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**Mindfulness facets, trait emotional intelligence, emotional distress, and multiple health behaviors: a serial two-mediator model**

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## **Abstract**

In the present study, we suggest a serial mindfulness facets-trait emotional intelligence (*TEI*)-emotional distress-multiple health behaviors mediation model. This model was tested in a sample of  $N=427$  occupational therapists. The mindfulness facets-*TEI*-emotional distress section of the mediation model revealed partial mediation for the mindfulness facets Act with awareness (*Act/Aware*) and Accept without judgment (*Accept*); inconsistent mediation was found for the Describe facet. The serial two-mediator model included three mediational pathways that may link each of the four mindfulness facets with multiple health behaviors. Eight out of 12 indirect effects reached significance and fully mediated the links between *Act/Aware* and Describe to multiple health behaviors; partial mediation was found for *Accept*. The mindfulness facet *Observe* was most relevant for multiple health behaviors, but its relation was not amenable to mediation. Implications of the findings will be discussed.

**Key words:** mindfulness, KIMS, trait emotional intelligence, *TEIQue-SF*, stress, health behaviors, occupational therapists

## 1. Introduction

### 1 Introduction

Many contemporary public health problems are largely preventable by adhering to a healthy lifestyle. For instance, a combination of healthy diet, physical activity, optimal weight, non-smoking, and moderate consumption of alcohol significantly reduces the risk of premature mortality (Loef & Walach, 2012). Given that diverse health behaviors tend to coexist within individuals (Wiesmann, Timm, & Hannich, 2003), it is necessary to identify predictors of combined health behaviors. Personality traits are important predictors of morbidity, longevity, and health behaviors (Ferguson, 2013). The present study focuses on mindfulness and trait emotional intelligence (*TEI*), as both are reliably linked to health outcomes (e.g., Keng, Smoski, & Robins, 2011; Martins, Ramalho, & Morin, 2010).

The Health Behavior Model (Smith, 2006) provides the framework for the current study: Traits may influence health via health behavior and traits affect health behavior either directly or indirectly via stress and coping. In line with this reasoning, a serial mindfulness facets-*TEI*-emotional distress-multiple health behaviors mediation model will be suggested and tested in a sample of occupational therapists. Occupational therapists face various occupational stressors which contribute to perceived stress (Lloyd, McKenna, & King, 2005) and emotional exhaustion (Gupta, Paterson, Lysagt, & von Zweck, 2012). The tested model may help to identify individual differences in health professionals that may guide the implementation of health-sustaining interventions.

#### 1.1 Mindfulness facets and multiple health behaviors

Mindfulness is defined as a self-regulation of attention directed at the present moment, thus allowing recognition of mental events as they arise, and as an orientation involving curiosity, openness, and acceptance (Bishop et al., 2004). Mindfulness may refer to a state of awareness or to a trait-like propensity to be in a mindful state (Bergomi, Tschacher, & Kupper, 2013). This propensity reflects a “universal human capacity proposed to foster clear

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thinking and open-heartedness” (Ludwig & Kabat-Zinn, 2008, p. 1350) which can be cultivated via meditation (Falkenström, 2010). Throughout this article, we adhere to the trait perspective on mindfulness.

Mindfulness is an inherently multifaceted construct (Bergomi et al., 2013). For instance, Baer, Smith, and Allen (2004) distinguish four trait-like mindfulness facets: observe, notice, or attend to various internal and external phenomena (*Observe*), non-evaluative describing or labeling of observed phenomena with single words or phrases (*Describe*), full engagement in one’s current activity with undivided attention (*Act with awareness; Act/Aware*), and being nonjudgmental and allowing the experienced phenomena to be as they are without attempting to avoid, change or eliminate them (*Accept* without judgment).

Mindfulness predicts various positive outcomes, including physical health (Murphy, Mermelstein, Edwards, & Gidycz, 2012). This effect might be partially mediated via health behaviors (Ludwig & Kabat-Zinn, 2008). Consistent with this assumption, higher total mindfulness is associated with healthier eating habits, better sleep quality, more physical activity, less nicotine dependency, and lower smoking frequency (Black, Szussman, Johnson, & Milam, 2012; Murphy et al., 2012; Roberts & Danoff-Burg, 2010; Vidrine et al., 2009). However, total scores may obscure differential relationships between mindfulness facets and health behaviors which may impede our understanding of the construct (Baer et al., 2004).

Gilbert and Waltz (2010) were among the first who investigated specific links between mindfulness facets and health behaviors. They showed that Observe and Describe were more related to healthy diet and physical activity than the remaining mindfulness facets. However, Accept/Non-judgment and Act/Aware are more related to the avoidance of substance use than Observe (Karyadi, VanderVeen, & Cyders, 2014).

The multiple health behaviors index used in the present study comprises various regularly performed health-enhancing behaviors and the avoidance of health-compromising behaviors (Wiesmann et al., 2003). The range of this health behaviors index and those prior

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findings on the mindfulness-health behavior link form the base for our first hypothesis (*H1*): All four mindfulness facets are specifically and positively related to multiple health behaviors (paths  $f_i$  in Figure 1).

**Please insert Figure 1 about here**

### 1.2 Mindfulness facets, emotional distress, and health behavior

The Health Behavior Model (Smith, 2006) suggests that stress may partially mediate the mindfulness facets-health behavior link (paths  $c_i$  &  $d$  in Figure 1). Stress is a multifactorial construct. It comprises stressors in terms of environmental conditions and role transitions, and the experience of stress, which entails stress appraisal or perceived stress consequences as well as the emotional response in terms of emotional distress (Segerstrom & O'Connor, 2012). In the current study, we focus on the experiential aspect of stress.

