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The mediating role of basic psychological needs satisfaction in the relationship between trait mindfulness and psychological distress in clinical trainees

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ABSTRACT

Clinical trainees are especially prone to psychological distress. Mindfulness has shown to promote well-being among health care professionals, yet the mechanisms through which it reduces psychological distress are still uncertain. Self-determination theory suggests that mindfulness allows individuals to be more open and receptive to information from their inner and outer worlds, which facilitates satisfaction of their basic psychological needs (BPNS), considered essential to optimal functioning. However, studies investigating whether (BPNS) is an actual pathway through which mindfulness reduces psychological distress are limited to cross-sectional designs. This longitudinal study tested a mediation model using data collected among 27 clinical trainees at the beginning (T1) and mid-point of the academic year (T2). Results indicated that BPNS (T1) partially mediates the relationship between trait mindfulness (T1) and psychological distress (T2). Both the direct ($\beta = -.36$, 95%CI [-.67; -.05]) and indirect ($\beta = -.27$, 95%CI [-.58; -.05]) effects were significant. This model explained a large portion of variance for both needs satisfaction ($R^2 = .30$) and psychological distress ($R^2 = .61$). Our results not only yield support to the role of basic psychological needs in clinical trainees' well-being, but also contribute to the understanding of mindfulness and one of its mechanisms of action.

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Mindfulness; self-determination theory; basic psychological needs; psychological distress; clinical trainees

Psychological distress, defined as a state of emotional suffering characterized by symptoms of depression and anxiety (Mirowsky & Ross, 2002), is perturbingly common among clinical trainees. For instance, a survey conducted among 287 psychology trainees found that 75% of them reported being moderately to very stressed due to their training, while 59% presented symptoms of psychological distress (Cushway, 1992). In the following decade, a couple of studies conveyed similar results. A survey conducted among 199 clinical psychology programs found that anxiety and depression were among the five most commonly reported impairments in students (13% and 23%, respectively; Huprich & Rudd, 2004). Likewise, a study conducted among 363 UK clinical psychology trainees found that 41% of respondents reported one or more significant issues related to anxiety, depression, low self-esteem, or work adjustment (Brooks, Holttum, & Lavender, 2002).

More recently, a study conducted among 203 clinical and counselling psychology doctoral students revealed that 75% of them experienced burnout at some point in their doctoral training (Swords & Ellis, 2017). In light of consistent results over three decades, it is clear that psychological distress is a serious concern among clinical trainees.

This is not surprising, considering the multiple challenges inherent to clinical training. Indeed, in addition to the high academic requirements and expectations inherent to every graduate training program, clinical trainees face specific challenges associated with the nature of their work. For instance, learning to conduct therapy can be a source of high ambiguity due to the absence of clear answers and protocols to follow (Skovholt & Rønnestad, 2003). This high ambiguity can be added to the typical self-doubts that appear when learning to conduct therapy, especially when coupled with the high expectations trainees tend to have at this stage of their training (Cushway, 1992; Pakenham & Stafford-Brown, 2012). Trainees must also learn how to conciliate their new professional identity with their existing personal one. Also, establishing new boundaries between these two (Jahn & Smith-Adcock, 2021) is a learning process that can be potentially stressful and conflictual. For example, one may have to learn where to set limits between expressing empathy and compassion as a friend versus a therapist. Furthermore, clinical trainees may experience feelings of isolation due to the confidential nature of their work, and the prohibition to share information regarding their clinical work with personal acquaintances. In summary, considering the above challenges associated to clinical training, along with the variety and complexity of patients' issues that trainees face, it is clear such a training is particularly stressful.

More critically, it has been shown that clinical trainees presenting significant levels of psychological distress show poorer competencies in therapy, such as greater difficulties in conducting initial assessments, providing psycho-education, or implementing behavioral change techniques, among others (Humphreys, Crino, & Wilson, 2017). In addition, some authors suggest that the link between psychological distress and trainees' competency in therapy may in turn negatively influence the quality of patient care (for a review, see Pakenham & Stafford-Brown, 2012). For instance, a nationwide survey of 749 psychologists practicing psychotherapy revealed that 74.3% of respondents reported experiencing distress in the preceding three years, of which 36.7% indicated that their distress adversely influenced the quality of patient care, while 4.6% admitted that it resulted in inadequate treatment (Guy, Poelstra, & Stark, 1989). In another survey conducted among 522 practicing psychologists, results revealed a strong correlation ($r = .87, p < .0001$) between respondents' distress levels and the number of impairments at work (Sherman & Thelen, 1998). Considering that clinical trainees are especially at risk of psychological distress, it seems imperative to study determinants of trainees' psychological distress and ways to prevent it, especially as it negatively influences their ability to conduct therapy, and their patients may suffer negative consequences as a result. Exploring constructs that may reduce trainees' psychological distress is beneficial to both parties, i.e. the trainees and ultimately their clients. Research suggests that mindfulness can be a promising avenue in this context, as it is frequently associated with lower psychological distress (Carpenter, Conroy, Gomez, Curren, & Hofmann, 2019).

