Fox et al., 2016; Tang et al., 2015) and neuroanatomical (Fox et al., 2014) correlates of mindfulness have been systematically explored. Thus, to date, many important notions about mechanisms of action, neural substrates, and clinical applications of mindfulness have been accumulated. However, a widely accepted and compelling theoretical framework for the effects of mindfulness on mental health is still lacking.

To this aim, Lindsay and Creswell (2017) proposed the Monitor and Acceptance Theory (MAT) of mindfulness. MAT is a unified and testable framework for interpreting and predicting varied mindfulness effects on cognition, affective reactivity, emotion regulation, and health-related variables. Following MAT, mindfulness includes two distinct skills: attention monitoring and acceptance. The definition of these

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two constructs broadly follows the definition of mindfulness by Bishop et al. (2004). Therefore, in MAT, awareness is defined as an "ongoing awareness of present-moment sensory and perceptual experiences […] [which] relies on selective and executive attention networks." (Lindsay & Creswell, 2017, p. 50) while acceptance is defined as "a mental attitude of nonjudgment, openness and receptivity, and equanimity toward internal and external experiences […] a broad construct encompassing a range of acceptance-related constructs (e.g., nonreactivity, equanimity, nonjudgment, openness, non-evaluative, non-elaborative)" (Lindsay & Creswell, 2017, p. 50). Both mindfulness skills could be present in the general population as traits or improved via mindfulness training or mindfulness-based intervention, such as Mindfulness-Based Stress Reduction (Kabat-Zinn, 2013) or Mindfulness-Based Cognitive Therapy (Segal et al., 2002).

MAT is articulated around two main components or tenets, as they are called by its authors (Lindsay & Creswell, 2017): Tenet 1 affirms that "attention monitoring skills enhance the awareness of present-moment experience," while Tenet 2 affirms that "acceptance skills modify the way one relates to present-moment experience, regulating reactivity to affective experience." Each tenet is then further articulated in multiple assumptions, indicated by letters from A to C. Thus, Tenet 1 claims that attention monitoring enhances awareness, and that this in turn not only improves cognitive functioning in neutral contexts (Tenet 1A) but also increases affective reactivity to the experience (Tenet 1B), leading to possible problems in emotion regulation and thus in psychological well-being. To regulate this enhanced reactivity, acceptance is needed (Tenet 2); in fact, acceptance skill leads to a better emotion regulation, affecting performance in cognitive task requiring emotion regulation (Tenet 2A), reducing negative affective reactivity (Tenet 2B), and improving stress-related outcomes measured on health variables such as blood pressure or cortisol level (Tenet 2C).

The main evidence in support of MAT came from studies with a cross-sectional design and based on self-report measures. The main results in support of MAT have been reported in two studies, the first about the relationship between mindfulness, emotion regulation strategies, and psychological symptoms of depression and anxiety (Desrosiers et al., 2014); and the second in which acceptance skill moderated the relationship between monitoring skill and depressive symptoms (Barnes & Lynn, 2010). While they seem to fully support MAT theory, these studies, along with others cited in the MAT paper (for example, Eisenlohr-Moul et al., 2012), should be carefully considered as being only preliminary. Those studies, in fact, reported that some measures of monitoring were linked to increased (or decreased) psychological symptoms or well-being, and that some measures of acceptance moderated these effects, or not. In fact, several issues arose while considering those as substantial evidence in favor of a general mindfulness theory, and they can be summarized in the following four points or issues:

1. They used different scales and sub-scales as measures of monitoring and acceptance mindfulness skills, and each of them seemed to focus on the one that led to significant results in that particular study.
2. The evidence of a direct effect of monitoring on psychological symptoms and well-being is partial and non-replicated in many cases.
3. The evidence of a moderating effect of acceptance on the relationship between monitoring and outcomes is not reliable, as many studies measuring these variables with the same scales obtained inconsistent results when conducting different analyses. Moreover, experimental results that do not show a moderating effect of acceptance on monitoring exist in the literature.
4. Theoretically, MAT considers as essential the combination of monitoring and acceptance for psychological well-being. Then, it overlooks the possibility that acceptance alone would explain this effect and that monitoring could moderate the effect of acceptance on psychological variables, though evidence existed that acceptance without monitoring could be assessed and that monitoring could even moderate acceptance effect.

In this review, we analyze the main experimental evidence for each critical issue listed above, reporting the facts that support the theory and those that do not support, partially support, or contradict MAT. For each issue, we start from the same evidence reported in MAT papers and then expand on them with more recent or different evidence in favor of or against the theory. This review is not exhaustive or conclusive, but it might shed some light over critical points that might be relevant to MAT and other mindfulness theories. The aim of this paper is to encourage the development of alternative or revised theories, as well as more compelling experimental results in the field of mindfulness research.

Issue #1: Defining and Measuring MAT Skills

Many questionnaires exist to measure dispositional mindfulness. Except for the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), these questionnaires tend to be multidimensional and include multiple subscales measuring different facets or aspects of mindfulness. The most widely used scales are the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto

et al., 2008), and the Cognitive and Affective Mindfulness Scale-Revised (CAMS; Feldman et al., 2007). These scales include multiple subscales since they are based on mindfulness conceptualizations that describe mindfulness as defined at least by two essential aspects: the attention or present-moment awareness, i.e., the *what* of mindfulness, and the qualities of acceptance, non-judgment, non-attachment, and equanimity included in the way this attentional process takes place, i.e., the *how* of mindfulness (Baer, 2019).