From a bottom-up regulation perspective, mindfulness promotes exposure to threatening or challenging stimuli, which in turn are considered as mere mental events with no need to be acted upon (Chiesa, Serretti, & Jakobsen, 2013). This facilitates psychological distance from what is experienced, desensitization, staying in touch with one's experience without actively regulating or reappraising the stimuli, all of which reduces emotional distress (Chiesa et al., 2013).

From a top-down regulation perspective, mindfulness raises one's capacity to regulate emotional states, which lowers emotional distress (Coffey, Hartman, & Frederikson, 2010; Hill & Updegraff, 2012). Both perspectives may account for the negative relationships between Describe, Act/Aware, and Accept and emotional distress (Baer et al., 2004; Coffey et al., 2010; Ströhle, Nachtigall, Michalak, & Heidenreich, 2010). The Observe facet tends to be unrelated to emotional distress, at least in populations mostly naïve to meditation. This is probably due to ambiguous item content which may confound mindful observing and self-attention in non-meditators (Bergomi et al., 2013). Thus, our second hypothesis (*H2*) assumes

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that Describe, Act/Aware, and Accept will relate specifically and negatively to emotional distress (paths  $c_2$ - $c_4$  in Figure 1); no specific hypothesis is formulated for Observe (path  $c_1$ ).

Lower perceived stress and lower emotional distress promote cognitive focus and release resources to pursue a healthier lifestyle (Roberts & Danoff-Burg, 2010; Yarcheski, Mahon, Yarcheski, & Cannella, 2004). This leads to our third hypothesis ( $H3$ ) that emotional distress will relate specifically and negatively to multiple health behaviors (path  $d$  in Figure 1).

The assumed relationships (paths  $f_i$ ,  $c_i$ , &  $d$  in Figure 1) imply the presence of mediation via emotional distress. Thus, it is assumed that emotional distress will mediate portions of the links between Describe, Act/Aware, and Accept with multiple health behaviors; no specific hypothesis is formulated for the Observe facet ( $H4$ ). Roberts and Danoff-Burg (2010) reported preliminary evidence for a partial total mindfulness-perceived stress-health behaviors mediation. However, it remains to be shown how their results extend to mindfulness facets.

### 1.3 Mindfulness facets, trait emotional intelligence, distress, and health behavior

Trait emotional intelligence (*TEI*) refers to a configuration of trait emotional self-efficacies or emotion-related dispositions located at the lower levels of trait-hierarchies (Petrides, Pita, & Kokkinaki, 2007). TEI captures emotion-related variance that is either unique to TEI or scattered across higher-order trait factors (Petrides et al., 2007). The TEI-domain is hierarchically structured and consists of 15 TEI facets organized under four TEI factors and a global TEI factor at the top of the hierarchy (Petrides, 2009).

The decision to regard TEI as a variable that mediates the relationships between mindfulness, stress, and health behaviors was based on an integration of prior theory and research: Consistent with the top-down regulation perspective, mindfulness may serve as a platform to develop the emotional self-efficacies comprising TEI (Schutte & Malouff, 2011).

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Attending to one's ongoing experience and adopting a non-judgmental, accepting orientation enables individuals to accurately perceive emotions and to effectively regulate emotional states (Coffey et al., 2010; Hill & Updegraff, 2012). Accordingly, mindfulness-based interventions impact positively on TEI (Chu, 2010). Correlational evidence also suggests that total mindfulness relates positively to TEI (Bao, Xue, & Kong, 2015; Schutte & Malouff, 2011; Sinclair & Feigenbaum, 2012). Furthermore, Describe correlated positively and reliably with various TEI facets; the slightly more heterogeneous relationships between Act/Aware, Accept, and Observe with TEI facets tend to be positive as well (e.g., Baer et al., 2004; Coffey et al., 2010). Thus, our fifth hypothesis (*H5*) assumes that all four mindfulness facets will uniquely and positively relate to TEI (paths  $a_i$  in Figure 1).

Higher TEI is linked with the use of more adaptive and less maladaptive coping strategies, less rumination (Petrides et al., 2007), less difficulties in emotion regulation (Sinclair & Feigenbaum, 2012), better health and lower emotional distress (Martins et al., 2010). Even in the presence of total mindfulness, TEI remained related to stress (Bao, Xue, & Kong, 2015; Wang & Kong, 2014). Our sixth hypothesis (*H6*) therefore assumes that TEI will relate specifically and negatively to emotional distress (path  $b$  in Figure 1).

The mindfulness facets-TEI-emotional distress model nested within the larger serial mediation model (paths  $a_i$ ,  $b$  &  $c_i$  in Figure 1) is consistent with prior research showing that TEI partially mediates the effects of total mindfulness on stress (Bao et al., Wang & Kong, 2014), well-being (Schutte & Malouff, 2011), and pain (Wright & Schutte, 2014). By drawing on mindfulness facets, the current study will extend this line of research. TEI was expected to mediate portions of the links between Describe, Act/Aware, and Accept to emotional distress, whereas no specific hypothesis was formulated for Observe (*H7*).

TEI is negatively associated with health-compromising habits such as alcohol abuse and disordered eating (Gardner & Qualter, 2010). Saklofske, Austin, Galloway, and Davidson (2007) reported positive relations between TEI and regular exercises, diet, and number of



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doctor's visits. Although emotional distress may mediate portions of the TEI-multiple health behavior link, TEI may also be directly linked to multiple health behaviors due to intervening mechanisms unrelated to stress (cf. Smith, 2006). Thus, our eighth hypothesis (*H8*) assumes a specific and positive direct effect for TEI on multiple health behaviors (path *e* in Figure 1).

Compared to Roberts and Danoff-Burg's (2010) mediation model, the serial mediation model enables a more detailed analysis of the mechanisms that link mindfulness and health behaviors by considering three specific mediation pathways: via emotional distress (see *H4*), via TEI, and serially via TEI and emotional distress. Complementing the fourth hypothesis, our ninth hypothesis (*H9*) therefore assumes that the relationships of Describe, Act/Aware, and Accept with health behaviors will additionally be mediated via TEI and serially via TEI and emotional distress; no specific prediction was formulated for Observe.