Mindfulness and psychological distress

Introduced in the West in the 1970s, mindfulness is a concept rooted in Buddhist traditions as part of the original process of emancipation from human suffering (Bodhi, 2011). Although its definition is still a source of debate within the scientific community (Davidson & Kaszniak, 2015), mindfulness is most often described as a particular way of being attentive to one's experience, i.e. on purpose, in the present moment, and without judgment (Kabat-Zinn, 1990). This way of being is generally cultivated through the practice of mindfulness meditation, which involves focusing one's attention on a particular object, such as the breath or bodily sensations, or else remaining open and attentive to any experience in the field of consciousness, from moment to moment (Lutz, Slagter, Dunne, & Davidson, 2008). In either case, the practice involves redirecting one's attention to the experience of the present moment whenever one notices that it has gone astray, while cultivating an attitude of openness, acceptance and non-judgment (Shapiro, Carlson, Astin, & Freedman, 2006).

In this context, mindfulness has been defined both as a trait (i.e. the tendency to be mindful in daily life), a state (i.e. being mindful for a specific period, e.g. following a short meditation practice), or even more recently, as a set of skills, as operationalized by the concept of embodied mindfulness (Khoury et al., 2017). Despite these differences in conceptualizing and operationalizing mindfulness, mindfulness skills and trait are highly correlated (Khoury, Vergara, Sadowski, & Spinelli, 2021), and mindfulness training (e.g. meditation) is strongly related to an increase in mindfulness skills (Khoury et al., 2021), state (Lau et al., 2006; Tanay & Bernstein, 2013), and trait (Baer, Carmody, & Hunsinger, 2012). In particular, research has shown that changes in mindfulness state following regular mindfulness practice through meditation predicted changes in their mindfulness trait several weeks later, suggesting that mindfulness trait can be fostered through repetitive mindfulness state induction (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015).

Moreover, studies investigating individual differences in trait mindfulness found it to be associated with various mental health outcomes. For instance, trait mindfulness has been associated with lower levels of psychological distress, including lower levels of psychological symptoms such as depression, anxiety, and stress (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003). Meta-analyses have also supported these results, indicating that trait mindfulness was negatively associated with signs of psychological distress, including negative emotions, anxiety, depression, and perceived life stress (Carpenter et al., 2019; Giluk, 2009).

Following the growing evidence of the association between trait mindfulness and lower psychological distress, more interest was brought to the mechanisms through which mindfulness produces such effects. Over the last decade, researchers suggested various processes (Hölzel et al., 2011), with most pointing at better self-regulation capacities, including cognitive, affective, behavioral, and interpersonal self-regulation (for a recent review, see Wielgosz, Goldberg, Kral, Dunne, & Davidson, 2019). One model that has gained attention stems from self-determination theory (Rigby, Schultz, & Ryan, 2014), suggesting that individuals with higher trait mindfulness would better satisfy their basic psychological needs, essential for optimal functioning. Although this model has strong theoretical grounds, only a few empirical studies investigated the relationship

between trait mindfulness, basic psychological needs as defined by self-determination theory, and psychological distress.

Self-determination theory

Self-determination theory (SDT) proposes three basic psychological needs (BPN) that are essential for optimal functioning (Ryan & Deci, 2017). First, the need for autonomy relates to one's volitional endorsement and self-regulation of one's actions and experiences, free of internal or external pressure. Then, the need for competence refers to the feeling of being self-efficient in important areas of one's life, while the need for relatedness reflects the need to feel socially connected in the context of meaningful relationships. SDT stipulates that when these needs are satisfied, one will feel capable of exercising their full potential, feeling in control of themselves and connected with others, as well as readily able to regulate their behaviors in a way that is flexible and coherent with their thoughts, feelings, goals and values (Ryan & Deci, 2017). When free from pressures to act or feel a certain way, one falls into a state of optimal functioning characterized by psychological and behavioral flexibility, openness, and a sense of self-coherence, i.e. that one's external actions are in complete coherence with one's internal state. Ultimately, SDT stipulates that this sense of self-coherence is associated with greater psychological well-being and optimal functioning (Ryan & Deci, 2017).