These two main mindfulness aspects closely resemble the two basic constructs of MAT, in which monitoring is the *what* and acceptance is the *how* of mindfulness. Lindsay and Creswell (2017) proposed a classification for mindfulness scales measuring these two aspects, as summarized in Table 1. This classification is reported here according to the one proposed in Lindsay and Creswell (2017). While the PHLMS contains only two subscales that correspond to the two core aspects of mindfulness for MAT, the other scales include other measures considered as not related to MAT. In particular, the authors excluded Describing and Acting with Awareness. In this review, we will focus mainly on the FFMQ scale, since it can be considered as an extension of the KIMS and it has been employed in most of the studies relevant for MAT (Barnes & Lynn, 2010a; Curtiss et al., 2017; Desrosiers et al., 2014; Eisenlohr-Moul et al., 2012; Hamill et al., 2015; Lau et al., 2018; Peters et al., 2013; Tomfohr et al., 2014).

The FFMQ scale was proposed by Baer et al. (2006) and it was constructed without a priori conceptualization of mindfulness, but in an empirical way, starting from all the other mindfulness scales presented before, including PHLMS, MAAS, and KIMS. FFMQ presented a 5-factor structure, with subscales measuring five aspects related to mindfulness: *Observing*, as the ability to notice or attend to internal and external phenomena; *Describing*, as the ability of labelling the observed phenomena; *Acting with Awareness*, as the ability to stay focus on the present, ongoing activity; non-judging of inner experience (referred as *Nonjudging*), as the capability to have a non-judging stance toward the experience; and nonreactivity to inner experience (referred as *Nonreacting*), as the capability to accept the experience as it is without reacting to it. As reported in Table 1, Lindsay and Creswell (2017) proposed to consider the Observing scale as a measure of monitoring skill and the Nonjudging and Nonreacting scales as measures of acceptance. They consequently excluded the other two FFMQ subscales as they "do not discretely measure monitoring or acceptance" (see Table 1 in Lindsay & Creswell, 2017, p. 52).

About the Describing facet, Baer et al. (2006) considered it as a part of the *what* side of mindfulness along with the Observing facet, whereas other authors questioned it as

Table 1 Definition of the principal multidimensional mindfulness scales and MAT classification of their subscales as measures of monitoring or acceptance, according to Lindsay and Creswell (2017)

Scale	Subscale	Subscale's description	MAT classification
KIMS (Baer et al., 2004)	*Observing*	Observing, noticing, or attending to internal phenomena, such as bodily sensations, cognitions, and emotions, and external phenomena, such as sounds and smells	Monitoring
	Describing	Describing, labeling, or noting of observed phenomena by covertly applying words	Not relevant
	Acting with Awareness	Engaging fully in one's current activity with undivided attention, or focusing with awareness on one thing at a time	Not relevant
	Accept without judgment	Accepting, allowing, or being nonjudgmental about present-moment experience	Acceptance
FFMQ (Baer et al., 2006)	*Observing*	Noticing or attending to a variety of internal or external phenomena (e.g., bodily sensations, cognitions, emotions, sounds)	Monitoring
	Describing	Applying words or labels to observed phenomena	Not relevant
	Acting with Awareness	Engaging fully in one's present activity rather than functioning on automatic pilot	Not relevant
	Nonjudging of inner experience	Taking a non-evaluative stance toward thoughts and feelings	Acceptance
	Nonreactivity to inner experience	Accepting thoughts and feelings and allowing them to come and go without being caught up in or carried away by them	Acceptance
PHLMS (Cardaciotto et al., 2008)	*Present-moment awareness*	Continuous monitoring of experience with a focus on current experience rather than preoccupation with past or future events	Monitoring
	Acceptance	Stance toward experience characterized by nonjudgmental attitude, acceptance, openness, and compassion	Acceptance

KIMS, Kentucky Inventory of Mindfulness Skills; *FFMQ*, Five Facet Mindfulness Questionnaire; *PHLMS*, Philadelphia Mindfulness Scale

a mindfulness core ability at all (Cardaciotto et al., 2008). Moreover, it is not relevant nor considered relevant in any of the papers supporting MAT (Barnes & Lynn, 2010; Desrosiers et al., 2014; Pearson et al., 2015). Thus, it could be excluded based on both theoretical and empirical arguments.