## 2. Method

### 2.1 Procedure and participants

The current study was conducted as a web-based survey. Participants were recruited by posting links to the online survey on three online forums for German occupational therapists. No material incentive was given for participation. Participants who gave their informed consent completed an online questionnaire containing various scales presented in a random order. Completion of the survey took about 30 minutes (for further details see Jacobs, Sim, & Zimmermann, 2015).

A total of  $N=741$  visitors accessed the questionnaire, and a total of  $N=427$  participants completed the survey. The dropout rate was 42%, which is common for web-based surveys (Musch & Reips, 2000). The final sample consisted of 22 (5.1%) men and 405 (94.9%) women. The participants were rather diverse in age ( $M=34.1$  years,  $SD=9.9$ ), work experience ( $M=11.2$  years,  $SD=7.6$ ), work load per week ( $M=34.7$  hours,  $SD=9.1$ ), and domains of work (e.g., psychiatry, pediatrics, neurology, geriatrics, and orthopedics).

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### 2.2 Instruments

*Kentucky Inventory of Mindfulness Skills (KIMS, Baer et al., 2004; German version, Ströhle et al., 2010)*: The KIMS is a self-report inventory designed to assess four trait-like facets or skills of mindfulness: *Observe* (12 items), *Describe* (8 items), *Act with awareness (Act/Aware)*; 10 items), and *Accept without judgment (Accept)*; 9 items). All items were rated on a 5-point scale (1='never or very rarely true' to 5='very often or always true'). Ströhle et al. (2010) established the reliability and validity of the German KIMS. In the present study, Cronbach's  $\alpha$  of the KIMS scales ranged from .75 to .90 (see Table 1).

*Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF, Petrides, 2009)*: TEI was assessed with the German TEIQue-SF which provides a comprehensive coverage of the TEI-domain with two items per TEI facet. The 30 items were derived from the German TEIQue (Freudenthaler, Neubauer, Gabler, Scherl, & Rindermann, 2008), rated on a 7-point scale (1='completely disagree' to 7='completely agree'), and scored to produce a global TEI score. The reliability and structural validity of the German TEIQue-SF have been shown in Jacobs et al. (2015). The coefficient  $\alpha$  of the total TEI score was .88.

*Brief Depression Anxiety Stress Scale (DASS-21, Lovibond & Lovibond, 1995; German version, Köppe, 2001)*: Emotional distress experienced in the past two weeks was assessed by the German DASS-21 *Stress* scale. The seven Stress items cover tension, irritability, negative activation, agitation, and a tendency to overreact to stressful events. Respondents were asked to rate how much each statement applied to them on a 4-point scale (0='never' to 3='most of the time'). The German DASS-21 showed good reliability and validity (Köppe, 2001). In the current study, Cronbach's  $\alpha$  of the Stress scale was .89.

*Multiple Health Behavior Questionnaire (MHB, Wiesmann et al., 2003)*: The full MHB-39 assesses 39 habitual health-enhancing and reverse scored health-compromising behaviors.

### 3. Results

We excluded 9 items which either seemed ambiguous in the context of health-behavior (e.g., repair faulty electrical appliances) or were rated as only slightly conducive to health (e.g., act environmentally conscious, share information about health with others; ratings in Wiesmann, Klein, & Hannich, 2011). The selected 30 items comprised behaviors related to an active life style (e.g., outdoor activities, being active), compliance (e.g., regular health check-ups, adhere to physicians advices), hygiene (e.g., regular dental & body care), nutrition (e.g., avoid sweets & fatty meals), avoid substance use (e.g., avoid nicotine & alcohol), and security (e.g., use seat belts, drive considerately). Respondents indicated on a 5-point scale (0='never' to 4='always') to what extent they perform these behaviors on a regular basis. The reliability of the MHB ( $\alpha=.78$ ) was comparable to the reliability of the full MHB-39 ( $\alpha=.80$ ; Wiesmann et al., 2003).

**Please insert Table 1 about here**

#### 2.3 Statistical analyses

Hypotheses were tested in IBM SPSS 20 with PROCESS (Hayes, 2013) using an ordinary least squares path analytical framework. Inferences about indirect effects were based on bias corrected (BC) confidence intervals derived from 5000 bootstrap resamples. The mindfulness-TEI-emotional distress mediation model nested within the larger serial two-mediator model was tested first. Next, the serial mediation model was probed. Age correlated with mindfulness facets, TEI, and MHB (see Table 1) and was used as a covariate in all analyses. Gender was omitted as a covariate, as it did not significantly correlate with TEI, Stress, and MHB.

### 3. Results

#### 3.1 Testing the mindfulness facets-TEI-emotional distress mediation model

When TEI was regressed on age and mindfulness facets, 50.2% of variance in TEI was explained,  $F(5,421)=84.73$ ,  $p<.001$ . Higher Describe, Act/Aware, and Accept were specifically related to higher TEI (see Table 2 & Figure 2). Observe correlated positively with

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TEI,  $r=.19$ ,  $p<.001$ . However, because of its overlap with Describe,  $r=.33$ ,  $p<.001$ , it did not relate specifically to TEI,  $\beta=.07$ ,  $p\leq.08$ . In the total effects model, age and mindfulness facets accounted for 30.9% of variance in Stress,  $F(5,421)=37.73$ ,  $p<.001$ . Higher Act/Aware and Accept were significantly related to lower Stress (total effects in Table 2). Describe and Observe were not specifically linked to Stress. In the direct effects model, TEI explained 7.3% of incremental variance in Stress,  $F(1,420)=49.72$ ,  $p<.001$ . When the negative effect of TEI on Stress was accounted for, Accept and Act/Aware were still negatively, albeit weaker linked to Stress (direct effects in Table 2 & Figure 2).