Over the last two decades, several studies showed evidence supporting the relationship between BPN satisfaction (henceforth referred to as BPNS) and well-being, many of which have been summarized in meta-analyses (Van den Broeck, Ferris, Chang, & Rosen, 2016; Yu, Levesque-Bristol, & Maeda, 2018). This relationship has been demonstrated across several life domains (Milyavskaya & Koestner, 2011), including work (Deci et al., 2001) and education (Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013). Moreover, BPNS has been shown to contribute to people's well-being across several different countries (Chirkov, Ryan, & Willness, 2005; Church et al., 2013), regardless of individual differences in the importance attributed to each of these needs or the desire to satisfy them, suggesting that BPNS be a universal source of well-being (Chen et al., 2015). Yet, while several studies have investigated the link between BPNS and well-being, fewer looked at its relationship with psychological distress. Indeed, although sometimes thought of as opposites of the same continuum, psychological well-being and psychological distress have been shown to represent two distinct constructs that need to be studied separately (Winefield, Gill, Taylor, & Pilkington, 2012). While the former reflects a combination of positive affective states and optimal functioning in important areas of one's life (Ryan, Huta, & Deci, 2008), the latter relates more to a state of emotional suffering associated with symptoms of anxiety and depression in response to a specific stressor (Ridner, 2004). Considering that clinical trainees are primarily at risk of psychological distress (Huprich & Rudd, 2004; Swords & Ellis, 2017), focusing on this particular aspect of their psychology appears crucial.

Furthermore, in the SDT literature, psychological distress has been more often studied with BPN frustration (BPNF), namely the active thwarting of the needs by one's environment. These studies generally reveal that BPNF is associated with various adverse outcomes, such as anxiety, depression, and burnout (Ferrand & Martinent, 2020; Tindall & Curtis, 2019). In this context, theoretical and empirical accounts of BPN generally posited

that BPNS predicted psychological well-being, while BPNF predicted psychological distress (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013). Still, some studies suggest that BPNS can also predict lower levels of psychological distress. For example, Gunnell et al. (2013) showed that while BPNF predicted only negative affect, BPNS predicted both positive and negative ones. In another study, the level of autonomy satisfaction in therapy was associated with decreases in levels of anxiety and depression in patients (Dwyer, Hornsey, Smith, Oei, & Dingle, 2011). Similarly, studies with athletes showed that BPNS negatively predicted burnout (for a meta-analysis, see Li, Wang, Pyun, & Kee, 2013). Thus, more research is warranted to determine the relationships between BPNS and psychological distress. Yet, studies to date suggest that individuals whose needs are better satisfied would be better able to cope with stressful events and thus, experience less psychological distress (Vansteenkiste & Ryan, 2013).

Trait mindfulness as a determinant of one's own BPNS

Traditionally, SDT suggests that optimal functioning is conditional on the environment's capacity to support one's own fundamental psychological needs; just like plants need water, sunlight, and good soil to grow, human beings are said to need sufficient psychological nourishment to flourish (Ryan & Deci, 2017). In this context, one's peers, loved ones, and teachers are key agents of need support or thwarting. But how could individuals satisfy their own BPN if the environment does not supply those basic ingredients, or even worse, thwarts their basic needs? SDT proposes that one's ability to be mindful could potentially offer individuals a way to autonomously satisfy one's own BPN (Rigby et al., 2014). It is thought that more mindful individuals would be more attentive and receptive to inner and environmental cues, in a non-defensive manner and without judgment, thus enabling them to meet their BPN (Rigby et al., 2014).

Yet, beyond theory, very few studies have empirically linked trait mindfulness to BPNS, and most of them have focused only on autonomy satisfaction (Brown & Ryan, 2003). However, regarding BPNS more globally, experimental evidence linking mindfulness to BPNS is scarce, and results have been contradictory, with mindfulness training in children either lowering, increasing, or being unrelated to BPNS (Malboeuf-Hurtubise, Joussemet, Taylor, & Lacourse, 2018; Malboeuf-Hurtubise, Taylor, & Mageau, 2019). These contradicting results underline the necessity for more empirical studies investigating the relationship between mindfulness and BPNS. Moreover, as suggested by Malboeuf-Hurtubise and colleagues, this relationship may be different among children than adults, with the former being developmentally more dependent on environmental influence than the latter.

A few studies examined the relationship between mindfulness, BPNS, and symptoms of psychological distress among adults. For instance, BPNS has been found to mediate the link between trait mindfulness and negative affect among Chinese undergraduates (Chang, Huang, & Lin, 2015), as well as between trait mindfulness and psychological distress among military college cadets (Charbonneau, 2019). Similarly, autonomy satisfaction has also been found to explain the link between trait mindfulness and stress among student-athletes (Shannon et al., 2020). While these studies are an important first step in supporting the idea that BPNS accounts for some part of the relationship between trait

mindfulness and reductions in psychological distress, these studies all employed a cross-sectional design. As such, they cannot fully prove a mediation, as there is no temporal sequence between variables in the model (Maxwell & Cole, 2007). Indeed, mediation implies a process that is operating through time. Hence it has been shown that cross-sectional approaches to mediation do not account for this effect on the studied variables and can consequently create substantial bias in the estimation of the actual longitudinal effects (Maxwell, Cole, & Mitchell, 2011). Longitudinal designs with at least two points in time would be required to effectively consider the effect of time on variables and consequently reduce those biases (Mitchell & Maxwell, 2013).