A different story is about the Acting with Awareness facet. MAT did not consider it as relevant, as it is considered not to discretely measure monitoring or acceptance skill. Unfortunately, Lindsay and Creswell (2017) did not report any compelling argument or clarification for this choice, except for a footnote in which they stated that Acting with Awareness score reflects "both an implicit orientation of acceptance toward experience (the opposite of automatic and distracted behavior being an openness to engaging with one's experiences), and also measures attention monitoring (on one's actions or not)" (Lindsay & Creswell, 2017, p. 55, footnote 4). Thus, we conclude that they excluded this scale as they consider it a mixed measure of both MAT skills, and then not interesting for testing its tenets. Instead, we consider that this mindfulness facet could have some important implications for this theory, as we will argue in the next paragraphs. In MAT, attention monitoring is indeed defined as ongoing awareness of present-moment sensory and perceptual experiences (Lindsay & Creswell, 2017), while the Acting with Awareness scale includes items such as "I rush through activities without being really attentive to them," "I find it difficult to stay focused on what's happening in the present," and "I find myself doing things without paying attention." Thus, attention monitoring can be linked to the Acting with Awareness facet of FFMQ. Acting with awareness has been explicitly considered as a measure of present-moment awareness by Peters et al. (2013). Also Tomfohr et al. (2014), cited in support of MAT, obtained significant interactions of Nonjudging and Nonreacting (as acceptance measures) with both Observing and Acting with Awareness (as monitoring measures). Moreover, the Acting with awareness score was positively correlated with psychological well-being in both meditators and non-meditators, while the Observing score was unexpectedly positively correlated with distress in non-meditators (Baer et al., 2006). In agreement with Baer et al. (2006, p. 42), we also consider that "it is possible that the content of the observe items used here does not adequately capture the quality of noticing or attending to experience that is characteristic of mindfulness."

Another important proof of the relevance of the Acting with Awareness facet in MAT comes from a study using latent profile analysis reported as supporting the theory in Lindsay and Creswell (2017). In this study, Pearson et al. (2015) identified four mindfulness profiles based on the FFMQ scores of 941 participants: a *high mindfulness* profile, a *low mindfulness* profile, a *non-judgmentally aware* profile, and a *judgmentally observing* profile. These four profiles were consistently revealed also in subsequent studies (Bravo et al., 2018; Kimmes et al., 2017; Sahdra et al., 2017). As depicted in Fig. 1, while the high and low mindfulness profiles showed a flat pattern throughout the five facets, the other two showed a mirrored pattern. In fact, the judgmentally observing class is characterized by high Observing, low Nonjudging, Acting with Awareness and Describing, and an average Nonreacting score, while the non-judgmentally aware class shows low Observing, high Nonjudging and Acting with Awareness scores, and average to low scores in Describing and Nonreacting. Pearson et al. (2015) further reported that the judgmentally observing profile had poor psychological well-being, while the non-judgmentally aware group had better emotional outcomes.

This result was referred to two times in Lindsay and Creswell (2017). The first time it was reported correctly in support of Tenet 1 as "participants high in monitoring (Observe) but low in acceptance (Nonjudgment) had higher levels of depressive and anxiety symptoms, affective lability, and distress intolerance than participants low in both monitoring and acceptance skills" (p. 53). The second time, instead, it was reported wrongly in support of Tenet 2 as

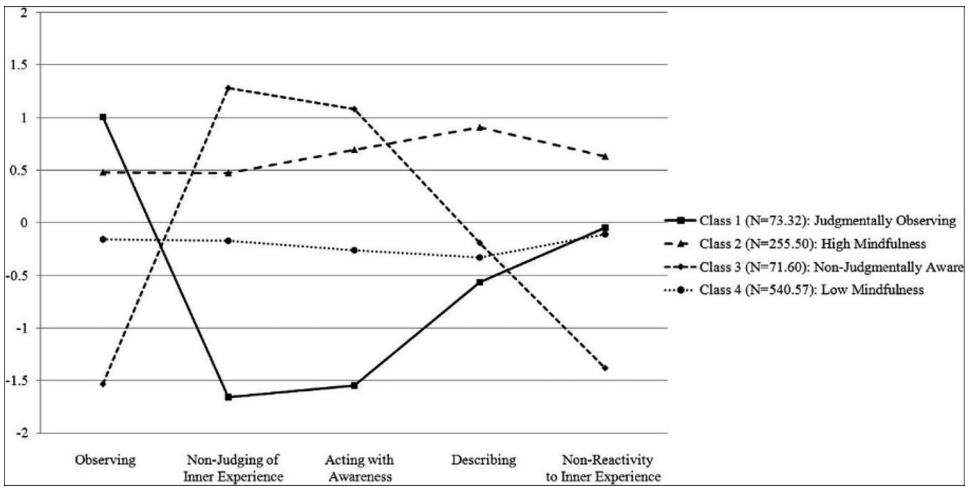

Fig. 1 The four latent profiles individuated by Pearson et al. (2015) with the FFQM scores (reprinted with permission of Elsevier, license number 5491930199181, license date Feb. 18, 2023)

"students with high monitoring skills (Observe) and high levels of acceptance (Nonjudgment) reported significantly lower levels of depressive and anxiety symptoms, affective lability, and distress intolerance than students high in monitoring (Observe) with low levels of acceptance (Nonjudgment)" (p. 54). This sentence was not correct as, in the results by Pearson et al. (2015), increased psychological well-being was related to high Acting with Awareness and Nonjudging, and low Observing; instead, high Observing was associated with low Nonjudging and thus to maladaptive emotional regulation.