Mediation analyses revealed that the 95%-BC-confidence intervals (95%-CI) of three indirect effects  $ab$  precluded zero suggesting significance: Describe ( $ab=-.144$ , 95%-CI:  $-.206$  to  $-.090$ ), Act/Aware ( $ab=-.067$ , 95%-CI:  $-.114$  to  $-.035$ ), and Accept ( $ab=-.151$ , 95%-CI:  $-.221$  to  $-.095$ ). The significant total, direct, and indirect effects for Accept and Act/Aware implied partial mediation via TEI; the indirect effect for Describe in conjunction with nonsignificant, yet oppositely directed total and direct effects suggested inconsistent mediation (cf. Hayes, 2013). Due to the insignificant specific relation between Observe and TEI, no significant indirect effect emerged for Observe ( $ab=-.025$ , 95%-CI:  $-.060$  to  $.003$ ).

**Please insert Figure 2 and Tables 2 and 3 about here**

#### 3.2 Testing the serial mediation model

To examine pathways that may link mindfulness and multiple health behaviors, indirect effects via TEI, Stress, and serially via TEI and Stress were tested per mindfulness facet. Since testing three indirect effects per facet might inflate type I error, more conservative 99%-confidence intervals were estimated. Table 2 shows the total and direct effects on MHB and the variance explained in MHB (for a graphical representation see Figure 2). Table 3 shows the indirect effects and the respective bias corrected 99%-CIs for each mindfulness facet.

In the total effects model, age and mindfulness facets accounted for 29.1% of variance in MHB,  $F(5,421)=34.49$ ,  $p<.001$ . Higher scores on all four mindfulness facets were uniquely

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linked to better multiple health behaviors. In the direct effects model, TEI and Stress explained incremental 8.7% of variance in MHB,  $F(2,419)=29.45, p<.001$ . Both mediators showed specific effects on MHB, suggesting that lower Stress and higher TEI related uniquely to better health behaviors. After controlling for both mediators, significant direct effects on MHB remained for Observe and Act/Aware.

Mediation analysis revealed that the 99%-CIs of eight indirect effects precluded zero, thus suggesting significance (see Table 3). Significant indirect effects via Stress were found for Act/Aware and Accept: Greater Act/Aware and Accept were significantly related to lower Stress (over and above TEI), which in turn was uniquely related to better health habits. Indirect effects via TEI were confirmed for three facets: Higher Describe, Act/Aware, and Accept were associated with higher TEI, and higher TEI in turn was linked to better health habits (over and above Stress). Serial mediation via TEI and Stress was shown for Describe, Act/Aware, and Accept. The results suggested full mediation for Describe and Accept, partial mediation for Act/Aware, and no mediation for Observe.

#### **4. Discussion**

The present study tested a serial mindfulness facets-TEI-emotional distress-multiple health behaviors mediation model in occupational therapists. It extended prior literature in three important ways: *a*) it integrated the mindfulness-TEI-stress mediation model (Bao et al., 2015; Wang & Kong, 2014) and the mindfulness-TEI-health behaviors model (Roberts & Danoff-Burg, 2010) into a serial two-mediator model, *b*) it took the multifaceted nature of mindfulness into account (Baer et al., 2004) and *c*) it used an index of multiple health behaviors as outcome (Wiesmann et al. 2003). What were the main results and what did we learn from this study?

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Regarding the mindfulness-TEI-emotional distress section of the model, the negative total effects of acting with awareness and accepting without judgment on emotional distress provided partial support for the second hypothesis and emphasized the importance of both facets in the context of mental health (Ströhle et al., 2010). The lack of an incremental effect for mindful describing was due to its overlap with Accept and Act/Aware, both of which are deemed to be more central to mindfulness (Bergomi et al., 2013). The non-significant relationship between Observe and emotional distress is consistent with other findings in samples naïve to meditation (Baer et al., 2004; Ströhle et al., 2010). The present study also showed that mindfulness facets bear different relevance for TEI: Higher Describe, Accept, and Act/Aware were uniquely linked to higher TEI (H5 partially supported). Due to its overlap with Describe, Observe showed no specific relationship with TEI. These results are reconcilable with prior assumptions that TEI represents a sequel of mindfulness (Chu, 2010; Coffey et al., 2010). Moreover, higher TEI was specifically related to lower emotional distress (H6 supported). This adds to the importance of TEI as an individual difference that co-varies with mental health outcomes (Martins et al., 2010) even in the presence of other important health-related variables such as mindfulness facets.

Our results also add to prior literature (Bao et al., 2015; Schutte & Malouff, 2011; Wang & Kong, 2014; Wright & Schutte, 2014) of TEI's ability to mediate the mindfulness-emotional distress link varies across mindfulness facets: Inconsistent mediation emerged for Describe, partial mediation was revealed for Accept and Act/Aware, Observe was not amenable to mediation via TEI (H7 partially confirmed). The inconsistent mediation found for mindful describing suggests a dual process: One process linked higher Describe via TEI to lower emotional distress, whereas variance unique to Describe gave rise to a tentative, yet insignificant direct positive effect on emotional distress. Both effects interfered and resulted in an insignificant total effect. Moreover, global TEI partially mediated the associations between Accept and Act/Aware with emotional distress. The presence of partial mediation is

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consistent with prior research using total mindfulness scores (e.g., Bao et al., 2015; Schutte & Malouff, 2011). It points to the existence of intervening mechanisms outside the TEI domain, such as bottom-up emotional and behavioral regulation processes (Chiesa et al., 2013) or core self-evaluations (Kong, Wang, & Zhao, 2014), that need further research.