To our knowledge, only one study tested the relationship between trait mindfulness, BPNS, and psychological distress in a longitudinal design (Chang, Chang, & Chen, 2018). Results from this study supported previous findings, showing that BPNS played a mediational role in the relationship between trait mindfulness and various indicators of psychological well-being. Yet, the focus of the study was mainly on eudemonic and hedonic well-being, with the latter being defined as the presence of positive affect in the absence of negative affect. Thus, negative affect was measured only using six items (i.e. anxiety, frustration, anger, irritability, fear, and depression; PANAS; Watson, Clark, & Tellegen, 1988). In the name of robust science, we aim to replicate Chang et al. (2018)'s findings with a more extensive measure of psychological distress. Also, as clinical trainee populations are particularly at risk for psychological distress, such as depression, stress, and anxiety, a more clinically investigative measure is imperative. Moreover, it seems particularly important to investigate whether trait mindfulness and BPNS are effectively determinants of lower psychological distress within this population. Specifically, we aim to explore whether trait mindfulness is associated with lower levels of psychological distress in clinical trainees, and to what extent BPNS is an effective mechanism explaining this relationship.

Methods

Participants

Following ethics approval, we recruited 38 clinical trainees (i.e. students completing graduate studies to become licensed mental health professionals) via class advertisement at the beginning of the semester over two consecutive years in two large, urban universities in the same city. Trainees were either 2nd or 3rd year doctorate students in clinical psychology, or 1st or 2nd year master's students in counselling psychology. To be eligible, participants had to conduct therapy as part of their training. Data was collected at two time-points. First, at the beginning of the fall semester, when trainees were starting to see clients, and second, at the mid-point of the school year (respectively, T1: September & T2: January). This timeline was determined based on practical considerations, thus ensuring that each data collection time-point fell at the beginning of a semester, i.e. a moment when students are usually more available. In the end, 27 participants completed the questionnaires at T2. Thus, the final sample consisted of 19 master-level students in counselling psychology and eight doctorate-level students in clinical psychology. Participants were predominantly female (93.6%), Caucasian (77.8%), born in Canada (59.3%), and aged between 23 and 49 ($M = 27.59$; $SD = 5.35$). Most participants indicated

having no regular meditation practice (81.50%) and had never previously taken a mindfulness class (96.3%).

Procedure

Participants interested in the study received a link to an online consent form and survey at the beginning of the semester (T1: September). Participants received a second link to the same questionnaire midway through the academic year (T2: January). They had a week to complete each survey. Participants were given a monetary compensation prorated for the time spent participating in the study (\$20 per time-point questionnaire fulfilled, for a maximum of \$40 in total).

Measures

Trait mindfulness

The Five Facets Mindfulness Questionnaire (FFMQ; Baer et al., 2006) was used to assess trait mindfulness in trainees. This self-reported questionnaire consists of 39 items on a 5-point scale, ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*), and explores five facets of trait mindfulness, including *Observing* (one's ability to be aware of external and internal stimuli such as sensations, cognitions, emotions, sights, sounds, and smells), *Describing* (one's capacity to label inner experiences with words), *Acting with Awareness* (attending to one's activity in the present moment, in contrast to acting on automatic pilot), *Nonjudgement* of inner experience (the tendency to take a nonevaluative stance towards one's thoughts and feelings), and *Nonreactivity* to inner experience (the tendency to allow thoughts and feelings to come and go, without getting caught up in or carried away by them). Of note, the Observing facet was not included in the analysis, as it has shown inadequate fit in samples of non-experienced meditators (Baer et al., 2006, 2008). Thus, the sum of the other four facets was used in this study to assess mindfulness trait. Finally, a French version of the questionnaire was used (Heeren, Douilliez, Peschard, Debrauwere, & Philippot, 2011), which showed good validity and reliability across multiple French-speaking samples. In our study, this measure showed good reliability ($\alpha = .94$).

Basic psychological needs satisfaction

The Basic Psychological Needs Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) was used to assess trainees' satisfaction of their needs for autonomy, competence, and relatedness. This self-reported questionnaire includes 24 items on a 5-point scale, ranging from 1 (*Not true at all*) to 5 (*Completely true*), of which eight assess each need, half measuring need satisfaction, and the other half need frustration. Following previous studies (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Kindt, Vansteenkiste, Loeys, & Goubert, 2016), the mean of the three needs satisfaction scales was computed to obtain a BPNS score. A French version of the questionnaire was used, translated and validated by Armour (2019). In our study, this measure showed good reliability ($\alpha = .83$).