In this section about the first issue with MAT, i.e., how to measure its related skills, we showed that the indications given by MAT's authors were not well supported from a theoretical and an empirical perspective. These uncertain foundations make it problematic to support a theory such as MAT without more robust evidence from experimental studies (for a review of the RCTs claimed to support MAT, see next sections). To overcome the epistemological problems relative to the assessment of MAT's skills, and based on the reported empirical findings, we support the view of measuring monitoring as a combination of Observing and Acting with Awareness, as both are related to present-moment awareness. Another possible solution could be to consider as relevant for MAT only the studies that included questionnaires or scales measuring directly to the two constructs implicated in MAT, such as the PHLMS (Cardaciotto et al., 2008).

Issue #2: Monitoring Without Acceptance Could Both Increase and Decrease Psychological Distress

One of the most controversial findings in mindfulness literature was the positive relationships between the observing/awareness measures of mindfulness and the presence of psychological symptoms, such as anxiety or depression. For example, Baer et al. (2006) reported that the Observing facet of the FFMQ positively correlated to both psychological distress (dissociation, psychological symptoms, absent-mindedness) and well-being (openness to experience, emotional intelligence, self-compassion). This result was found overall their 881 participants' sample, whereas in a sub-sample of meditators the relationships between observing and psychological distress factors were not significant. They thus concluded that in presence of meditative experience observing score does not correlate with psychological distress. MAT reports this result in support of the point that "monitoring may intensify and heighten all experiences: negative, positive, and neutral alike" (Lindsay & Creswell, 2017, p. 53). In fact, Lindsay and Creswell (2017) cited a number of studies in which the Observing scale was positively correlated either to psychological distress (Barnes & Lynn, 2010; Hamill et al., 2015) or to psychological well-being (Christopher & Gilbert, 2010). However, following the Tenet 1 that posits that monitoring should increase reactivity to both positive and negative experiences, one would expect to find in cross-sectional data results as those reported in Baer et al. (2006), in which monitoring positively related to both positive and negative outcomes, but this is not the case.

In fact, some studies report that observing/monitoring positively correlated with negative outcomes, such as depressive symptoms (Barnes & Lynn, 2010; Kimmes et al., 2017), borderline traits (Peters et al., 2013), anxiety and stress (Hamill et al., 2015), psychopathological symptoms (Curtiss et al., 2017), sleep problems (Simione et al., 2021), and negative affective states (Mneimne et al., 2019). We also have other studies in which observing positively correlates instead with positive psychological outcomes, such as reduced worry and rumination (Desrosiers et al., 2014) or life satisfaction and self-esteem (Christopher & Gilbert, 2010; Sahdra et al., 2017), and with positive physical outcomes, such as reduced stress markers (Tomfohr et al., 2014). However, we also individuated a cluster of studies in which the association between monitoring and psychological distress or well-being was not reported or it was not significant (Eisenlohr-Moul et al., 2012; Krafft et al., 2017; Lau et al., 2018). Most of these results are correlational and, in the very same studies, these significant associations did not survive in a multiple regression analysis (as in Eisenlohr-Moul et al., 2012; Peters et al., 2013). Moreover, the monitoring skill has been associated only with a subset of the investigated variables, for example with satisfaction with life but not with depressive symptoms (Christopher & Gilbert, 2010), or with sleep problems and anxiety but not with satisfaction with life and stress (Simione et al., 2021). From this review of the MAT supporting cross-sectional data, we conclude that, while in non-meditative samples monitoring should be associated with both positive and negative outcomes, few studies found both at the same time and with all the measured outcomes considered. Thus, this association seems spurious and not robust across the reviewed studies.

While Lindsay and Creswell (2017) did not directly address this problem, we propose that one possible explanation to this mixed pattern of results could rely in the use of the Observing scale of the FFMQ as a measure of monitoring. In fact, a different scale such as the PHLMS Awareness scale seems not related to any negative outcomes in both student and clinical samples (Cardaciotto et al., 2008). While the FFMQ Observing scale is more devoted to measure physical and sensitive experiences (e.g., "I pay attention to sensations, such as the wind in my hair or sun on my face"), the PHLMS Awareness scale is more balanced, including an increased number of items referring to emotional experiences (e.g., "When talking with other people, I am aware

of the emotions I am experiencing") or mental life (e.g., "I am aware of what thoughts are passing through my mind"). This unbalancing in Observing scale of FFMQ could have biased the correlation and regression results reported, measuring only one aspect of the monitoring activity, that instead should include attention to physical, bodily, emotional, and mental experiences. This point is further supported by a factor analysis conducted by Rudkin et al. (2018), showing how FFMQ Observing has poor construct validity as it does not assess emotional awareness, which is a central point of the monitoring skill (as also stressed in MAT). In the same vein, also Baer et al. (2006) acknowledged the limitations of FFMQ Observing, as they recognized how it focuses mostly on bodily sensations and external stimuli. In this respect, a more complete and comprehensive measure of monitoring should be used in order to avoid such biased results, for example the brief observing scale proposed in Rudkin et al. (2018), which includes an equal number of items assessing awareness to external stimuli, bodily sensations, and emotions.