Our results for the serial two-mediator model also extend prior research (Black et al., 2012; Murphy et al., 2012; Roberts & Danoff-Burg, 2010; Vidrine et al., 2009) by showing that higher mindfulness is linked to combined health behaviors and that these associations vary across mindfulness facets. Consistent with H1, all KIMS facets related positively to multiple health behaviors and the most relevant facet for MHB was Observe. Although Observe may be of limited relevance for substance use (Karyadi et al., 2014), mindful observing seems to be relevant for other health behaviors comprising the MHB index. Interestingly, Gilbert and Waltz (2010) reported that men's health behaviors were mostly related to Observe, whereas women's health behaviors were mostly linked to Describe. The present study points to the importance of Observe for both genders' health behaviors.

However, Observe was measured with items that may connote self-attention to persons with limited meditation experience (Bergomi et al., 2013). But to be conducive to one's health, observing of ongoing events needs to be done mindfully. Contrary to being overly attentive to benign or ambiguous bodily sensations and to experience them as unpleasant and alarming, mindful observing of ongoing internal stimuli may increase the veridicality of somatic perceptions (Mirams, Poliakoff, Brown, & Lloyd, 2013). Mindfulness has the potential to improve the accuracy of perceptions of internal and external stimuli, which may contribute to more flexible, objectively informed health behavior responses. Thus, there is a fine line to balance and further research is needed to clarify the degree to which the Observe-health behaviors link reflects mindful perceiving or maladaptive vigilance regarding health.

#### 4. Discussion

Consistent with the third and eighth hypothesis, Stress and TEI accounted both for unique portions of variance in multiple health behaviors over and above mindfulness. This contributes to prior research showing that TEI and emotional distress are important factors that are related to how well a person is able to maintain a healthy lifestyle (Gardner & Qualter, 2010; Saklofske et al., 2007; Yarcheski et al., 2004).

Compared to Roberts and Danoff-Burg (2010), the facet-based approach to mindfulness and the serial mediation model revealed a more detailed picture of the intervening processes linking mindfulness and health behaviors: Eight out of 12 specific indirect effects were significant and enabled full mediation for Describe and Accept, partial mediation for Act/Aware, but no mediation for Observe. All three indirect effects were needed to fully mediate the Accept-MHB link and to partially mediate the Act/Aware-MHB link. Two indirect effects (via TEI and serially via TEI and Stress) fully mediated the Describe-MHB association. Thus, the results partially confirmed the fourth hypothesis and were fully in line with the ninth hypothesis. The serial mediation model improves our understanding of the mechanisms that connect mindfulness and health behaviors and it provides a basis for linking mindfulness facets with health via health behaviors (Smith, 2006). However, full mediation does not preclude alternative mediational pathways (Hayes, 2013). Future research might test TEI and Stress against alternative mediators, such as emotion regulation difficulties (Sinclair & Feigenbaum, 2012) or core self-evaluations (Kong et al., 2014) to identify the most reliable and powerful intervening mechanisms that link mindfulness facets to health behaviors.

In a similar way, the significant direct effects for Observe and Act/Aware point to mediation mechanisms outside the model. For example, habitually directing one's attention to internal and external stimuli may be crucial for a clearer perception of a personal susceptibility to risk and illness, which may strengthen one's intention for health behaviors (Ferguson, 2013). Both KIMS facets may also enhance one's self-controlling and self-



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monitoring skills that help to monitor, regulate, and maintain a healthy life style (Gilbert & Waltz, 2010). Finally, mindfulness may facilitate separation between thoughts (e.g., “this is too difficult to do”) and action. This may strengthen the intention-behavior link in the context of healthy behaviors and it may shield unhealthy intentions or urges from converting into unhealthy behaviors (Black et al., 2012). These processes may have contributed to both direct effects for Observe and Act/Aware, which need further research.

The current study was limited by several factors: Firstly, as the present study was cross-sectional, causality cannot be inferred. Treating mindfulness facets as predictor variables and TEI as a mediator variable was consistent with prior theory and empirical findings (e.g., Chu, 2010; Coffey et al., 2010; Schutte & Malouff, 2011). However, the assumption that mindfulness causally impacts on TEI (and not vice versa) needs further research with longitudinal and experimental data. Secondly, content overlap among the scales might limit the validity of the results. To preclude artifacts, we created modified scales with nine emotion related items (KIMS) and six well-being related items (TEIQue-SF) removed (cf. Petrides et al., 2007). When the mediation analyses were re-run, all previously significant effects remained significant. Thus, controlling for content overlap did not render the results different, which corroborated the validity of the results. Thirdly, the web-based design of the survey might impair the quality of the data. However, prior evidence suggests that online methods and traditional methods yield basically equivalent data (Davidov & Depner, 2011). Fourthly, only 5.1% of the study participants were male which precluded the ability to examine whether the findings hold across both genders. Similar low frequencies of male occupational therapists were also reported elsewhere (e.g., Gupta et al., 2012; Lloyd et al., 2005) and may reflect the low base-rate of men in this profession. Finally, participants likely differed in their familiarity with the mindfulness concept. These differences may lead to differential understanding of mindfulness items, especially of Observe items (Bergomi et al., 2013). This may bias the

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effects of mindfulness. More research using experimental or case control designs (compare persons with and without meditation experience) is needed to evaluate this potential bias in the context of the suggested serial two-mediator model.

Despite these limitations, the present study permitted important insights into the links between mindfulness facets, global TEI, distress, and multiple health behaviors. The results have also important clinical implications. Given that meditation practice increases mindfulness (Falkenström, 2010), TEI (Chu, 2010), and health (Keng et al., 2011), the results provide a basis for how to implement mindfulness based interventions aimed at reducing distress and sustaining and increasing health in occupational therapists. More generally, since premature mortality and many contemporary health problems are largely preventable by regularly performing multiple health behaviors (Loef & Walach, 2012), TEI and mindfulness are important individual differences that promote such a healthy lifestyle.