Psychological distress

The short version of the Depression Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) was used to assess trainees' psychological distress. This 21-item questionnaire

comprises three subscales measuring symptoms of anxiety, depression, and stress on a 4-point scale ranging from 0 (*does not apply to me at all*) to 3 (*applies to me completely, or most of the time*). The *Depression* subscale assesses dysphoric mood states, including self-depreciation, lack of interest or involvement, hopelessness, and anhedonia. The *Anxiety* subscale assesses arousal states, including autonomic arousal, muscular tension, and anxious affect. Finally, the *Stress* subscale assesses negative emotional lability to stressors and general tension. For the purpose of this study, the mean of the three subscales was used to evaluate general psychological distress. The French version used in this study was translated and validated by Ramasawmy, Hicks, and Gilles (2013). Our measure presented good internal consistency in our sample ($\alpha = .91$).

Statistical analyses

First, the assumption of normality was assessed. The multicollinearity assumption was met for all variables. Moreover, one participant had incomplete data on BPNSFS at T1. As our main analysis used listwise deletion when dealing with missing data, it was conducted among the remaining 26 participants. All descriptive and preliminary analyses were conducted using SPSS (version 25), while our main mediation analysis was conducted with PROCESS (SPSS macro version 3.5), using a 5000 bootstrapping method with 95% confidence intervals (Hayes, 2017). Trait mindfulness (T1) was identified as the independent variable, psychological distress (T2) as the outcome, and BPNS (T1) as the mediator. Moreover, all variables were entered as Z scores in the model to obtain standardized coefficients and standardized confidence intervals. Finally, to understand attrition in our longitudinal data between T1 and T2, we conducted a t-test comparing the trait mindfulness, BPNS, and distress levels of participants who had completed our study fully and those who had not completed T2.

Results

Preliminary analyses

Means, standard deviations, and bivariate correlations for all variables are presented in Table 1. Trainees showed relatively severe to extremely severe levels of psychological distress, as measured by the DASS subscales, at T1 and T2. A paired t-test revealed a marginal difference in psychological distress between T1 and T2, $t(26) = 2.06$, $p = .05$, with participants tending to be slightly more distressed at the beginning of the school year ($M = 27.60$) than at the mid-point ($M = 25.46$). In addition, t-test results revealed that participants who dropped out of the study at T2 had significantly *lower* levels of psychological distress at T1 ($M = 21.70$) compared to participants who stayed in

Table 1. Descriptive statistics and Pearson correlations.

	<i>n</i>	<i>M (SD)</i>	2	3	4
1 – T1 Trait Mindfulness	27	23.75 (4.68)	.55**	-.45*	-.66**
2 – T1 BPNS	26	4.02 (0.47)		-.62**	-.72**
3 – T1 Psychological Distress	27	27.60 (7.55)			.72**
4 – T2 Psychological Distress	27	25.46 (6.89)			

* $p < .05$; ** $p < .001$; BPNS: Basic Psychological Needs Satisfaction

the study ($M = 27.60$), $t(36) = 2.38$, $p = .02$. However, they did not differ on baseline levels of mindfulness, $t(35) = -1.18$, $p = .25$, or needs satisfaction, $t(35) = -1.63$, $p = .11$. Also, no significant differences were found at T1 between master and doctorate-level students in terms of trait mindfulness, $t = 2.04$, $p = .16$, BPNS, $t = 0.31$, $p = .58$, or psychological distress, $t = 0.39$, $p = .54$, suggesting they were similar enough at baseline to be considered as a unified group in our analyses. Finally, significant correlations were found between all variables (see Table 1). More specifically, trait mindfulness (T1) was highly, positively correlated with BPNS (T1) and highly, negatively associated with psychological distress (T2). On the other hand, BPNS (T1) was highly, negatively correlated with psychological distress (T2).

Mediation analysis

To test the mediating role of BPNS in the relationship between trait mindfulness and psychological distress, we conducted a mediation analysis with trait mindfulness as the independent variable, psychological distress as the outcome, and BPNS as the mediator (see Figure 1). Consistent with previous research, the total effect was significant, $\beta = -.63$, 95%CI $[-.94, -.32]$, indicating that trainee's trait mindfulness at T1 predicted psychological distress at T2, such that the more one reported being mindful at T1, the less psychologically distressed they reported being at T2. Moreover, trait mindfulness (T1) was positively associated with BPNS (T1), $\beta = .57$, 95%CI $[.20, .93]$, such that trainees with higher levels of trait mindfulness at T1 reported more BPNS at T1. In turn, BPNS (T1) was negatively associated with psychological distress (T2), $\beta = -.48$, 95%CI $[-.78, -.18]$, such that trainees with higher BPNS at T1 reported lower levels of psychological distress at T2. Notably, although the direct effect of trait mindfulness (T1) on psychological distress (T2) was significant when controlling for BPNS (T1), $\beta = -.36$, 95%CI $[-.67, -.05]$, there was also a significant indirect effect of trait mindfulness (T1) on psychological distress (T2) through BPNS (T1), $\beta = -.27$, 95%CI $[-.58, -.05]$, indicating that BPNS (T1) partially mediated the relationship between trait mindfulness (T1) and psychological distress (T2). These results generally supported our hypothesis in that BPNS partially explains the relationship between trait mindfulness and lower psychological distress among trainees. According to the recommendations by Cohen (1988), this model explained a large portion of