Other evidence contrasting the MAT Tenet 1 has come from two randomized control trials conducted by the same research group proposing this theory. In these experimental studies, Lindsay et al. (2018, 2019) conducted a three-arm parallel trial in which they delivered via smartphone three different 14-day interventions to participants: monitoring only (MO), monitoring with acceptance (MA), and a coping control program. They found that only the group trained in both monitoring and acceptance reported lower stress reactivity (Lindsay et al., 2018) and increased social functioning (Lindsay et al., 2019) with respect to the control group, whereas the MO group did not report any difference with respect to the control group in the post-intervention measures. While they argued from this result that the acceptance is necessary in a mindfulness training including monitoring to reduce stress and increase psychological well-being, about the lack of changes in the MO group they affirmed that they "had no specific hypotheses comparing MO vs. control" (Lindsay et al., 2018, p. 69). However, following MAT Tenet 1, it should be hypothesized that increasing only monitoring without acceptance would lead to an amplified emotional reactivity, in turn increasing stress markers and psycho-social distress measures. As they did not find any changes in the MO group, we should conclude that monitoring did not directly relate to psychological distress in those studies, in disagreement with MAT Tenet 1.

The authors also reported about this result that "structured monitoring practice, in contrast to the dispositional tendency to monitor in the absence of meditation training, may promote adaptive outcomes […] systematically monitoring one's experiences may begin to engender an implicit orientation of acceptance" (Lindsay et al., 2018, p. 71). While we agree with this statement, this means that one of the followings should be true: (a) the MO intervention would also increase acceptance, thus the intervention would not be on monitoring-only as reported, invalidating the reported results; or (b) the MO intervention in fact increased monitoring but this would not lead to an increased emotional reactivity. We propend for this latter position, as it is also consistent with the cross-sectional data reported above and with the results reported in Chin et al. (2021), showing how a monitoring-only training was effective in increasing this skill. However, the lack of measurement in mindfulness skills before and after the intervention in Lindsay and colleagues' papers (2018, 2019) did not help in clarifying this controversy, which should be further addressed in future works.

In the same vein, Wang et al. (2019) conducted an experiment with pain stimulation in which they compared pain intensity, tolerance, and endurance in groups receiving different short-term training: attention-only (comparable to MO), acceptance-only, combined attention and acceptance (comparable to MA), and no training (control group). They correctly stated that "according to MAT, without concomitant training in acceptance, development in attention may increase attention to salient distressing stimuli, intensifying the pain intensity" (Wang et al., 2019, p. 1353). However, they failed in finding an increased pain intensity after the attention-only training, in disagreement to that expected following MAT Tenet 1. We will further discuss their findings in the subsequent sections.

Taken together, the aforementioned results showed that a strong relationship between the monitoring facet of mindfulness and the emotional reactivity/psychological distress could not be inferred from the existent literature, as it was reported only in cross-sectional studies employing FFMQ and not systematically, whereas it did not emerge at all in the experimental and RCT studies reviewed. Thus, summing up the evidence collected so far, the Tenet 1B of MAT seems not to be nicely supported by the literature on mindfulness. Here, we proposed a revision of Tenet 1B as follows "Attention monitoring alone could heighten affective experience and reactivity but only in non-meditators, showing in some cases an exacerbation in negative symptoms and/or an enhancement in positive experiences."

Issue #3: Maybe Acceptance Moderates Monitoring Effects on Well-being, or Maybe It Does Not

The third point of our review about MAT regards the effect of acceptance in moderating the relationship between monitoring and well-being. This is related in particular to MAT Tenet 2B that affirms that "attention monitoring and acceptance skills together […] reduce negative reactivity

(e.g., anxiety, depression, stress) and reduce grasping of positive experiences (e.g., craving, substance use)" (Lindsay & Creswell, 2017, p. 51), as it does not claim any ameliorative effect of acceptance on psychological well-being. However, in subsequent parts, the paper reports that "MAT predicts that attention monitoring is an important mechanism of mindfulness effects on improved affective and stress reduction outcomes, but only with concomitant high levels of acceptance skills," and later that "high tendency to monitor experiences is associated with adaptive outcomes only with concomitant high levels of acceptance" (Lindsay & Creswell, 2017, p. 54). Those latter quotes seem to support the idea that people with both high monitoring and acceptance should have the better outcomes, with improved affective states and reduced stress/distress. However, the studies cited in support of this "strong" position were only partially in agreement with it, while they seem more to support a "weak" position, claiming that acceptance mitigates the relationship between monitoring and negative outcomes without increasing its relationship with positive outcomes, as we will show.

The first study reported is that by Barnes and Lynn (2010), in which Nonreacting moderated the effect of Observing on depression such as only at low level of Nonreacting, Observing increased depression level. This study supports the weak position, as it reports that high level of acceptance reduces to nearly zero the relationship between observing and depression score. Similar results can be retrieved from successive studies in which only at low level of acceptance monitoring has a positive relationship with psychopathological symptoms (Curtiss et al., 2017; Lau et al., 2018), couples' satisfaction (Krafft et al., 2017), and negative affective state (Mneimne et al., 2019). At a high level of acceptance, such relationships were no more significant, but they did not change sign (as supported by the strong position).