## 5. References

- Baer, R.A., Smith, G.T., & Allen, K.B. (2004). Assessment of mindfulness by self-report the Kentucky inventory of mindfulness skills. *Assessment, 11*, 191–206.
- Bao, X., Xue, S., & Kong, F. (2015). Dispositional mindfulness and perceived stress: The role of emotional intelligence. *Personality and Individual Differences, 78*, 48–52.
- Bergomi, C., Tschacher, W., & Kupper, Z. (2013). The assessment of mindfulness with self-report measures: existing scales and open issues. *Mindfulness, 4*, 191–202.
- Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D. et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230–241.

## 5. References

- Black, D.S., Sussman, S., Johnson, C.A., & Milam, J. (2012). Trait mindfulness helps shield decision-making from translating into health-risk behavior. *Journal of Adolescent Health, 51*, 588–592.
- Chiesa, A., Serretti, A., & Jakobsen, J.C. (2012). Mindfulness: Top-down or bottom-up emotion regulation strategy? *Clinical Psychology Review, 33*, 82–96.
- Chu, L.C. (2010). The benefits of meditation vis-à-vis emotional intelligence, perceived stress and negative mental health. *Stress and Health, 26*, 169–180.
- Coffey, K.A., Hartman, M., & Fredrickson, B.L. (2010). Deconstructing mindfulness and constructing mental health: understanding mindfulness and its mechanisms of action. *Mindfulness, 1*, 235–253.
- Davidov, E., & Depner, F. (2011). Testing for measurement equivalence of human values across online and paper-and-pencil surveys. *Quality & Quantity, 45*, 375–390.
- Falkenström, F. (2010). Studying mindfulness in experienced meditators: A quasi-experimental approach. *Personality and Individual Differences, 48*, 305–310.
- Ferguson, E. (2013). Personality is of central concern to understand health: towards a theoretical model for health psychology. *Health Psychology Review, 7*, S32-S70.
- Freudenthaler, H.H., Neubauer, A.C., Gabler, P., Scherl, W.G., & Rindermann, H. (2008). Testing and validating the trait emotional intelligence questionnaire (TEIQue) in a German-speaking sample. *Personality and Individual Differences, 45*, 673-678.
- Gardner, K.J., & Qualter, P. (2010). Concurrent and incremental validity of three trait emotional intelligence measures. *Australian Journal of Psychology, 62*, 5–13.
- Gilbert, D., & Waltz, J. (2010). Mindfulness and health behaviors. *Mindfulness, 1*, 227–234.

## 5. References

- Gupta, S., Paterson, M.L., Lysaght, R.M., & Von Zweck, C.M. (2012). Experiences of burnout and coping strategies utilized by occupational therapists. *Canadian Journal of Occupational Therapy, 79*, 86–95.
- Hayes, A.F. (2013). *Mediation, moderation, and conditional process analysis*. New York: Guilford Press.
- Hill, C.L., & Updegraff, J.A. (2012). Mindfulness and its relationship to emotional regulation. *Emotion, 12*, 81–90.
- Jacobs, I., Sim, C.W., & Zimmermann, J. (2015). The German TEIQue-SF: Factorial structure and relations to agentic and communal traits and mental health. *Personality and Individual Differences, 72*, 189–194.
- Karyadi, K. A., VanderVeen, J. D., & Cyders, M. A. (2014). A meta-analysis of the relationship between trait mindfulness and substance use behaviors. *Drug and Alcohol Dependence, 143*, 1–10.
- Keng, S.L., Smoski, M.J., & Robins, C.J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31*, 1041–1056.
- Kong, F., Wang, X., & Zhao, J. (2014). Dispositional mindfulness and life satisfaction: The role of core self-evaluations. *Personality and Individual Differences, 56*, 165–169.
- Köppe, E. (2001). Happy parents - nice children? Impact of partnership and parental symptomatology on children's behavior. (Unpublished doctoral dissertation). Technische Universitaet Braunschweig, Braunschweig, Germany.
- Lloyd, C., McKenna, K., & King, R. (2005). Sources of stress experienced by occupational therapists and social workers in mental health settings. *Occupational Therapy International, 12*, 81–94.
- Loef, M., & Walach, H. (2012). The combined effects of healthy lifestyle behaviors on all cause mortality: a systematic review and meta-analysis. *Preventive Medicine, 55*, 163-170.

## 5. References

- Lovibond, P.F., & Lovibond, S.H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*, 335–343.
- Ludwig, D.S., & Kabat-Zinn, J. (2008). Mindfulness in medicine. *The Journal of the American Medical Association*, *300*, 1350–1352.
- Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Personality and Individual Differences*, *49*, 554–564.
- Mirams, L., Poliakoff, E., Brown, R.J., & Lloyd, D. (2013). Brief body-scan meditation practice improves somatosensory perceptual decision making. *Consciousness & Cognition*, *22*, 348–359.
- Murphy, M.J., Mermelstein, L.C., Edwards, K.M., & Gidycz, C.A. (2012). The benefits of dispositional mindfulness in physical health: a longitudinal study of female college students. *Journal of American College Health*, *60*, 341–348.
- Musch, J., & Reips, U.-D. (2000). A brief history of web experimenting. In M. Birnbaum (Ed.), *Psychological experiments on the internet* (pp. 61–85). San Diego, CA: Academic.
- Petrides, K.V. (2009). Psychometric Properties of the Trait Emotional Intelligence Questionnaire (TEIQue). In Stough, C., Saklofske, D.H., & Parker, J.D.A. (Eds.), *Assessing Emotional Intelligence: Theory, Research, and Applications* (pp. 85–101). New York: Springer.
- Petrides, K.V., Pita, R., & Kokkinaki, F. (2007). The location of trait emotional intelligence in personality factor space. *British Journal of Psychology*, *98*, 273–289.
- Roberts, K.C., & Danoff-Burg, S. (2010). Mindfulness and health behaviors: is paying attention good for you? *Journal of American College Health*, *59*, 165–173.