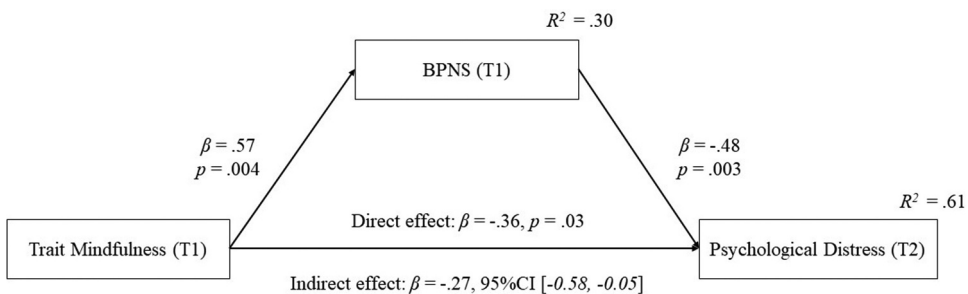


Figure 1. Partial mediation path of BPNS (T1) explaining the link between trait mindfulness (T1) and psychological distress (T2). BPNS: Basic psychological need satisfaction; T1: September; T2: January; All coefficients are standardized regression coefficients of a linear regression

variance for both BPNS ($R^2 = .30$) and psychological distress ($R^2 = .61$). A power analysis for the indirect effect was conducted using Schoemann et al.'s Rstudio package (Schoemann et al., 2017), using a sample size of $n = 26$ (due to listwise deletion) and 95% confidence intervals. It revealed a 70% chance of finding significant results if they were present.

Discussion

In the current study, we investigated the mediation role of BPNS on the relationship between trait mindfulness and psychological distress in clinical trainees using a two-wave longitudinal design over four months. Overall, our findings supported our hypotheses. First, we found that trainees with higher levels of trait mindfulness at the beginning of the school year had lower levels of psychological distress at mid-year. Those results are consistent with previous research on trait mindfulness and psychological distress, with higher levels of trait mindfulness being associated with lower levels of psychological symptoms, such as anxiety and depression (Carpenter et al., 2019). These findings support the idea that trait mindfulness may likely protect against such symptoms for this population. This is particularly important as clinical trainees are prone to psychological distress, particularly in a period as stressful as the middle of the semester, when our T1 measurements took place. Our results, thus, suggest that trait mindfulness may effectively have protected trainees from psychological distress in this distinctively high-stress period.

Second, we found that higher levels of trait mindfulness in trainees were associated with better BPNS. These results yield support to a self-determination theory theoretical claim, whereby trait mindfulness can contribute to one's ability to use internal and external events as informative cues on how to satisfy their own BPN (Brown & Ryan, 2003; Rigby et al., 2014). Other than relying on environments, which may or may not support one's needs, increasing trait mindfulness through mindfulness training may be one avenue by which individuals may come to better support their own needs. This finding is particularly relevant for our population of clinical trainees, as previous research has shown that BPNS is associated with better self-regulation, more meaningful and satisfying relationships, as well as a greater feeling of competency (Ryan & Deci, 2017). Clinical trainees with these attributes are likely to be more at ease when working with their clients. Higher BPNS may thus assist them in managing the particularly high demands of emotional and behavioral self-regulation associated with their work (Pakenham & Stafford-Brown, 2012; Skovholt & Rønnestad, 2003). Moreover, trainees are specifically being trained for relational-type work, in which the capacity to create meaningful and trusting relationships is one of the main driving forces in treatment success (Norcross & Wampold, 2011). As trait mindfulness is associated with being more aware of environmental cues related to BPNS (Rigby et al., 2014; Ryan & Deci, 2017), mindfulness training may help trainees be more effective in being aware of relational cues during important therapeutic moments that are significant in establishing a strong therapeutic alliance with their clients. Thus, both trainees and their clients may simultaneously benefit from the former's tendency to be mindful.

Third, we found that better BPNS at the beginning of the school year was associated with lower levels of psychological distress in trainees at the mid-point of their school year. This is an interesting result, as many scholars point out that while BPNS is mostly associated with psychological well-being, psychological distress is generally better

predicted by BPNF (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013). The significant relationship between BPNS and lower psychological distress highlights that BPNS may simultaneously pull the individual away from distress, as well as towards better well-being. To our knowledge, it is also the first time that this relationship has been established among clinical trainees. This result underscores the relevance of BPNS in reducing psychological symptoms for this population, as well as emphasizes where efforts could be made to foster trainees' well-being during their school year.