A couple of studies could be considered as more supporting of the strong position, showing that at a high level of acceptance the relationship between monitoring and psychological distress turns negative instead of becoming just non-relevant. In these cross-sectional studies, this moderation effect was true for the relationship between monitoring and substance use/abuse (Eisenlohr-Moul et al., 2012) and between monitoring and both anxiety and depressive symptoms (Desrosiers et al., 2014). The only issue with those studies consists in the non-relevant role of nonjudging as a moderator (not significant in Eisenlohr-Moul et al., 2012, and not considered a priori in Desrosiers et al., 2014), while it should be one of the two acceptance measures included in FFMQ following MAT. In fact, we found no moderator role for nonjudging in the reported correlational studies, with the exception of Tomfohr et al. (2014), who reported the modulatory effect of nonjudging on the relationship between monitoring (measured as Acting with Awareness, not Observing) and blood pressure, and of Mneimne et al. (2019), in which nonjudging showed a modulatory effect but in the opposite direction respect to what was expected, i.e., only with high nonjudging monitoring increases negative affective state. All such considerations cast doubts about the relative importance of the Nonjudging scale of mindfulness as a measure for acceptance. It should be really important to understand in future works the difference between Nonreacting and Nonjudging scores, as they seem not to have the same modulatory effect on Observing, differently to what proposed in MAT (see Table 1 in Lindsay & Creswell, 2017, p. 52).

From a different perspective, cross-sectional studies implying latent profile analysis showed instead a prominent role of nonjudging in defyning the mindfulness profiles with respect to the nonreacting capacity (Bravo et al., 2018; Kimmes et al., 2017; Pearson et al., 2015; Sahdra et al., 2017). As previously reported, apart from the two less interesting *high mindfulness* and *low mindfulness* profiles, they usually reported two further profiles, one with high Observing, low Acting with Awareness, and low Nonjudging (referred as *judgmentally observing*); and the other with low Observing, high Acting with Awareness, and high Nonjudging (referred as *non-judgmentally aware*). In these works, Nonjudging allows to discriminate between the worst adaptive profile (judgmentally observing) and the best one (non-judgmentally aware), whereas Observing and Acting with Awareness seem to have opposite patterns, and Nonreacting was only marginally important in defyining the different profiles. Even more, Nonreacting was usually very low in the non-judgmentally aware people, such as people who have high Nonjudging combined with high Acting with Awareness usually have also very low Nonreacting. To sum up, even if these studies seem to support the strong position on Tenet 2 (high monitoring and high acceptance lead to the best adaptive outcomes), they did not merge with the correlational ones in terms of measures considered for both monitoring, i.e., Acting with Awareness instead of Observing, and acceptance, i.e., Nonjudging instead of Nonreacting.

Experimental studies on the interaction between acceptance and monitoring did not seem to support Tenet 2 at all. In fact, in the pain experiment previously reported (Wang et al., 2019), participants performed better in the acceptance alone condition than in the acceptance with monitoring condition, showing that the crucial factor was acceptance, not the combination of it with monitoring. Instead, the two RCTs by Lindsay et al. (2018, 2019) that aimed exactly to test this particular MAT's prediction should be considered as inconclusive on this respect as they did not include a crucial acceptance-only intervention group. Because they did not include this condition, they did not really collect evidence that acceptance did not work in isolation and that

it should be combined with monitoring in order to obtain better outcomes.

Thus, in discussing Tenet 2B, we should carefully observe that a moderation effect of acceptance on monitoring seems to be supported in literature, whereas it is not clear from the current state of art of research which measures should be considered for acceptance and monitoring. In this respect, to avoid hazardous cherry-pick methods in research, in which all the FFMQ scales are assessed but only statistically significant results are presented, we encourage researchers to test the MAT with both Nonjudging and Nonreacting as measures of acceptance and with both Observing and Acting with Awareness as measures of monitoring. Furthermore, another amendment could consist in using only instruments assessing exactly the two skills proposed by MAT, such as the PHLMS (Cardaciotto et al., 2008).

Issue #4: Is It Possible to Train Acceptance Without Monitoring?

A claim of MAT is that acceptance should be trained together with monitoring to be effective. The authors further affirm: "it's not clear how acceptance would be trained in the absence of a target object to monitor with acceptance" (Lindsay & Creswell, 2017, p. 56), and in a subsequent paper: "it is important to reiterate that monitoring and acceptance—rather than acceptance alone—act synergistically to reduce social risk factors. […] acceptance alone is likely not sufficient for improving social functioning, but is instead a necessary component of mindfulness interventions" (Lindsay et al., 2019, p. 3491). Thus, they sustain the position that acceptance could be trained only concurrently with monitoring because the training first needs an object toward which to apply acceptance. However, as already pointed out in this review and by Lindsay and Creswell themselves (2017), acceptance seems to have a role by itself in increasing well-being.

A first set of data in this direction comes from the non-intervention literature, showing that in the non-clinical and non-meditators population, the acceptance and monitoring skills are independently distributed. In fact, as reported in Baer et al. (2006), Observing facet of mindfulness was little or not correlated to acceptance measures, such as Nonjudging and Nonreacting (for similar results, see Cardaciotto et al., 2008), and it did not load into a general mindfulness factor. In these very same samples, acceptance scores relate to a better psychological condition, showing that acceptance alone could be correlated to reduced psychological symptoms or increased well-being factors. The already discussed LPA studies reported that acceptance and awareness could be independently found as traits in the normal population (Pearson et al., 2015). Moreover, those LPA studies also showed how the high acceptance scores characterized the most adaptive profiles, irrespectively from the monitoring level, whereas the less adaptive profiles were those in which acceptance was low (Bravo et al., 2018; Pearson et al., 2015; Sahdra et al., 2017). These results support the view that monitoring and acceptance are rather independent skills and that acceptance alone would lead to better psychological outcomes.

Also, in a more clinical-grounded literature, Germer (2013) reports that, while mindfulness as a whole includes both awareness and acceptance in the present-moment, these two factors can be found alone, e.g., acceptance without awareness or vice versa. It is possible to imagine a person with high trait monitoring but low trait acceptance, who focuses greatly on inner and outer perceptions but overreacts to them, judges them, or simply remains "attached" to them, without letting them go. It is also possible to imagine an individual reporting high trait acceptance but low trait monitoring, as a person who tends to be detached from and to non-judge the life events as they come but is poorly focused on the perceptual and emotional experiences that accompany them. Following the dispositional mindfulness literature, the first kind of person would be more prone to distress while the second one to well-being. Moreover, the non-monitoring but accepting individuals might theoretically have an "advantage" on the judgmentally aware individuals, as they might be facilitated in improving their low trait monitoring thanks to their developed acceptance skills because a minimum level of acceptance is required in order to face the inner experiences and outer events when they are challenging. On the contrary, high trait monitoring might not contribute to improving acceptance skills. This is the standpoint from which the Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) starts.

In fact, one of the main tenets of ACT is the fundamental role of experiential avoidance in shaping psychopathology (Hayes et al., 1996). Experiential avoidance is defined as "the phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts, memories, behavioral predispositions) and takes steps to alter the form or frequency of these events and the contexts that occasion them" (Hayes et al., 1996, p. 1155). Experiential avoidance can be considered opposite to mindfulness, i.e., avoidance is the contrary of acceptance. Thus, to contrast experiential avoidance, a main ACT's strategy is to increase experiential acceptance, i.e., to stay in touch with the experience of thoughts, senses, and emotions as they are in the present moment. This simple strategy, together with other ACT strategies not relevant for this paper, has been reported to be effective in patients with chronic pain (Scott & McCracken, 2015; Veehof et al., 2016), obsessive–compulsive spectrum disorders (Bluett et al., 2014), and anxiety disorders (Norton

et al., 2015; Vøllestad et al., 2012), as also with depression and other psychological problems (Ruiz, 2010). Increasing acceptance seems to be a viable strategy to increase experiential awareness and thus psychological well-being. Moreover, acceptance alone seems to be a stronger candidate than emotion regulation, emotion competence, and mindfulness awareness in predicting lower distress and better psychological conditions (Kotsou et al., 2018). This is also supported by Wang et al. (2019) in an experiment with painful stimulation in which acceptance alone had been revealed as a better strategy for pain management than both attention (monitoring) and attention combined with acceptance (monitoring + acceptance).

Taken together, these findings support that acceptance alone is a strong candidate for increasing psychological well-being and tolerance to pain or frustration, and to increase awareness as well. Thus, the acceptance facet of mindfulness alone could explain the efficacy of mindfulness interventions and brief mindfulness inductions. This position also leads to the conclusion that acceptance can drive an increase in monitoring rather than the other way around: to monitor and thus be aware of an internal state, an event, or a perception, one should first accept (or not avoid) the presence of such experience. As many of the experimental studies supporting MAT used a cross-sectional design while testing the moderation of acceptance on awareness, they should also examine the moderation in the other way around, i.e., acceptance as moderated by awareness. The only study that tested such double-way moderation design was conducted by Krafft et al. (2017) on couple satisfaction as outcome. It reported that awareness decreased satisfaction when acceptance was low and that acceptance increased satisfaction when awareness was high. Again, the result reported by Krafft et al. (2017), together with the others reported above, points out the partial view implied in MAT, in which monitoring is the fundamental process on which acceptance is built. Instead, contrasting evidence supports the idea that acceptance could be a rather basic process than monitoring in developing mindfulness, or at least at the same level.

Discussion: Finding Ways Out

In this article, we evaluated MAT against the available scientific literature and found (at least) four potential issues with this theory. Firstly, there are difficulties in the operationalization of monitoring and acceptance using self-reported questionnaires (i.e., Issues #1 and #3). Secondly, there is contradictory evidence in favor of MAT's Tenets 1 (i.e., monitoring alone should increase reactivity to positive and negative experiences) and 2B (i.e., the interaction of monitoring and acceptance drives positive effect outcomes) (i.e., Issues #2 and #3). Finally, acceptance skills alone might lead to the positive health outcomes observed in mindfulness research, contrary to MAT's prediction (i.e., Issue #4). Following the description of each issue, we provided some methodological recommendations that could potentially lead to research results more in line with MAT's predictions. For example, we recommended the use of the PHLMS instead of the FFMQ in studies testing MAT. However, considering the available evidence and state of the literature, we believe that MAT's issues might also stem from theoretical problems.

A first potential theoretical issue with MAT is that the model needs a more precise definition and operationalization of its components. Specifically, in their seminal paper, Lindsay and Creswell (2017) defined monitoring and acceptance on the basis of different self-reported questionnaires (and related theoretical backgrounds) and theories. This is problematic, as each measure will define and operationalize mindfulness differently, which might have led to the spurious results mentioned in our article (see Issues #1 and #3). Moreover, an unprecise definition might lead to dangerous cherry-picking procedures, where a researcher might employ multiple measures of monitoring and acceptance and only report or emphasize results for those that showed an effect in the expected direction. A more precise definition and operationalization of monitoring and acceptance might solve these problems and lead to a more refined theory, and thus to more clearly formulated hypotheses. However, we recognize that this theoretical issue is older than MAT (Anālayo, 2019; Bishop et al., 2004), and that solving this issue would benefit not only MAT, but all the mindfulness-related fields of study.

A second potential theoretical issue with MAT is that there is currently little evidence that directly supports it. That is, MAT was generated on the basis of preliminary research that partially supports it (Lindsay & Creswell, 2017), and it included a set of hypotheses to be further tested in experimental and clinical studies. However, a paucity of experimental studies has subsequently directly tested this model and only focused on investigating few of its tenets, also when conducted directly from the same authors and their collaborators (Chin et al., 2019; Lindsay et al., 2018, 2019). For example, in a study by Chin et al. (2019), the authors only tested the MAT hypotheses that acceptance is a key component of mindfulness and that a mindfulness course can improve acceptance. Similarly, Chin et al. (2021) only tested the MAT hypothesis that a mindfulness course can improve monitoring (with mixed results). To date, only a few experimental studies have directly tested MAT, and they do not seem to support its hypotheses (e.g., Wang et al., 2019). A larger corpus of theory-driven research articles that provide evidence for (or against) MAT might solve the Issues #2 and #3 mentioned in this paper. For example, future theory-driven research might focus on testing the MAT's core hypotheses that mindfulness interventions can improve monitoring and acceptance, and that the interaction

between monitoring and acceptance lead to improvements in health-related variables.

A third potential theoretical issue with MAT is that preliminary evidence seems to suggest that monitoring might not be a key component of the effect of mindfulness on psychological well-being (see Issue #4). Therefore, future theory-driven research might prioritize testing this specific hypothesis. If evidence against the necessity of monitoring to produce health benefits in mindfulness-based interventions were to accumulate, then MAT might need to be greatly reshaped to accommodate for a principal role of acceptance. Indeed, a recent cross-sectional study directly testing MAT tenets reported evidence in favor of this core role for acceptance more than for its interaction with monitoring (Simione et al., 2021). This result is also consistent with the result of a systematic review on the active components of mindfulness interventions (Stein & Witkiewitz, 2020), that identified and reported eight dismantling studies on mindfulness-based programs. Overall, they all agree that the key active component of mindfulness interventions is some form of acceptance. Therefore, we hypothesized that acceptance would be the very basic principle of mindfulness effect on psychological well-being, and its combination with awareness is only spurious and due to the traditional ways in which mindfulness is taught or assessed. In this regard, we are aware that the same issues reported here for MAT would arise for a theory revision based on acceptance only, as also this construct has been operationalized, assessed, and included in the interventions in a variety of forms, such as non-judging, non-reacting, equanimity, or curiosity, among others (Stein & Witkiewitz, 2020). Moreover, other dimensions could be studied in combination with acceptance, as suggested by Anālayo (2022), such as the ethical setting in which it is deployed (as suggested also in Greenberg & Mitra, 2015). Anālayo (2022, p. 1905) proposed that "the notion of acceptance as a crucial ingredient for beneficial outcomes across affective and physical health domains could be further enhanced by adding the qualification "wise." […] just acceptance as such will not necessarily have beneficial effects". Then, the road towards a full understanding of the active mechanisms of mindfulness is still long, and there is still much to learn.

We would conclude this critical review with a caveat. We criticized some aspects of the MAT theory, but we would like to underline the importance of such theoretical works for the research on mindfulness (see also Garland & Mitra, 2019). MAT is a particularly promising theory, as it attempts to define its key elements, and clearly presents testable core hypotheses and tenets, and preliminary research provides some support to it. Even if we have detected some potential methodological and theoretical issues with MAT and proposed solutions to these problems in this article, we believe that the debate opened by this theoretical work is valuable. In doing so, with this review, we hope to promote both theoretical advancements and research efforts in the field of mindfulness research in general and of MAT in particular, towards a more refined and comprehensive theoretical conceptualization of mindfulness.

Author Contribution Luca Simione conceptualized the review, analyzed the relevant literature, drafted the manuscript, and edited the final manuscript. Francesco Saldarini collaborated in the conceptualization of the review and in drafting the manuscript, and participated in finalizing the manuscript.

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Declarations

Conflict of Interest The authors declare no competing interests.

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