## 5. References

Saklofske, D.H., Austin, E.J., Galloway, J., & Davidson, K. (2007). Individual difference correlates of health-related behaviours: Preliminary evidence for links between emotional intelligence and coping. *Personality and Individual Differences, 42*, 491–502.

Schutte, N.S., & Malouff, J.M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Personality and Individual Differences, 50*, 1116–1119.

Segerstrom, S.C., & O'Connor, D.B. (2012). Stress, health and illness: Four challenges for the future. *Psychology and Health, 27*, 128–140.

Sinclair, H., & Feigenbaum, J. (2012). Trait emotional intelligence and borderline personality disorder. *Personality and Individual Differences, 52*(6), 674–679.

Smith, T.W. (2006). Personality as risk and resilience in physical health. *Current Directions in Psychological Science, 15*, 227–231.

Ströhle, G., Nachtigall, C., Michalak, J., & Heidenreich, T. (2010). Measuring mindfulness as a multidimensional construct: A German version of the Kentucky Inventory of Mindfulness Skills (KIMS-D). *Zeitschrift für Klinische Psychologie & Psychotherapie, 39*, 1–12.

Vidrine, J.I., Businelle, M.S., Cinciripini, P., Li, Y., Marcus, M.T. et al. (2009). Associations of mindfulness with nicotine dependence, withdrawal, and agency. *Substance Abuse, 30*, 318–327.

Wang, Y., & Kong, F. (2014). The role of emotional intelligence in the impact of mindfulness on life satisfaction and mental distress. *Social Indicators Research, 116*, 843–852.

Wiesmann, U., Timm, A., & Hannich, H.J. (2003). A gender comparison of multiple health behavior and vulnerability. *Zeitschrift für Gesundheitspsychologie, 11*, 153–162.

Wiesmann, U., Klein, A., & Hannich, H.J. (2011). Perceived health maintenance outcomes of multiple health behaviors. *Zeitschrift für Gesundheitspsychologie, 11*, 134–145.

## 5. References

Wright, C.J., & Schutte, N.S. (2014). The relationship between greater mindfulness and less subjective experience of chronic pain: Mediating functions of pain management self-efficacy and emotional intelligence. *Australian Journal of Psychology*, *66*, 181–186.

Yarcheski, A., Mahon, N.E., Yarcheski, T.J., & Cannella, B.L. (2004). A meta-analysis of predictors of positive health practices. *Journal of Nursing Scholarship*, *36*, 102–108.

Tables

Table 1

*Descriptive statistics, coefficient alpha, and correlations for study variables*

	<i>M</i>	<i>SD</i>	$\alpha$	1.	2.	3.	4.	5.	6.	7.
1. Observe	3.39	0.53	.79							
2. Describe	3.60	0.69	.88	.33***						
3. Act with awareness	3.18	0.51	.75	.17***	.31***					
4. Accept without judgment	3.78	0.79	.90	-.05	.25***	.41***				
5. Trait emotional intelligence	5.30	0.67	.88	.19***	.54***	.45***	.55***			
6. Stress	1.19	0.62	.89	-.03	-.25***	-.39***	-.51***	-.55***		
7. Multiple health behaviors	3.20	0.34	.78	.37***	.32***	.38***	.30***	.48***	-.42***	
8. Age in years	34.12	9.88	-	.13**	.15**	.25***	.16**	.10*	-.07	.19***

*Notes: M=mean; SD=standard deviation;  $\alpha$ =Cronbach's alpha. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (2-tailed).*



Tables

Table 2

*Standardized coefficients for effects on TEI, Stress, and multiple health behaviors (MHB) in the serial mediation model depicted in Figure 1*

	TEI	Stress		MHB	
	$\beta$	$\beta_{tot}$	$\beta_{dir}$	$\beta_{tot}$	$\beta_{dir}$
Age	-.07	-.06	-.03	-.05	-.08
Observe	-.07	-.00	-.03	-.31 <sup>***</sup>	-.29 <sup>***</sup>
Describe	-.37 <sup>***</sup>	-.09	-.06	-.10 <sup>*</sup>	-.01
Act/Aware	-.17 <sup>***</sup>	-.20 <sup>***</sup>	-.14 <sup>**</sup>	-.21 <sup>***</sup>	-.12 <sup>*</sup>
Accept	-.39 <sup>***</sup>	-.42 <sup>***</sup>	-.26 <sup>***</sup>	-.19 <sup>***</sup>	-.00
TEI			-.38 <sup>***</sup>		-.24 <sup>***</sup>
Stress					-.24 <sup>***</sup>
$R^2$	-.50 <sup>***</sup>	.31 <sup>***</sup>	-.38 <sup>***</sup>	-.29 <sup>***</sup>	-.38 <sup>***</sup>

*Notes:*  $\beta_{tot}$ =total effect;  $\beta_{dir}$ =direct effect; Act/Aware=Acting with awareness;

Accept=Accept without judgment; TEI=trait emotional intelligence;

MHB=multiple health behaviors. \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$ .

Tables

Table 3

*Total, individual, and serial indirect effects for mindfulness facets on multiple health behaviors and limits of the 99%-confidence intervals*

	Mediators	<i>Ind</i>	99%-confidence interval	
			<i>LL</i>	<i>UL</i>
Observe	Total	-.015	-.027	.060
	TEI	-.016	-.004	.052
	TEI & Stress	-.006	-.002	.019
	Stress	-.006	-.036	.018
Describe	Total	-.109	-.043	.191
	TEI	-.088	-.031	.163
	TEI & Stress	-.034	-.014	.065
	Stress	-.013	-.054	.014
Act/Aware	Total	-.090	-.045	.149
	TEI	-.041	-.012	.088
	TEI & Stress	-.016	-.005	.035
	Stress	-.033	-.005	.071
Accept	Total	-.191	-.115	.285
	TEI	-.093	-.035	.167
	TEI & Stress	-.036	-.014	.071
	Stress	-.063	-.026	.121