Accordingly, our results supported our main hypothesis that BPNS partially mediated the relationship between trait mindfulness and psychological distress. As such, BPNS may explain one path by which trait mindfulness is related to lower psychological distress, at least among clinical trainees. Again, this is in line with self-determination theory that suggests that more mindful individuals are more aware and receptive to cues that enable them to foster BPNS, which is in turn essential for optimal functioning (Rigby et al., 2014; Ryan & Deci, 2017). This partial mediation is also consistent with Chang and colleagues' recent studies (2018, 2015), which reported similar results among undergraduates and college athletes. Similar to Chang et al. (2018)'s study, our data draws from a longitudinal temporal sequence that supports mediation (Maxwell & Cole, 2007; Maxwell et al., 2011). Our results also add support to a series of studies (Chen et al., 2015; Chirkov et al., 2005; Church et al., 2013) claiming that BPNS is related to optimal functioning in every culture (Chen et al., 2015), as our sample mainly consisted of a western group of students, while Chang and colleagues' studies were mainly comprised of Chinese participants. They also support the idea that trait mindfulness, through BPNS, is associated with lower psychological distress regardless of the source of life stress, as clinical trainees may face different challenges than athletes or undergraduate students. Our results also add to the findings of Chang et al. (2018), who explored hedonic well-being (i.e. the presence of positive affect in the absence of negative affect), as we focused more precisely and more extensively on psychological distress. While Chang et al. (2018) also explored a mediation path of BPNS between trait mindfulness and negative emotions, they used a cumulation of six negative emotions using the PANAS (i.e. anxiety, frustration, anger, irritability, fear, and depression; Watson et al., 1988). While it measures hedonic well-being saliently, the PANAS does not reflect the intensity of psychological distress and one's adaptation to it, as necessary with our population. Our use of the DASS, a diagnostic tool designed to assess the clinical threshold of symptoms of psychological distress (Norton, 2007), was thus better suited to explore the intensity of individuals' adaptation to negative emotions in a clinical setting.

Considering the decades of research highlighting that clinical trainees are especially at risk for developing symptoms of psychological distress, the finding that BPNS partly explained the link between trait mindfulness and fewer psychological distress is promising. Our results suggest that more focus could be placed on clinical and counselling training programs to help clinical trainees satisfy their BPN. For example, more emphasis could be put on using mindfulness techniques to help trainees act in ways that are more self-coherent and less reactive to external pressures (i.e. more self-determined regulation; Ryan et al., 2008). This could be especially relevant in a context as demanding as clinical training. Such emphasis on acting with more self-coherence, based on one's values, is an important component of programs such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012), which have shown effective in enhancing well-being

among students and workers (A-Tjak et al., 2015). Future research could investigate how this combination of mindfulness and values identification could be included in clinical training as a means of reducing psychological distress.

Limitations

One of our study's main limitations is our small sample size ($N = 27$). However, despite this, and the 30% chance of not finding statistical significance, our results were significant. Moreover, we found substantial effect sizes of mindfulness on BPNS ($R^2 = .30$), and of mindfulness and BPNS on psychological distress ($R^2 = .61$), while using a conservative statistical approach based on confidence intervals. Statistically, models do not need large sample sizes to obtain significant results when effect sizes are large. Our large effect sizes thus highlight these variables' importance in reducing clinical trainees' psychological distress.

Nevertheless, our small sample size constituted a limitation for testing our model. For example, as mentioned in the methods section, a marginal difference was found between T1 and T2 psychological distress. Such a difference could suggest the need to control for psychological distress at T1 when testing our model. However, considering the marginal (i.e. non-significant) difference of this result, coupled with our small sample size, and the fact that each parameter added to the model reduces statistical power, we opted not to add psychological distress at T1 as a covariable. Still, future studies should consider testing a similar model with a larger sample size and include psychological distress at T1 as a covariate to delineate the effects of trait mindfulness and BPNS on the change of psychological distress in time among clinical trainees.

In addition, our sample size would not permit finer analyses of these relationships (e.g. differentiating between different mindfulness facets). Future studies may address this limitation, therefore allowing us to understand the role of each mindfulness facet in the relationship between BPNS and psychological distress. Given that mindfulness is a broad concept encompassing many different intentional, attentional, attitudinal, motivational, and even ethical components, this could help identify more specific interventions (Shapiro et al., 2006). Likewise, it would be interesting to differentiate between the three psychological needs of autonomy, competence, and relatedness in mediating the relationship between trait mindfulness and psychological distress. For instance, a path analysis could simultaneously explore which needs better explain the relationship between trait mindfulness and psychological distress. Some research suggests that these psychological needs represent three different constructs and should hence be studied separately (Van den Broeck et al., 2016). Nevertheless, combining the three needs together has been supported in previous studies (Haerens et al., 2015; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008), and we believe it constitutes a first step in the investigation of BPNS as explaining the link between trait mindfulness and psychological distress.

Furthermore, it is not possible to draw causal conclusions from our results. However, the longitudinal design used in our study allows predictive terms in such a way that higher trait mindfulness and BPNS at baseline predicted lower psychological distress three to four months later. Our longitudinal design represents a considerable step forward

compared to the strictly cross-sectional studies in the previous literature. Future studies may use one variable for each point in time, as suggested by Maxwell and Cole (2007), to reduce measurement biases. While not feasible in the context of our study, a broader longitudinal design could represent an important step for future studies investigating the relationships between trait mindfulness, BPNS, and psychological distress.

It is also possible to argue that other confounding variables may have influenced our results. For example, trainees may have been more stressed at the beginning of the study, considering that T1 measurements fell during mid-terms, a period generally higher in stress and demands on students. Conversely, they could also have developed competencies through the semester that made them more at ease and hence, less stressed when they completed T2 measurements. They could also have developed a stronger working relationship with their clients through time, which may have reduced their stress levels and/or increased their perceived sense of competence. Hence, more studies would be necessary to delineate these different influence factors on trainees' psychological distress in the future.

Also, our results are difficult to generalize to a broader population, considering that our sample was relatively homogenous. Most of our participants were young, White, and highly educated women, which may have positively biased levels of trait mindfulness. One might think that clinical trainees may present more dispositional mindfulness due to their tendency to be in a posture of introspection and awareness. Yet, to our knowledge, no studies have explored this potential bias. That said, the levels of trait mindfulness in our sample were comparable to the ones found in the general population (Baer et al., 2008). In addition, our preliminary analyses revealed that participants who dropped out of the study between T1 and T2 had lower levels of psychological distress at T1, i.e. better functioning, as compared to participants who stayed in the study. This leaves the question of whether the relationship found between trait mindfulness, BPNS, and psychological distress is similar among clinical trainees reporting low versus high psychological distress, considering that our sample's level of psychological distress was severe. Future studies should consider conducting group comparisons between participants with high versus low psychological distress to delineate any potential difference or non-linear relationship between these variables.

Finally, self-selection bias may have occurred in our sample, as participants interested in our study may have already been interested in mindfulness in general, and consequently, have a positive bias towards it. Conversely, as our longitudinal sample initially reported more psychological distress, the self-selection bias may have occurred due to our participants wishing to benefit from enrolling in this study in search of relief from their distress. Furthermore, some have shown that mindfulness questionnaires are easily prone to social desirability and other biases (Van Dam et al., 2018), which may have positively biased participants' mindfulness trait self-report. Future studies should consider other ways of measuring mindfulness (e.g. ecological momentary assessment; Moore, Depp, Wetherell, & Lenze, 2016) to reduce biases associated with self-reported measures.

Conclusion

In conclusion, our study brings support to self-determination theory, in that trait mindfulness contributes to one's own satisfaction of basic psychological needs for autonomy, competence, and relatedness. By doing so, our results highlight one mechanism through which mindfulness protects against psychological distress, indicating a promising avenue of intervention for a population as vulnerable to emotional distress as clinical trainees. In this context, universities may consider integrating mindfulness training into their curriculum, as this may contribute to more autonomous, relatable, competent, and most importantly, fully functioning trainees. Moreover, in the light of many years of research on mindfulness practice, there is enough empirical data supporting the benefits of mindfulness training in reducing psychological distress among mental health professionals and trainees to promote its inclusion in the curriculum of clinical trainees (for a meta-analysis, see Spinelli, Wisener, & Khoury, 2019).

In addition, considering the high levels of psychological distress observed in our sample, as well as in other studies on clinical trainees (Huprich & Rudd, 2004; Pakenham & Stafford-Brown, 2012), it appears crucial that clinical training programs provide more resources to help reduce trainee's distress during their studies. In particular, we suggest more information be given to trainees about the challenges they may face during their training and the possible ways to cope with them. This provision would render this topic an essential part of the general curriculum of trainees. For example, professors and clinical supervisors could include reading assignments, practical activities, and in-class discussions with trainees about self-care. This would highlight and increase awareness of the mental health issues among clinical trainees and the possible ways to cope with them, whether it is mindfulness training, personal therapy, or any other mental or academic resources available in their faculty. We recommend that self-care, especially the development of mindfulness skills, be central to clinical training. It is highly recommended that clinical trainees be taught strategies to cope with psychological distress during their academic training and be encouraged to share their challenges with professors, supervisors, and other trainees, rather than experiencing their difficulties alone and in silence.

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Data availability

The data that support the findings of this study are available from the corresponding author, BK, upon reasonable request.

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