*Note: Ind=indirect effect; LL=lower limit; UL=upper limit; 99%-confidence*

*interval are based on BC-bootstraps with 5000 resamples; Act/Aware=Act with awareness; Accept=Accept without judgment; TEI=trait emotional intelligence.*

Figure 1

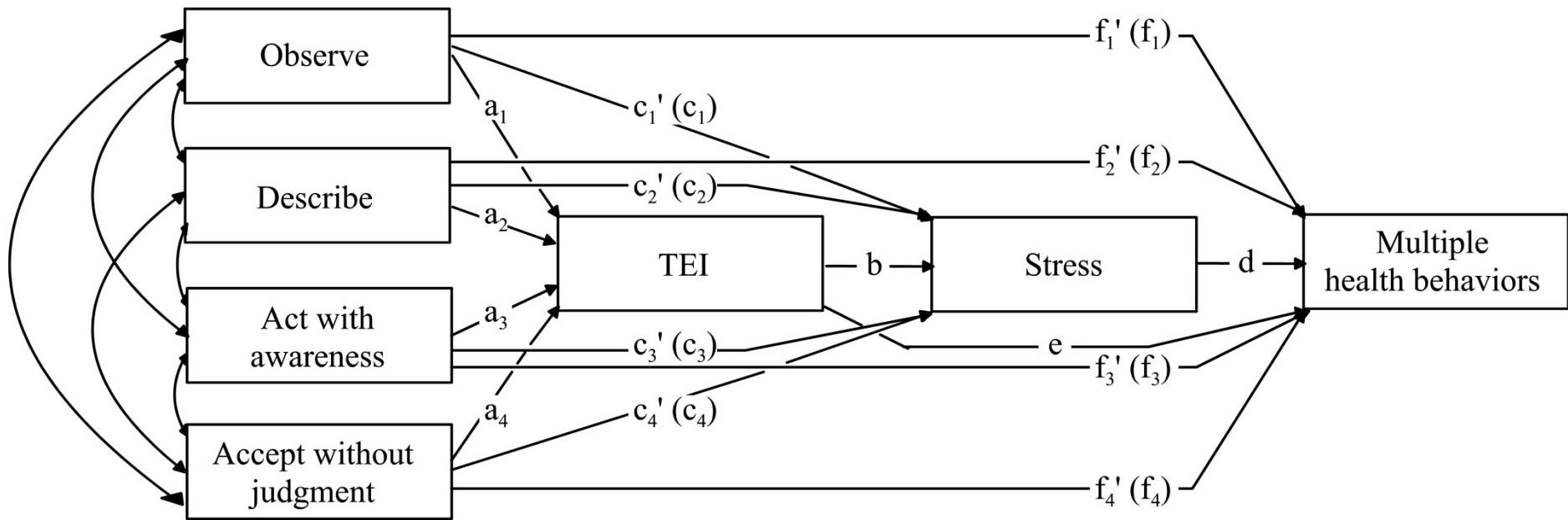
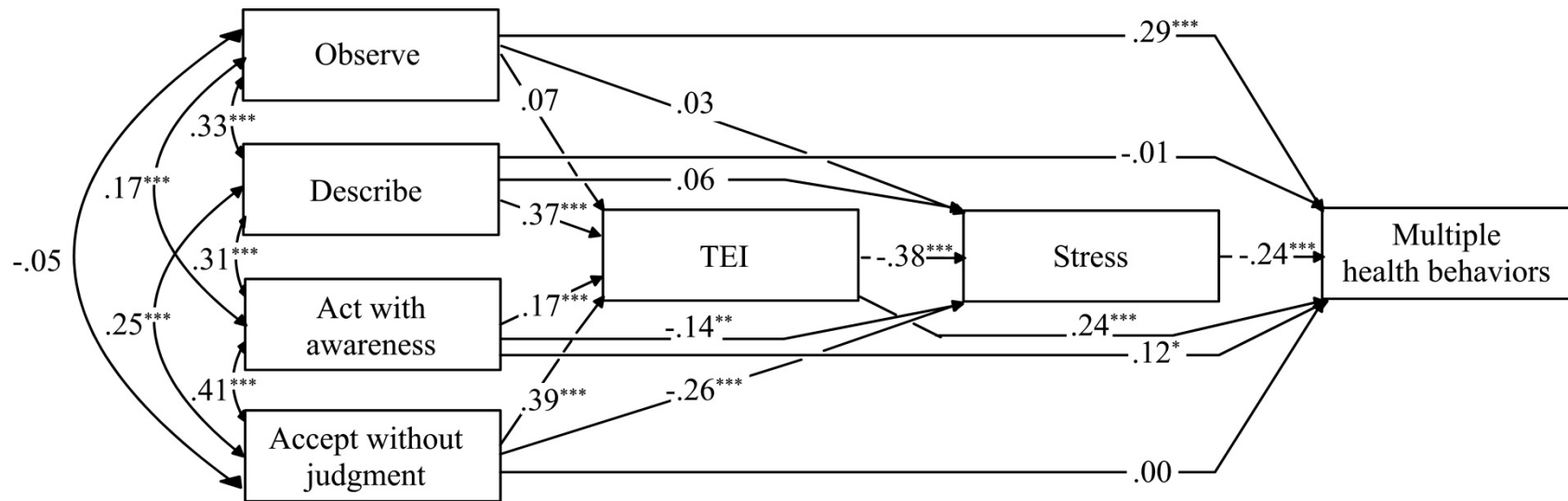


Figure 1. Serial trait mindfulness facets-trait emotional intelligence-emotional distress-multiple health behaviors mediation model.

Figure 1



$R^2 = .38, F(7,419) = 36.38, p < .001$

Figure 2. Standardized path coefficients for the serial two-mediator model (controlled for age). \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .