UNIVERSITY OF NICOSIA

Dispositional Mindfulness: The Correlations Between Time Perspectives, Prospection, and Mental Well-Being

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Abstract

Background: There is a limited body of empirical research looking into the relationships between dispositional mindfulness (DM) and time perspectives (TPs), regardless of the substantial body of evidence highlighting their importance for mental well-being in separate lines of research. Given the status of limited empirical research encompassing the two constructs simultaneously, it is also important to note the absence of any systematic review, to date, that focuses on organizing such empirical work. Cognitions focused on evaluating possible future events and imagining those, i.e. prospective thoughts and imagery, have also been documented to relate positively to mental well-being. Similar to the case with TP literature, empirical studies focusing on DM and prospective cognitions within a grounded working model have been scarce. Given the importance of prospection with regards to mental well-being, and the extant body of literature highlighting mindfulness as a very important contributor to mental health, it becomes even more vital to investigate the possible relations and interactions between these two constructs through empirically grounded and informative working models.

Objectives: Developing from the status of background literature briefly stated, the following thesis aimed at: i) introducing a systematic review for the growing empirical literature on the relationship between mental well-being, DM, and TP; ii) examining the possible links between DM and prospective risk assessments of possible future events in predicting identifiers of psychological distress (Study II: Empirical Paper I); and finally, iii) examining the relations between DM and prospective imagery vividness ratings within the context of psychological distress (Study III: Empirical Paper II).

Results: The systematic review identified a close link between DM and a balanced time perspective (BTP), related to a tendency of flexibility in focusing time domains that which also relates to supporting mental well-being. Mindful presence and non-judgment of experiences in the present moment did appear to be frequently associated, and nonreactivity of inner experience as well as mindful acceptance related to reported optimism on any time domain. Empirical Paper I revealed significant relations between DM, prospective thoughts, and mental well-being indicators; however, failed to identify any interaction effect between DM and prospective thoughts in influencing well-being. Empirical Paper II highlighted an

interaction effect between negative imagery vividness ratings and *nonreactivity to inner experience* facet of DM ($F_{(1,103)}$=4.00, R^2 change=.018, p<.05), the moderating variable, in predicting indicators of psychological distress – albeit being on the edge of statistical significance.

Conclusion: Regarding the relationship between TPs and DM, future studies are advised to incorporate experimental and longitudinal settings to identify causal links that relate to promoting mental well-being. Several promising constructs, including self-compassion and the Carpe Diem (CD) perspective, are highlighted as important points of primary attention. The empirical studies underscored the links between prospective thoughts, prospective imagery vividness, and DM in relating to mental well-being; and proposed a moderating effect for DM on prospective imagery vividness. Future studies are advised to recruit larger samples and rely on the experimental design to follow up on the proposed correlative evidence.

Keywords: dispositional mindfulness, time perspective, BTP, prospective imagery, phenomenologic characteristics, well-being

Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Nicosia. This thesis has been composed solely by myself except where stated otherwise by reference or acknowledgment. It has not been previously submitted, in whole or in part, to this or any other institution for a degree, diploma or other qualifications.

Signed: ....   Date: ....

Hasan Erguler

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Introduction

This thesis consists of three separate sections that encompass a systematic review and two cross-sectional studies . The systematic review focuses on cross-sectional studies centred on mindfulness traits (Baer et al., 2006) and time perspectives (Zimbardo & Boyd, 1999) – of which brief outlines will be introduced below. The cross-sectional studies focus on the links between self-report indices of prospective event risk assessments (MacLeod & Byrne, 1996), prospective imagery (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011), mindfulness traits (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) and psychological distress within a multiple moderated regression design (Hayes, 2012).

The first study is a systematic review (Study I) encompassing peer-reviewed studies with an analytical cross-sectional design, incorporating standardized measures of time perspective (TP; Zimbardo & Boyd, 1999) as well as mindfulness traits (Baer, 2019) in predicting psychological well-being. TP is a construct that is related to a predisposition to organizing life experiences and assigning meaning to these with respect to the three main time domains (i.e. past, present, future; Boniwell & Zimbardo, 2004; Zimbardo & Boyd, 1999) – where five distinct such TP predispositions have been defined as operating implicitly within the three time domains. These TP predispositions are (Zimbardo & Boyd, 1999): past negative (PN) and past positive (PP), having a dominantly pessimsitic and optimistic outlook on one's earlier life experiences, respectively; future perspective (FP),related to organizing goals and values of actions that can influence future outcomes; and finally the present hedonistic (PH) and present fatalistic (PF) perspectives, where PH relates to immediate sensation seeking and a tendency to react to gratifying experiences with a focus on short-term consequences, and PF relates to a pessimistic evaluation of one's agency in affecting life circumstances. More importantly, a functional shift between different TPs in relating to life experiences have been conceptualized as the predisposition supporting psychological well-being, termed as the balanced time perspective (BTP; Boniwell & Zimbardo, 2004; Boyd & Zimbardo, 2008; Drake et al., 2008). BTP was also reported to be correlating with dispositional mindfulness (DM; Baer et al., 2006) in predicting psychological well-being (Seema & Sircova, 2013; Zhang, Howell, & Stolarski, 2013). DM relates to a nonjudgmental, non-reactive, kind attitude towards current experiences that involves focused attention and awareness into the nature of such, without an explicit

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urge to act upon (Chiesa & Serretti, 2009; Hollis-Walker & Colosimo, 2011; Kabat-Zinn, 2005). It could be informative to outline relationships between time domain focus and mindful attention to one's current experiences – to examine possible links and relations between the two constructs. However, literature search highlighted that empirical studies linking DM and TP profiles are rather scarce, and that there is a lack of insight onto the general framework within which DM and TP can be related, when it comes to evidence-based conceptualizations on variables predicting psychological well-being. For this reason, this systematic review aimed to be the first one looking into the variables of interest, with an interest in outlining evidence-based relationships between DM and TP as well as guiding future research alongside findings highlighted. Furthermore, the systematic review part of this thesis did not include a meta analysis on top of the narrative synthesis. The reasons behind the decision not to include a meta analysis center around the novelty of review question asked, where a very limited number of empirical findings were to be found with respect to numerous variables that researchers did not have prior limitations in assessing for. This was mainly due to the rather exploratory nature of the review, aiming first at identifying study variables that were found to be linked with TP and DM measurements. It was believed that this review can then guide future research aiming to empirically advance promising variables of concern, and then to organize existing findings with respect to those variables under a possible meta analysis in line with gaps in literature. Any meta analysis conducted with the limited research that was included in this review would possibly be short-sighted in its scope and applicability – and for the reasons explained, the review was limited to a narrative synthesis as an initial guide for future studies interested in further exploring interesting variables that could be hinted at.

The first empirical study (Study II) examined the possible relationship between prospective thoughts and mindfulness traits in predicting psychological distress. People reporting higher psychological distress has often been found to report weaker probability assignments for the possibility of positive future events happening to them, and in contrast, stronger assignments for negative events (MacLeod & Byrne, 1996; MacLeod, Pankhania, Lee, & Mitchell, 1997; Stöber, 2000; Szollosi, Pajkossy, & Racsmany, 2015; Roepke & Seligman, 2016). In addition, people reporting higher psychological distress were often found to score lower on mindfulness traits (Baer et al., 2006; Donald, Atkins, Parker, Christie, & Ryan, 2016). Literature reviewed highlighted that prospective thinking and DM were

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not evaluated simultaneously with respect to their links with psychological distress, and Study II aimed at investigating the possibility of a moderating effect of DM on the relationship between prospective thinking and distress in a sample of college students. This is a gap in the status of current research that the empirical studies aim at addressing. It is probable that trait mindfulness, analyzed in its facet structure, will have links with future expectancies. As an important measure of trait-level tendency, DM may moderate the relationship between future expectancies and measures of psychological well-being. The importance of this can be that the moderation effect can minimize or even eliminate positive health benefits that would otherwise be expected from healthy prospections – an insight that can focus on improving current limitations of mainstream psychotherapy interventions (Roepke & Seligman, 2015).

The second empirical study (Study III) is very similar to Study II with two main differences. The first difference is that the focus of prospective thinking is shifted to prospective imagery, where positive and negative future scenarios are asked to be rated accordingly with how vivid one can imagine them happening in their personal future (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011). Literature reviewed suggests that more vivid imaginations of positive future scenarios, alongside with less vivid imaginations of negative scenarios, have been linked with psychological distress reported in the current moment (Stöber, 2000; Holmes, Lang, Moulds, & Steele, 2008; Holmes & Mathews, 2010; Morina et al., 2011; Sargalska, Miranda, & Marroquín, 2011), also reportedly related to increasing suicidal ideation (Hales, Deeprose, Goodwin & Holmes, 2011). Focusing on imagery vividness was also conceptualized as a *phenomenologic* nature of prospective imagery (Szpunar, Spreng & Schacter, 2014) in studies highlighting similar results (also referred to as *phenomenal*; Szollosi, Pajkossy, & Racsmany, 2015). Similar to the rationale of Study II, Study III also highlighted the lack of research focusing on the links between prospective imagery and facets of DM; hence, focused on analyzing the possible moderating effect of DM variables on the relationship between psychological distress and prospective imagery vividness ratings (self-report; Morina et al., 2011) through a moderated regression model (Hayes, 2012). Given the links between metacognitive skills and psychological well-being (Lee et al., 2012), it can be fruitful to address imagery as an indication of dysfunctional cognitive resource allocation towards the pessimistic imagination of the future – exacerbating symptoms of current psychological distress. DM may help clarify the link between imagery and

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well-being, as a possible moderation effect of its facets can have a pivotal importance that can guide relevant interventions focused on improving executive functioning to address psychological well-being (Edmondson & MacLeod, 2015; Holmes, Blackwell, Heyes, Renner & Raes, 2016).

Taken together, articles outlined are aiming to address gaps in literature with novel research questions that literature reviewed highlighted as not being addressed earlier. This aim also is in line with the possibility of guiding health interventions that can improve mental well-being alongside with relationships between mindfulness and prospective thinking that could not have been documented to exist before. Regarding mindfulness and time perspectives, a review of the growing yet limited scope of current studies with a cross-sectional design can guide a prolific improvement of future studies aiming at incorporating experimental and longitudal designs to try and infer causal links to help future interventions as well as supportive treatment. The presentation of studies begins with the systematic review first, and is followed by the empirical studies Study II and Study III, respectively.

Study I

The Relationship Between Time Perspective and Mindfulness with Respect to Well-Being and Cognition: A Systematic Review

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Abstract

Background: There is a growing yet limited number of research focusing on the links between time perspectives (TPs), mindfulness, and mental wellbeing. Even though TPs and mindfulness have been studied separately to a certain extent, their possible common basis and complementary influences on well-being is still in infancy with respect to the limited empirical studies combining the two constructs. There is, as of yet, no systematic review on this growing body of literature as well. Therefore, the present systematic review aimed at addressing the limitations stated. **Method:** Key databases including Scopus, Web of Knowledge and APA PsycINFO were screened, and the last search was done on February, 2021. Initial search resulted in 564 entries meeting criteria centred around the selection of cross-sectional studies. The final analysis incorporated the narrative synthesis strategy and included a final draft of 14 eligible articles. **Results** Mindfulness seems to be closely related to a flexible shift in time perspectives, called the Balanced Time Perspective (BTP). Furthermore, a non-judgmental focus devoid of evaluations of the present moment is central to mindful presence. Nevertheless, higher acceptance, presence, nonjudging of experience and nonreactivity to inner experience, specifically, are related to a more pronounced optimistic outlook on the past, future, and is linked to savouring the moment. **Conclusion**: Future research is advised to incorporate a longitudinal design in investigating the link between BTP and mindfulness more extensively. Further research incorporating Carpe Diem (CD) perspective, self-compassion, and self as a continuity-in-time, is required to better establish the complex interactions between mindfulness traits in influencing psychological well-being.

Keywords: mindfulness, time perspective, BTP, well being

1.0 Introduction

Mindfulness can be conceptualized as a present-oriented, friendly, curious and non-judging attitude that is often directed towards one's own thoughts and sensations in the given moment (Bishop et al., 2004; Kabat-Zinn, 2005; Shapiro, Carlson, Astin, & Freedman, 2006).This requires focus of attention on experiences unfolding in the current time frame – experiences often resulting from bodily sensational, emotional, cognitive, and any other internal event or an object of focus in the external environment (Brown & Ryan, 2003). That pertains to a deliberate focus of attention on experiences, infused with the quality of accepting of such without yielding to the inclination to label them as either good or bad (Coffey & Hartman, 2008). This yielding, however, should not mean resignation but a motive for full experience without discrimination (Bishop et al., 2004); hence, mindfulness can be conceptualized as a tendency to promote an enhanced focus on and acceptance of the present moment experiences in a non-judgmental manner (Kabat-Zinn, 1990, 2003)

Research on mindfulness has progressively grown within the last two decades (Williams & Kabat-Zinn, 2011), and the term itself has been dominantly understood to cover both a state-like (as a cognitive experience reported throughout daily events) and a trait-like (i.e. dispositional; as a more stable skill that is applicable across life experiences on a larger time frame) conceptualizations where both have positive health benefits, including psychological well-being (Baer et al., 2006; Coffey & Hartman, 2008). Evidence suggests that mindfulness can have positive influences on psychological well-being via an enhanced cognitive regulation of negative emotions, an increased appreciation of conceptualizing happiness as being not dependent upon external circumstances *per se*, and a reduction in ruminative negative thinking that focuses on self (Coffey & Hartman, 2008). Furthermore, a more pronounced dispositional mindfulness (DM) is related to increased likeliness to fulfil psychological needs, having a decreased likelihood to be absorbed in emotional states and negative affect, and a greater well-being overall (Brown & Ryan, 2003).

Higher trait mindfulness (i.e. DM) has been found to be associated with higher life satisfaction, enhanced ability to regulate negative thoughts and rumination, and more adaptive emotion regulation (Keng et al., 2011; Baer et al., 2006). Suppression of distress as an emotion regulation strategy in response to

stressors has been documented to predict higher psychological distress as a consequence (Bullis, Boe, Asnaani, & Hofmann, 2014). Even though short-term positive effects can be observed after engaging in avoidance of stressors by denial, suppression, or distraction (van 't Riet & Ruiter, 2013), prolonged avoidance and associated strategies cause negative impact on mental health (Almeida, 2005). In contrast, DM can provide an individual with a healthy working space to handle the influence of stressors (Kabat-Zinn, 2005) and has often been found to be negatively related to dysfunctional thought patterns, like rumination, and positively associated with the facilitation of adaptive coping strategies to address perceived stress (Rau & Williams, 2015; Tomlinson, Yousaf, Vitterson, & Jones, 2018). Evidence suggests that higher present moment awareness, a core identifier of increased mindfulness, is related to an increased focus on behaviour informed by personal values, and to a stronger belief regarding the ability to cope with stress; hence, facilitating better stress coping in response to daily stressors (Donald, Atkins, Parker, Christie, & Ryan, 2016). Emphasizing a non-judgmental, accepting, and a curious attitude that is devoid of an immediate reactive evaluation of stressors, mindfulness was reported to be positively associated with better stress management (Hollis-Walker & Colosimo, 2011; Chiesa & Serretti, 2009). Furthermore, the emphasis on a directive awareness of the present moment is thought to be related to a stronger sense of control over life events and a feeling of connectedness to sources of support – also discussed within the framework of self-determination theory (Ryan, Deci, & Vansteenkiste, 2016). Altogether, the predisposition to rely on skills encouraged by mindfulness hold a promising potential to offer a functional stress coping alternative.

The other important construct as a focus of this review is the general orientation in time, or a time perspective (TP) disposition (Zimbardo & Boyd, 1999). TP can be conceptualized as a tendency to focus on time domains (i.e. the past, present, and future) through a dominantly implicit temporal evaluation in assigning coherence and meaning to our experiences (Boniwell & Zimbardo, 2004; Zimbardo & Boyd, 1999). This is to say that TP helps us engage in a cognitive organization of our life experiences in a way that makes sense to us, and that it operates automatically, without conscious awareness. According to Sobol-Kwapinska (2013), TP involves focusing of attention with regards to chosen time frames, and then the evaluation of experiences occurring within the time frames that involves assigning valence, value ranking, and perceived importance. Zimbardo and Boyd (1999) defined five distinct themes of TP as a general tendency to rely on time domains

discussed. Amongst the five, the past positive (PP) and past negative (PN) perspectives focus on an affective evaluation in regard to past experiences. The present hedonistic (PH) and present fatalistic (PF) perspectives focus on how one reacts to the current moment experiences, and finally, the future (FP) perspective focuses on organization of future-directed goals and regulation of cognition with respect to perceived responsibilities.

The five distinct TPs can be relied on in a wide variety of ways, and over-reliance on some often results in comparative ignorance of others, leading to a temporal bias that has links with poorer life satisfaction (Boniwell, Osin, Linley, & Ivanchenko, 2010; Zhang & Howell, 2011) and well-being (Cunningham, Zhang, & Howell, 2015; Zhang, Howell, & Stolarski, 2013; Zimbardo & Boyd, 2008). According to Zimbardo & Boyd (1999), a fatalistic (PF) and negative outlook (PN) would involve a sense of lack of control over the course of events in life, and the experience of rumination of painful past experiences causing distress in the current moment, respectively. Indeed, the PN perspective, specifically, has often been reported to have strong negative associations with subjective well-being (Boniwell, Osin, Linley, & Ivanchenko, 2010; Drake, Duncan, Sutherland, Abernethy, & Henry, 2008) and depression (Roseanu, Marian, Tomulescu, & Pusta, 2008). The PF and PH perspectives were also reported to be correlated with stronger depressive symptoms (Anagnostopoulos & Griva, 2011). The PH, though, was earlier reported to be positively related to subjective well-being (Boniwell et al., 2010), but was also hinted at in cases with substance abuse or risky behaviour (Fieulaine & Martinez, 2011) when the urge to acquire immediate gratification overthrows caution and insight into long-term consequences. In contrast, the FP is related to the tendency to engage in emotion regulation and self-control to prioritize desirable possible outcomes in the future (Zimbardo & Boyd, 1999). In other words, the FP is focused on future gains and responsibilities that demand attention in the current moment so as to lead to greater satisfaction, often requiring restraint on short-term hedonistic impulses. Finally, the PP is related to an overall positive outlook on one's past experiences that uplift mood and promote optimism in the current moment (Zimbardo & Boyd, 1999). Not surprisingly, the FP and PP were often reported to be related with lower symptoms of depression and a better well-being, overall (Wittmann et al., 2014; Zimbardo & Boyd, 2008).

Given the differential links between specific TPs and mental health, it can be argued that stronger emphasis on the FP, PP, and PH perspectives together with

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weaker emphasis on PF and PN should be the desirable TP profile – called the balanced time perspective (BTP) profile (Boniwell & Zimbardo, 2004, Boyd & Zimbardo, 2008). Arguably, postponing immediate gratification to attend to responsibilities beneficial in the long run, and even when feeling regret regarding negative past experiences, there is still an evident focus on current sources of joy and future prospects of elation, a BTP may be a significant predisposition at play. Drake and others (2008), likewise, argued that BTP takes into the three time domains and is the ability "to be able to move between each perspective and to use the most appropriate one in a given situation" (p.50). In other words, BTP is a perspective that is proposed to help an individual acquire a metacognitive stance towards the implicit nature of TP (Zimbardo & Boyd, 2008). The shift between different TPs, then, depend on situational constraints to optimize effective allocation of cognitive resources to cope with stress (Zimbardo & Boyd, 2008). This re-allocation of attention and apparent flexibility to switch between different themes of TP is likely to be related to mindfulness skills, as BTP correlates positively with trait mindfulness (Drake et al., 2008; Seema & Sircova, 2013; (Stolarski et al., 2016). Furthermore, similar to mindfulness, BTP was also reported to have positive links with life satisfaction, positive affect, and subjective well-being (Zhang, Howell, & Stolarski, 2013), and has been slowly acquiring empirical support. Studies looking at DM and TP together, though, are scarce within the general scope of contemporary research focus – and an informative TP-based evaluation of mindfulness is believed to lead to a better theoretical understanding of both concepts.

Looking at the proposed mechanisms of DM and BTP, alongside with their positive links with positive affect, adaptive stress coping, and well-being, it can be argued that these constructs may have vital elements in common. As a restatement, dispositional nature of mindfulness is conceptualized as the tendency to invoke mindfulness skills that are available not strictly as a result of some form of dedicated practice, but naturally as part of an everyday life experience. The mindfulness skills involve a re-appraisal of the stressor with a non-reactive and kind attitude, a hallmark metacognitive stance towards the demands of present constraints. In this light, DM is inherently a present-centred attitude, and can also be thought of as a general orientation in time – suggestive of it being a TP on its own (Seema & Sircova, 2013; Zimbardo & Boyd, 2008). Drake et al. (2008) reported that higher DM is linked with a higher BTP, and argued that BTP is facilitating a more adaptive

stance towards engaging with the present stressors – a very similar function to the conscious awareness highlighted by mindfulness. Seema and Sircova (2013), likewise, identified that mindfulness and time perspective shares common features along the line that both are related to organization of conscious resource allocations within a given time frame – inclusive of appreciating the present moment as intimately linked to future consequences relevant for one's goals.

This study aims at providing, to the best of authors' knowledge, the first systematic review to try and combine various lines of research looking at DM and TP influences on mental well-being, with a specific focus on BTP, as well as relevant cognitive variables of time perspective studies. The principal review question was: how do time perspectives and measures of trait mindfulness relate to each other with respect to their influence on well-being and cognitive variables? In other words, the systematic review focused on the principal question of how mindfulness traits and time perspective dispositions can be understood in relation to each other with respect to their possible influences on psychological well-being. In asking this question, the review also focused on possible cognitive variables as could be related to either of these main two variables to enhance its scope. This review focused on data synthesis from cross-sectional studies assessing non-clinical adult samples. Aiming at providing valuable insights into the state of current empirical endeavour combining DM and TP research, this review will also try and clarify possible future directions that could be derived from the current status of the literature.

1.1 Method

1.1.1 Protocol Registration and Guidance

This systematic review was registered on the International Prospective Register of Systematic Reviews (PROSPERO) with the number CRD42021241388 (PROSPERO 2021). The link to full protocol is https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD420 21241388.

This systematic review followed the recommended procedure based on Joanna Briggs Institute (JBI) Checklist For Analytical Cross-Sectional Studies (Moola et al., 2020), which also required to follow along the guidelines listed for transparent reporting by the Preferred Reporting of Items for Systematic Reviews and Meta-Analyses (PRISMA 2020 guidelines; Page et al., 2021).

1.1.2 Eligibility Criteria

Numerous criteria were agreed upon prior to the extensive literature search that followed. Studies that would be suitable for inclusion in the review would be checked for eligibility accordingly with, if: 1) the study was an observational cross-sectional study, 2) standardized measures of trait mindfulness and time perspectives were used, 3) the study identified a sample of participants from a non-clinical recruitment setting, 4) the study also assessed for a well-defined conceptualization of well-being, with or without other cognitive variables of interest, 5) the study was written in English, 6) the study was published in a peer-reviewed journal (or is accepted for publication), and if 7) the study participants were adults, aged 18 years old or above. Exclusion of studies was done on the basis of, if: 1) the study was not cross sectional and was based on assessing the effects of an intervention, 2) the study did not measure trait mindfulness or time perspective with a standardized tool, 3) the study focused on clinical samples, and if, 4) the study could not satisfy the inclusion criteria overall. Inclusion of control groups and mean comparison tests were not a basis for article exclusion, and were identified when appropriate.

1.1.3 Search Strategy

Key databases including MEDLINE, ScienceDirect, Scopus, APA PsycINFO database and Web of Knowledge were searched. The last search was done on 28th February, 2021, and articles that met the inclusion criteria were retained. The search terms were [time AND persp* AND mindful* AND (trait OR facet OR disposition*], which was searched within the abstract, title, or subject terms of the articles within the databases outlined. Following the termination of initial search, possibly eligible articles were investigated from review articles, and from research articles already included in the final analysis.

1.1.4 Data Extraction

Data extraction focused on the following five domains: 1) general study information, including title, country of conduct, authors, and publication year; 2) method of recruitment – including the sampling strategy and whether it was an online recruitment; 3) participant demographics – including the sample size, the range and average of age, and gender distribution; 4) type of study DM measurement and mediation/moderation variable measurements of interest –

including information on whether it was self-report basis only or had experimental tasks incorporated also; and finally, 5) summary of key findings and conclusions – together with strengths and limitations when informative.

1.1.5 Risk of Bias (Quality) Assessment

This review only included academic articles with cross-sectional design; and for quality assessment on such, the JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies (Moola et al., 2020) was used. This checklist is composed of eight questions that look at: 1) clarity of inclusion criteria, 2) description of samples, 3) the reliability and appropriateness of measurement tools used, 4) description of standard criteria used for recruitment, 5) identification of confounding variables, 6) description of strategies that were used to minimize confounding effects, 7) valid and reliable measurement of target variables, and finally, 8) the use of appropriate statistical tests. For each study, a numerical score out of eight was assigned where higher numbers would mean higher quality articles. First author screened for article eligibility, and all studies meeting the inclusion criteria were added in the final analysis regardless of risk of bias evaluation. Findings from lower quality articles, though, were examined with caution.

1.1.6 Strategy for Data Synthesis

The narrative synthesis strategy will be implemented in this systematic review (Popay et al. 2006). Accordingly, the theoretical background looking at both mindfulness and TP will be outlined, and a possible theoretical insight linking both constructs will be examined. Popay and others (2006) outlined a general path of progress from this initial step onwards. Alongside their recommendations, following this step, a preliminary synthesis of information derived from studies will be done and evidence of interaction and/or correlational relationships between study variables will be investigated. Evidence for significant relationships will be synthesized based on the proposed theoretical insight looking at how TP and mindfulness may be understood better in relation to one another. This review did not include a meta-analysis.

1.2 Results

1.2.1 Study Selection

The study selection process is outlined in Figure 1.1. The initial electronic

database search yielded 564 results. Eleven of these articles were duplicates, and their removal resulted in a total of 553 initial entries. Of these, 526 articles were deemed ineligible from the title and keywords examination, and three further articles were added from citation searching– making it 30 articles. The next step involved screening for the abstract, and 10 articles were found to be ineligible as they looked for the experience of passage of time, not examining the dispositional concept of time perspective. Furthermore, one article could not be accessed – resulting in a total of 19 articles. The last step included assessment of standardized measures, absence of intervention, and participant characteristics, where a further five articles were found to be ineligible. The last step resulted in a final count of 14 articles to be included for review.
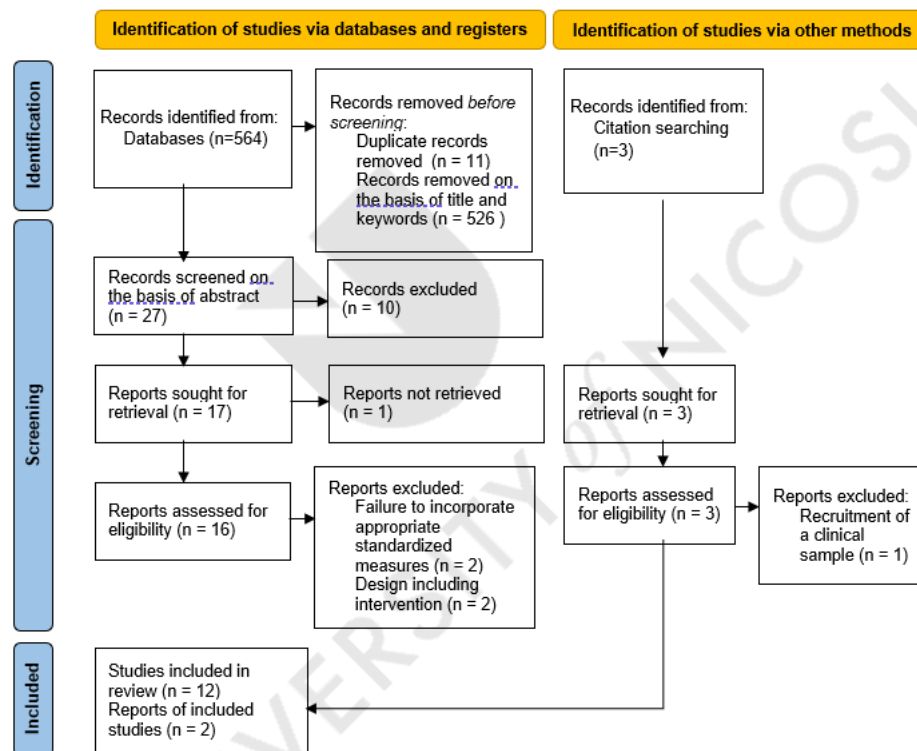
Figure 1.1. *The Flow Diagram of Study Selection Process*

1.2.2 Characteristics of Reviewed Studies

The articles included in the final analysis were all published after 2013 (n=13), except one that was on 2008 (n=1). Studies included were conducted on eight different countries, which are, in the ranked order of frequency: Germany (n=4), Poland (n=2), Canada (n=2), China (n=2), UK (n=1), Spain (n=1), Estonia (n=1), and Netherlands (n=1). It was noteworthy that only the studies from Germany included self-report scales on trait variables as well as numerous other variables

related to time perspectives, including experimental evaluations of subjective passage of time, and time dilation.

Study focus. Out of 14 articles included, seven (50%) focused on the relationship between BTP and trait mindfulness. Five articles (36%) incorporated multiple regression analysis with a mediator/moderator variable. Out of these, mediating variables were self-compassion (n=1), resilience and inner peace (n=1), BTP (n=1), and trait mindfulness (n=1), mediating the relationship between materialism and BTP (Watson, 2019). One of the selected articles included the Carpe Diem perspective as a moderator variable between trait mindfulness and basic psychological needs (n=1; Sobol-Kwapinska et al., 2016). For measuring trait mindfulness, seven articles used the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003), five articles used the Freiburg Mindfulness Inventory (FMI; Kohls, Sauer, & Walach, 2009; Walach et al., 2006), four articles used the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) scale (although two articles used the short form [FFMQ-SF; Bohlmeijer et al., 2011]); and, one article used the Comprehensive Inventory of Mindfulness Experience scale (CHIME-β [will be referred to as CHIME in short]; Bergomi, Tschacher, & Kupper, 2013). All of the studies included are observational and cross-sectional studies by design, all incorporated self-report measures as the most common tool for outcome measurement, and four of them included experimental evaluation of subjective passage of time, time dilation, and relevant task-oriented variable reports on top of trait variable measures.

Sample characteristics. The samples covered within the scope of this review were non-clinical participants, given that otherwise was not stated. Only one article reported a psychotherapy-based assessment in a secondary stage in analysis (Seema & Sircova, 2013), and this stage was not included in the data extraction. The majority of participants were female, and the average age reported ranged between 20.4 and 39.9, with missing data from one study (Wittmann, Otten, et al., 2015).

Quality assessment. Study quality assessment revealed that there are notable differences between specific categories of evaluation. Overall, most of the studies scored above four and the average score evaluated from the 14 articles included in the final analysis was 5.86 out of eight (73.25%). This score indicated a moderate to high quality of the articles selected. All the studies stated objective and standard criteria used for measurement, almost all of them included appropriate

statistical analyses, stated clear setting and participant characteristics, and clearly defined inclusion criteria. Only six of the studies, though, identified confounding variables, and five articles in total provided valid strategies to deal with them (with the exclusion of Wittmann, Otten, et al., 2015).

1.2.3 Narrative Synthesis

1.2.3.1 Measuring Mindfulness and Time Perspective Traits.

Time perspective traits. Almost all of the studies relied on the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) measure for assessing the five distinct TPs outlined above. The two exceptions include a study that focused on measuring Carpe Diem (CD) perspective specifically (Sobol-Kwapinska, Jankowski, & Przepiorka, 2016), and the study that assessed for temporal perspective variables slightly distinct from a TP formulation (Samani & Busseri, 2019). Detailed explanations of mentioned variables are highlighted in the next section.

Mindfulness. Measures of DM more often involved the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003). MAAS is a 15-item single factor scale that was designed to center around the assessment of sustained focus and awareness that is associated with mindfulness, lacking crucial emphasis on the non-judgmental, non-reactive, kind and accepting attitude that is also highlighted with mindfulness traits (e.g. Kabat-Zinn, 2005). Therefore, MAAS focuses on cognitive aspects of mindfulness without a significant attention on the affective elements.

The second most frequent assessment tool for DM was the Freiburg Mindfulness Inventory (FMI; Kohls, Sauer, & Walach, 2009; Walach et al., 2006). The FMI is a 14-item scale that evaluates trait mindfulness via a two-factor structure: *presence*, the tendency to be aware and vigilant of present moment experiences; and, *acceptance*, the non-judgmental attitude towards own thoughts and behaviour. In comparison to MAAS, one can argue that FMI partially addresses the friendly attitude towards self as a crucial component of mindfulness – highlighting a potential advantage of using this scale.

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) and its Short Form (FFMQ-SF; Bohlmeijer, Ten Klooster, Fledderus, Veehof, & Baer, 2011) were used in four studies in total. The FFMQ is a 39-item self-report scale that assesses for DM through a five sub-scale (i.e, facet) structure: *nonreactivity to inner experience* ('non-reactivity'); *observing*; *acting with awareness*; *describing with words* and *nonjudging of experience*

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('nonjudging'). The short form, with a 24-item structure, taps into the same five factor organization as well (Bohlmeijer et al., 2011). Due to its multidimensional structure, FFMQ was reported to cover important aspects of mindfulness, hold superiority to earlier measures employing a very limited factor structure, and to relate to reliable indicators of mental health (Rau & Williams, 2016). Even though the scale can be reported as an aggregate score, it is advisable to use the multi-faceted evaluation to rely on a better informative analysis (Baer, Smith, Lykins, Button, & Krietemeyer, 2008). The *observing* facet, however, tapping into the tendency to be aware of bodily sensations, was criticized to be lacking an innately mindful dimension as it rather undermines affective awareness – giving rise to potentially misleading inferences made from the facet (Bergomi, Tschacher, & Kupper, 2013; Rudkin, Medvedev, & Siegert, 2018).

Finally, only one study (Wittmann et al., 2014) incorporated the Comprehensive Inventory of Mindfulness Experience (CHIME-β; Bergomi, Tschacher, & Kupper, 2013). Relying on CHIME- β (Bergomi et al., 2013), Wittmann et al. (2014) reported using a 37-item CHIME questionnaire assessing mindfulness via the proposed 8-factor structure that potentially has a wider scope than the FFMQ (Baer et al., 2006). These factors are: *inner* and *outer awareness* (assessing the awareness of either internal or environment-sourced stimuli), *acting with awareness*, *acceptance* (including a non-judgmental and accepting attitude towards events and actions), *decentering* (including a non-reactive and observant look upon experiences as they unfold), *openness* to experiences, *relativity* (regarding appreciation of thoughts as subjective and transient entitites), and *insight* (referring to an insightful appreciation of experiences).

1.2.3.2 Mindfulness and Time Perspective Trait Analysis.

1.2.3.2.1 MAAS. Drake and colleagues (2008) reported that participants with a BTP profile had higher scores on DM. This finding, however, relied on a very limited number of participants (n=13). In addition to the focus on BTP, Drake and colleagues (2008) also analyzed the individual TP profiles separately. Accordingly, the PN, PH, and PF perspectives were found to show a significant negative correlation, where the PP was found to be positively correlated, with DM. Furthermore, higher DM scores were predictive of higher subjective happiness scores. In other words, the stronger the past positive perspective, the more one reported to have a disposition towards mindful attention and awareness. Expectedly,

present hedonism and fatalism tendencies in time perspective showed a negative correlation with the mindfulness dispositions assessed for.

Following Drake et al. (2008), the next study to address the link between DM and TP was interested in conceptualizing mindfulness itself as a TP (Seema & Sircova, 2013). Accordingly, the overall MAAS scores in that study showed negative correlations with the PN, PH, and PF perspectives. In contrast to Drake et al. (2008), however, the FP showed a positive and significant relationship with MAAS. Authors argued that a mindful attitude to presence is different from present hedonism in that there is a future perspective at play also, that consequences of actions taken and long-term goals in mind are not ignored for immediate sensation seeking (Seema & Sircova, 2013). Authors also reported a positive correlation between high BTP scores, DM, and subjective well-being. Arguably, relying on a holistic and balanced shift between different time perspectives according to contextual demands, mindfulness can be a metacognitive awareness of time perspective and a separate time perspective altogether at the same time – explaining a significant amount of variance when added to ZTPI measures (Seema & Sircova, 2013).

The following research shed more light on the distinctions between the present moment time perspectives and mindfulness as a trait. In this light, the concept of Carpe Diem (CD) was introduced (Sobol-Kwapinska et al., 2016). CD has previously been defined as a specific TP that involves a concentration on the present moment experiences with a significantly enhanced valuation of each moment as unique and precious (Sobol-Kwapinska, 2013). The concept, reportedly, differs from mindfulness (Sobol-Kwapinska et al., 2016) in that there is an added positive evaluation of the value of present moment experiences, highlighting their relative importance over experiences residing on other time frames. It is further argued that CD leads to an underemphasis of the other TPs focused on the past or the future. Accordingly, cognitions like regret or anxiety, together with their affective qualities, are seen as misleading because of their detached nature from the immediate present moment experiences (Sobol-Kwapinska et al., 2016). Perhaps supporting this reasoning, CD had earlier been reported to have positive links with positive affect (Sobol-Kwapinska, 2013) and life satisfaction (Sobol-Kwapinska, 2009) – making it a potentially fruitful focus of research that tries to identify factors that could benefit people reporting lower subjective well-being.

Looking at the correlations between CD and mindfulness, Sobol-Kwapinska and colleagues (2016) failed to identify a significant relationship between CD and

DM. The authors then speculated that mindfulness may be different from CD in that CD is focused on the content of the present moment experiences, while mindfulness is not centered around evaluations of such. Furthermore, the authors highlighted a moderation effect of CD on the relationship between mindfulness and basic psychological needs fulfilment (Sobol-Kwapinska et al., 2016). This construct relies on Ryan and Deci's theory of self-determination (2000) that identifies three basic needs that are vital for one's mental well-being. These basic needs are the need for competence (perceived ability to influence outcomes of actions, and events), the need for relatedness (the desire to form close, loving relationships with others), and the need for autonomy (the desire to be dominantly responsible for one's decisions and behaviour) (Ryan & Deci, 2000). Measuring these three basic needs fulfilment with the self-report General Need Satisfaction Scale (GNSS; Gagne, 2003), Sobol-Kwapinska et al., (2016) identified a moderation effect of CD on the relationship between DM (measured with MAAS; Brown & Ryan, 2003) and overall basic psychological need fulfilment.

Sobol-Kwapinska and colleagues (2016) argued that the need for competence requires an extensive focus on making the best use of the present moment to support one's ability to influence outcomes of actions – yet failed to elaborate on the effect on relatedness and autonomy needs, adequately. It can be argued that the desire to have good and loving relations with others requires an elaboration of attitude and behaviour of both one's self and others as is happening in the actual moment, so as to ensure the relationship is maintained and healthy. In this light, a CD perspective may add onto the non-judgmental nature of awareness supported by mindfulness. The need for autonomy, likewise, may require elaboration of which experiences in the moment are best suited for supporting personal responsibility and personal values – possibly requiring extensive evaluation at times (Ryan & Deci, 2000). CD, then, may possibly be a link between mindfulness and basic needs fulfilment; though, causal explanations will need to be invoked for a more thorough evaluation – with the aid of experimental studies also looking at state mindfulness, and perhaps longitudinal studies focusing on dispositional as well as state nature of mindfulness.

In a separate line of reasoning, Muro and colleagues (2017) focused on the links between mindfulness, time perspectives, and life satisfaction as an indication of subjective well-being. Life satisfaction is related to evaluating how content one reports to be in regards to life experiences (Howell, Kern, & Lyubomirsky, 2007) and

even though the construct does not centre around emotional valuation but primarily includes cognitive evaluations of life satisfaction (Diener et al., 1985), it was reported to be negatively associated with depressive symptoms, and correlated with longevity (Altun & Yazici, 2015; Steptoe & Wardle, 2012). Stressing the effects of cultural variables on time processing (McGrath & Tschan, 2004) and preference for multiple tasking as being highlighted more in a Mediterranean culture, Muro and colleagues (2017) wanted to study the relationship between mindfulness and TP in a Catalan cultural context to supplement earlier studies from Estonia (Seema & Sircova, 2013) and Poland (Stolarski et al., 2016). Their findings suggest that the more BTP demonstrated, the higher DM should be expected – in addition to higher levels of reported life satisfaction. Due to their lack of moderation analysis and reliance on a hierarchical regression analysis (Muro et al., 2017), it would be challenging to provide an insight about how mindfulness and BTP may be interacting with one another to influence life satisfaction scores. Authors further pointed out that the PN and PF perspectives were in significant negative correlation with mindfulness, as was expected. When it comes to the present time perspectives, they reported a negative correlation with both hedonistic and fatalistic components – further emphasizing the notion that mindfulness is strongly associated with a BTP, instead of a reliance on present time perspectives *per se* (Drake et al., 2008; Seema & Sircova, 2013). Muro and colleagues (2017) reported that MAAS scores and PP perspective predicted higher life satisfaction scores, whereas PN perspective predicted lower life satisfaction scores.

Furthermore, controlling for the effects of both present time perspectives (PF and PH) and confounding demographic variables, the authors reported a significant predictive value of MAAS scores on life satisfaction. This, Muro and others (2017) argued, may hint at mindfulness being a more reliable indicator of a present time perspective in contrast to the ones included in the ZTPI measures. Mindfulness would require a non-judgmental and a receptive state of mind, whereas both hedonistic and fatalistic narratives of present moment experiences (respectively covered by the PN and PF) would appear to be contradictory to the proposed cognitive operations of mindfulness (Brown & Ryan, 2003; Kabat-Zinn, 2005; Williams, 2010). Finally, Muro and colleagues (2017) reported that when BTP was assessed, they failed to identify cultural differences in comparison to earlier studies in the predictive value over life satisfaction – further supporting the BTP's predictive utility on indicators of well-being (Zhang, Howell, & Stoalrski, 2013) that could be

used in wider cultural contexts. Muro et al. (2017) critiqued their approach by outlining the inherent potential bias with the MAAS measure. Accordingly, the measure centres around assessing reverse item scores that look into 'lack of mindfulness', and not necessarily the presence of it (Brown & Ryan, 2003; Muro et al., 2017). This may introduce bias into study results as lack of mindlessness, i.e. failure to observe an absence of significant predispositions of mindfulness, does not necessarily reflect the presence of mindfulness (Grossman, 2011) – and that facet-level measures may provide more insight into the matter (e.g. the FFMQ; Baer et al., 2006).

In another line of inquiry, Watson (2019) focused on the relationship between DM, materialism, and TPs. Materialism can be defined as a focus on the attainment of possessions and finances as a central goal of one's life – often aiming to acquire power by means of striving to reach a social status via such attainment (Kasser, Ryan, Couchman, & Sheldon, 2004). Materialistic individuals, though, often report lower subjective well-being (Burroughs & Rindfleisch, 2002; Dittmar, Bond, Hurst, & Kasser, 2014) and has links with antisocial and self-centered, hedonistic traits of psychopathy (Foulkes, Seara-Cardoso, Neumann, Rogers, & Viding, 2014). Interestingly, individuals high on materialism as well as DM are reportedly less likely to suffer from negative effects of materialism on mental health (Wang, Liu, Tan, & Zheng, 2017). Materialism was also reported to correlate with a present fatalistic tendency on TP (Watson, 2017), where, in the same study, evidence suggested a past-negative TP to mediate the relationship between materialism and well-being.

Considering the flexible focus on time domains in people with high trait mindfulness, Watson (2019) reported supportive evidence to suggest that individuals with high materialistic tendencies score lower in DM as well as a BTP. Furthermore, trait mindfulness was also found to partially mediate the relationship between materialism and BTP. More specifically, the materialism assessed for in Watson's study (2019) incorporated the Material Values Scale (MVS; Richins & Dawson, 1992) and Belk Materialism Scale (BMS; Belk, 1985) – and DM (measured with MAAS; Brown & Ryan, 2003) was found to mediate the relationship between the scores found in either scale and a BTP.

The MVS measures three core values related to materialism (Richins & Dawson, 1992): the centrality of acquiring material possessions, the centrality of acquisition as a means for reaching happiness, and the tendency of one to define success by possessions acquired. It can thus be argued that mindfulness works

towards realizing the value of materialistic possession centrality for one's life. Furthermore, a metacognitive stance provided by mindfulness (Bishop et al., 2004; Brown & Ryan, 2003) towards defining happiness and success through one's acquisition of possessions would likely be leading one to challenge these definitions – hence the mediation effect reported (Watson, 2019). The BKS (Belk, 1985) includes assessments for non-generosity, envy, and possessiveness. Likewise, we can argue that trait mindfulness is related to a kind, non-judgmental, and a loving attitude towards oneself (Kabat-Zinn, 2005; Baer et al., 2006). These attitudes are highly related to a compassionate view towards oneself (Neff, 2003), and it can be argued that one would be in a stronger position to argue against feelings of envy when one has a stronger tendency to be mindful (Wang et al., 2017). Likewise, craving to hold on to possessions and tendency towards not helping others in need by not being generous are intrinsically incompatible with a loving mindful attitude. The mediation effect observed by Watson (2019) can mean that the disinclination to define one's worth through materialistic concerns and a tendency to be kinder to living beings, provided by mindfulness, would likely increase the chances one will see the consequence of actions through a more flexible time perspective. The BTP is compatible with this reasoning, as it provides a more optimistic and supportive attitude towards seeing one's worth in a continuation of time from past to future (Seema & Sircova, 2013; Stolarski et al., 2016).

Ge and colleagues (2020) added on the growing theoretical discourse on links between DM and TP by focusing on assessing the relationship between DM and PN time perspective by also taking into account the possible effects of resilience and inner peace. In addition, this research looked for possible differences between a meditating and a non-meditating group of equivalent-sized samples of participants – a valuable enhancement of the earlier studies covered thus far.

Resilience has been conceptualized as a trait that directs one to outgrow challenging adversities by a focus on behaving proactively and striving to be optimistic, responding with a growth mindset to negative experiences (Richardson, 2002). Correlated to psychological well-being, this trait is especially important for health professionals constantly facing challenging circumstances (Epstein & Krasner, 2013). Furthermore, evidence suggests it is related to trait mindfulness as resilience was found to mediate the link between mindfulness and subjective well-being (Bajaj & Pande, 2016). Indeed, Ge and colleagues (2020) found that resilience was a full mediator on trait mindfulness predicting lower PN time perspective scores

in meditators, and a partial mediator in the same regression model on non-meditators. The negative relationship between DM and a PN perspective was supportive of earlier points raised (Drake et al., 2008; Seema & Sircova, 2013; Zimbardo & Boyd, 2008), and the full mediation observed was argued as a possible result of dedicated mindfulness meditation training. This is a coherent argument, given that mindfulness meditation can have an influence on one to develop trait mindfulness and effective coping strategies following the accumulation of consistent training (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015; Wallace & Shapiro, 2006).

Inner peace, often referred to as "piece of mind" and as a central focus of Chinese culture influenced by Buddhism (Lee, Lin, Huang, & Fredrickson, 2013), can be defined as the state of a felt serenity and harmony in relationships between one's environment, emotions, and cognitions. Mindfulness training was found to be related to increases in reported inner peace (Liu, Xu, & Wang, 2015), and inner peace was also closely linked with a kind and accepting attitude towards one's self (Xu, Rodriguez, Zhang, & Liu, 2015). Consistent with earlier literature, Ge and others (2020) also reported the relationship between DM and PN perspective to be fully mediated by inner peace in meditators, and partially mediated by non-meditators. Furthermore, the full mediation reported in meditators was reportedly stronger for inner peace than for resilience, a finding upon which authors speculated to be related to the centrality of the idea of peace of mind in Chinese culture (drawing from the fact that the study was selectively conducted with Chinese participants). Mindfulness meditation can lead to long lasting changes in inner peace (Epstein & Krasner, 2013), and that is in line with the idea that the more DM one reportedly has, the less likely it is that one's past will be seen through a pessimistic, judgmental attitude that contrasts with inner peace.

1.2.3.2.2 FMI. Utilizing the FMI measure (Kohls et al., 2009), Wittmann, Otten and others (2015) reported that participants with experience on variations of mindfulness meditation practice were found to score higher on presence and acceptance facets of DM. In contrast, non-meditators showed a stronger disposition towards the PN perspective. In a related study, Wittmann, Rudolph, et al. (2015) reported a moderate positive correlation between PH and PP time perspectives with the mindfulness facet presence. Furthermore, a negative correlation with PN perspective was also noted. The presence facet focuses on how attentive one is to the present experience – and the mentioned findings could indicate a positive

emotional response to being in the present (hence, present hedonistic), together with a more optimistic overview of one's past experiences (Wittmann, Rudolph, et al., 2015).

Focusing on a limited number of college students (n= 63) and the comprehensive CHIME scale (Bergomi et al., 2013) in addition to the FMI (Kohls et al., 2009), Wittmann and colleagues (2014) reported that higher acceptance was positively correlated with the PP perspective, and authors suggested this may be due to better emotional control on the experience of events happened in the past. Furthermore, the FP perspective was positively correlated with acting with awareness and insight - possibly due to insight towards and responsibility assumed for the future consequences of events that are direct results of current actions. The PN perspective was strongly negatively correlated with acceptance, decentering, and openness. Additionally, it was strongly positively correlated with relativity (recognition of thoughts as transient and subjective) – to which authors did not suggest a possible explanation. Examining the items under relativity subscale of CHIME (Bergomi, Tscahcher, & Kupper, 2014; Johnson, Burke, Brinkman, & Wade, 2017), the items "I am aware that my thoughts about people or events could easily change", "I realize my thoughts aren't always facts", "I realize that my point of view is not always based on facts", and "I am aware that my point of view could change" may hint at the self being not a reliable source of valid viewpoints and thus not dependable. It can be argued that putting distance between thoughts and self requires a decentered attitude which can help an individual modify and rationalize strongly held attitudes towards a more functional, supportive nature (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). The relativity items stated above, however, implies a negative evaluation of the self as being gullible ("I am aware that my thoughts about people or events could easily change") and not dependable ("I realize that my point of view is not always based on facts") – possibly deviating away from a focus on the nature of thoughts *per se* but also implying the self to assume a non-dependable position on top of this. This, arguably, may explain the positive correlations observed with PN perspective – as this time perspective correlates negatively with indicators of mental health (Roseanu, Marian, Tomulescu, & Pusta, 2008; Watson, 2017; Zimbardo & Boyd, 2008) and a negative evaluation of self implies a judgmental attitude that is unjustly inflicted, that could be a potential explanation for the observation that Wittmann and colleagues (2014) failed to argue and direct future research on.

Interestingly, Schötz et al. (2016) identified a significantly higher PF time perspective score for a small sample of experienced meditators (n=20) with higher mindful presence and acceptance. This was rather an unexpected finding, given the correlations of fatalistic overview of present experiences with lower mindfulness skills, described earlier. Authors did not provide an inclusive discussion on this finding. For one, the group with meditation experience, though, was experienced not in the mindfulness tradition, but on transcendental meditation – which involves recitation of certain phrases (i.e. mantra) and differ in structure to mindfulness practice (Jevning, Wallace, & Beidebach, 1992). In addition to the small study sample, we can argue that the present fatalistic viewpoint might also be related to the nature of meditation experience.

Stolarski, Vowinckel, Jankowski, and Zajenkowski (2016) focused on the link between BTP and DM. The authors reported that DM correlated positively with BTP; and more specifically, a role for BTP in mediating the relationship between mindfulness and life satisfaction. However, the study participant characteristics lacked precise details as to the percentage of student vs non-student participants, as well as online or face-to-face administration of scales. Reportedly, authors also argued that their design did not incorporate affect-based evaluations of life satisfaction, but instead focused on cognitive judgments *per se* – raising concerns over generalizability to satisfaction in life in general. Furthermore, Stolarski et al. (2016) reported that they relied on composite scores, and not on factorial evaluations, of FMI (Kohls et al., 2006), MAAS (Brown & Ryan, 2003), and FFMQ (Baer et al., 2006) scales. This also raises concerns over which sub-scale of mindfulness skills are related to BTP, specifically, and the possibility that such an analysis may not reflect the intended use of these validated tools.

1.2.3.2.3 FFMQ. Samani and Busseri (2019) took an approach in contrast to earlier research focusing on ZTPI and highlighted the limitations of that measure in assessing the full scope of temporal perspective variables. Along this reasoning, the authors focused on examining relationships between facet level assessments of DM (via FFMQ; Baer et al., 2006) and five constructs related to time perspectives and yet tapping into different cognitive processes.

The first of these constructs was temporal focus, which straightforwardly assesses the allocation of attention on cognitions related to the three general time domains – the past, present, or future (Bluedorn, 2002). There is evidence to suggest that stronger focus on the present and future, in addition to weaker focus

on the past, is linked with positive emotions and higher life satisfaction (Busseri, Malinowski, & Choma, 2013; Shipp, Edwards, & Lambert, 2009). Indeed, Samani and Busseri (2019), through a canonical correlation analysis, reported that the higher one scores on DM facets of acting with awareness, nonjudging of cognitions and affect, and tendency for describing own cognitions and feelings, the more temporal focus on the present time frame (alongside with less focus on past) were observed. Furthermore, nonreactivity to inner experience and a stronger emphasis on observing facet of mindfulness, together with the describing facet mentioned above, related not only to a greater focus on the present but also a greater temporal focus on the future. This finding appears to be supportive of the BTP construct, where highly adaptive individuals are expected to be flexible in shifting time perspective domain from present to future mindfully (Seema & Sircova, 2013; Stolarski et al., 2016).

The construct of temporal evaluation assesses the valence of attitude one has in regards to time domains (Mello & Worrell, 2007), where, optimistic stance towards past experiences, current events, and future prospection are also linked with better mental health (Pavot et al., 1998; Stober, 2000; Roepke & Seligman, 2015). In this light, temporal evaluation may be linked with the CD perspective as it includes evaluation of the valence and importance of the present time as well (Sobol-Kwapinska et al., 2016). Again, Samani and Busseri (2019) reported that more positive temporal evaluations concerning one's past, current, and prospective future experiences altogether were related to higher scores on facets concerning acting with awareness, nonjudging of experience, and describing own cognitions and affect. As this applied to all three time domains, one can argue that higher scores on DM do indeed not appear as reserved only for the present moment but rather collectively integrates all three time domains for a better well-being and functioning – showing links with a general positive orientation one holds regarding one's life and self (Caprara, Steca, Alessandri, Abela, & McWhinnie, 2010).

Temporal distance is related to evaluations of perceived mental distance between the current time frame and past as well as future events in anticipation – regardless of calendar time, one can feel past events to be far behind their current time frame depending on how the event is perceived (Ross & Wilson, 2002). Without specifying on facet-level structures due to lack of significance, Samani and Busseri (2019) argued instead that a general increase in trait mindfulness were found to be related to greater felt distance between one's past and current life.

Temporal overlap refers to the tendency towards considering time domains as intrinsically related to one another in a mental continuum (Mello & Worrell, 2007) and that higher overlap can promote more adaptive, value-informed and goal-directed behaviour (Hershfield, Cohen, & Thompson, 2012). Indeed, Samani and Busseri (2019) reported stronger temporal overlap in individuals reporting higher mindfulness traits, though without specifying within the facet level.

Finally, temporal value has been conceptualized as the tendency with which an individual values future prospects in contrast to past experiences (Caruso, Gilbert, & Wilson, 2008). Valuation of future behaviour more than events with similar structure in past, specifically when there is profit to be made and not loss to be averted, was linked with a general asymmetry observable in healthy people possibly due to a greater affective reaction in response to anticipated gains (Caruso et al., 2008). Samani and Busseri (2019) offered a general finding that higher mindfulness trait scores were linked with stronger valuation of the present, and weaker valuation of past and prospective future events. This was possibly in line with the CD insight on holding the present moment with much higher importance in comparison to other time domains (Sobol-Kwapinsa et al., 2016), and somehow contrasts with the BTP stance (Seema & Sircova, 2013) that promotes a diffused focus along time domains. Samani and Busseri (2019) relied extensively on correlations and, with a lack of regression analysis looking at elimination of confounding variables, their results can offer insights on possible links between the valuation construct and mindfulness traits but with much debate that should be filled with methodological variations in future studies.

Samani and Busseri (2019) further argued that, in relation to the constructs related to time perspectives, mindfulness is linked with valuing the present moment higher, focusing more on the present, and evaluating both the present and future possibilities much more positively – making it rather an optimistic tendency in approaching life experiences. This optimistic tendency, through their canonical analysis, gets its basis structure from higher emphasis on describing, acting with awareness, and nonjudging of inner experience facets of the FFMQ (Baer et al., 2006). Finally, higher scores on describing, nonreactivity to experience, and observing facets were grouped under a form of trait mindfulness highlighted by decentering (Samani & Busseri, 2019). Authors proposed that this combination of mindfulness facets can be linked with the tendency for putting distance between thoughts and affect, i.e. detachment (Fresco et al., 2007), and supposedly leading

to the reported finding that participants scoring higher on this proposed decentering type of mindfulness (after grouping specific facet scores described) showed higher temporal focus on all time domains. Arguably, decentering may be substantially distinct from mindfulness. Demonstrably, it can be one key aspect of mindfulness' working mechanisms as a separate construct, possibly mediating its link to well-being (Gecht et al., 2014). Samani and Busseri (2019) argued instead that stronger attentional flexibility may be at the core of decentering, perhaps as a result of dedicated mindfulness training instead of a trait-level interaction *per se*. Their argument was more speculation than data-driven, and this means their insight into the approach on decentering needs to be grounded well in the established theoretical formulations of mindfulness to guide future research. Nevertheless, the focus on facet level structures of dispositional mindfulness provided interesting avenues of further research into formulating links between trait mindfulness facets and cognitive processes related to time perspectives.

Ge and colleagues (2019) focused on the links between mindfulness, self-compassion, and time perspectives. Self-compassion is a skill that involves being kind towards one's self, seeing one's own suffering as part of a common experience of being human, and being mindful of tendencies to put conditions of worth for one's value, or judging one's self harshly and unjustly – often, without awareness (Neff, 2003). It is different from self-esteem mainly in that self-compassionate people feel accepted and valued with their shortcomings, where people in need of defending a healthy self-esteem would judge their shortcomings to get better and stronger, not feeling comfortable with themselves the way they are in that given moment (Neff & Vonk, 2009). Self-compassion has been repeatedly shown to improve subjective well-being and mental health, helping individuals better cope with stress, anxiety, and depressive symptoms (Hall, Row, Wuensch, & Godley, 2013; Kirby, Tellegen, & Steindl, 2017; Zessin, Dickhauser, & Garbade, 2015). There is evidence to suggest that gains of compassion-based interventions can be apparent even after one year following termination of interventions (Neff & Germer, 2013), possibly due to learnt self-regulatory skills that individuals tend to incorporate into their daily lives. Self-compassion was also reported to be closely linked to DM as it is a kind attitude one actively holds on one's self (Germer, 2009; Shapiro, Carlson, Astin, & Freedman, 2006), and is also possibly mediating the relationship between mindfulness and psychological well-being (Hollis-Walker & Colosimo, 2011).

Keeping in mind the positive links between self-compassion and well-being, Ge and colleagues (2019) speculated that individuals with higher self-compassion would be more likely to develop and rely on a BTP – by possibly mediating the relationship between DM and BTP. Indeed, through a multiple regression analysis they reported a role for self-compassion as a partial mediator between levels of trait mindfulness and a BTP. Reporting a significant predictive value of mindfulness on BTP, authors also argued that mindfulness can help individuals identify the need for developing a time perspective and then aid making this a flexible one – adaptive to the demands of current stressors. As both a disposition towards being mindful and towards being self-compassionate positively predicted BTP, Ge and others (2019) also argued that self-development tools addressing compassion and mindfulness training are very important not only because of their direct links with improved psychological functioning, but also via their possible effect in improving flexibility to develop a supportive and a flexible attitude on time perspectives.

In addition to research looking at self-compassion, a focus on the concept of flow (Csikszentmihalyi, 1990) was also noted in research covered (Vowinckel, Westerhof, Bohlmeijer, & Webster, 2017). Flow is related to being absorbed with an activity in the present moment with a deep involvement, simultaneously loosening self-awareness, weaking anxiety, and an immediate gratification stemming from progressing on that activity (Csikszentmihalyi, 1990). The experience of flow was reported to be positively related to satisfaction with life and subjective well-being (Asakawa, 2010; Bassi et al., 2014). Furthermore, mindfulness was shown to be related to stronger experiences of flow through an active focus on the task in the present – most probably as a by-product of the disposition to be mindful towards present moment experiences (Kee & Wang, 2008). Vowinckel et al. (2017) combined the concepts of flow and mindfulness into formulating a new scale that they termed as "present-eudaimonic scale" for contrasting with the PH and PF factors of ZTPI (Zimbardo & Boyd, 1999). This scale was aimed at evaluating one's tendency and intention to be mindfully absorbed in present moment tasks – and was named with *eudaimonia* as the term refers to a state of deep fulfilment, positive affect, psychological growth, and self-actualization, in contrast to short-sighted hedonism or negative fatalism implemented in other present TPs (Deci & Ryan, 2008; Huta & Waterman, 2013). In their findings, Vowinckel and colleagues (2017) reported that the addition of a present-eudaimonic measure to the assessment for BTP had a significant positive contribution to assessments of psychological well-

being. Furthermore, the addition of items derived from theoretical structure of mindfulness and flow was demonstrated to be essential in a more thorough understanding of what BTP should constitute. In this regard, mindfulness was understood as an important component of a BTP with its constructive emphasis on the present moment, complemented by the eudaimonic elements of flow.

As a last note, Vowinckel and colleagues (2017) used the FFMQ (Baer et al., 2006) to also assess for the dispositional mindfulness facets, and in this regard, all of the five facets of mindfulness (acting with awareness, nonreactivity to inner experience, observing, nonjudgment of experiences, describing experiences) showed positive and significant correlations with the present-eudaimonic scale. The facets also showed significant negative correlations with the PN perspective (except for observing), and significant positive correlations with the PH perspective (except for nonreactivity to inner experience). The authors did not evaluate their findings in the facet-level, but instead focused on the importance of a present-eudaimonic scale in contributing to existing TP scales (Vowinckel et al., 2017). In this light, hierarchical regression analyses, together with mediation and/or moderation analysis (Hayes, 2012) can shed more light on specific contributions trait mindfulness in facet levels, further elaborating on the interactions between mindfulness and BTP in future studies.

1.2.3.3 Mindfulness, Subjective Time, and Duration Discrimination.

Present moment experiences leading to the perception of self as a real-time entity, i.e., embodied within the current time frame, have been thought of underlying the perceptual experience of what is called subjective time (Wittmann & Schmidt, 2014). Interestingly, mindfulness meditation practice have long been related to an alteration on subjective time experiences – a slowing down of felt time (Kabat-Zinn, 2005). Recent research specifically points at time duration judgment differences in the milliseconds-to-seconds range, possibly as a result of mindfulness meditation practice (Droid-Volet, Fanget, & Dambrun, 2015; Kramer, Weger, & Sharma, 2013). In cases of sustained attentiveness to mental imagery, as it occurs during daydreaming or under hypnosis, subjects tend to report underestimation of the passage of time, meaning a less intense perception of time passing (Naish, 2007). Wittmann and Schmidt (2014), for instance, argued that in experienced meditators this effect can be due to the increased focus on bodily sensations and present experiences, in general. Thus, time perception is thought to be inherently

linked with bodily sensations, also influenced by affective states as well as sustained attentiveness to bodily experiences (Carter et al., 2005; Droit-Volet et al., 2013; Droit-Volet et al., 2015; Sauer et al., 2012). Attentiveness to time passing is linked with a subjective experience of a longer duration passing, as well (Droid-Volet & Meck, 2007).

Wittmann, Otten, et al. (2015) focused on comparisons between meditators and non-meditators to assess for subjective time and duration discrimination differences. Expectedly, the group with significant meditation experience reported a slower passage of time with temporal expansion of the present moment. The meditator group was found to report significantly longer retrospective time judgments – much longer subjective experience of time passing as it pertains to events that had happened within the previous week or month. Authors argued that this was expected as retrospective duration experience reports rely on long-term memory stores and people who are skilled in meditative practice are expected to have a contextually more enriched memory for events that happened prior (Flaherty, Freidin, & Sautu, 2005) – leading to a longer subjective experience of time passing by. Furthermore, a stronger emphasis on attentiveness to one's sensory experiences due to mindfulness practice (Kabat-Zinn, 2005) was thought to be related to a subsequent reporting back of events with much richness of subjective experience, leading to the judgment of longer durations having had passed. The increased precision in meditators when duration discrimination is examined was also observed in non-meditators (Wittmann et al., 2014), where a stronger disposition towards outer awareness was related to shorter duration differences spotted. Higher scores on acceptance and decentering subscales were also related to less under-reproduction of visual duration.

Wittmann, Rudolph, et al. (2015) reported that the PH perspective correlated positively with faster passage of subjective time retrospectively, when asked specifically in regards to how last week felt having had passed. In the same study, authors found that higher scores on the FP were positively correlated with reports of subjective passage of time typically being faster. Authors argued that a more pronounced future perspective often actualizes at the expense of a present time perspective – and that it is one's increased self-awareness of current experiences that relates to perception of subjective time, i.e. as a continuation of self (Craig, 2009), leading to a perception of time passing quicker in the absence of such a present focus. This, however, does not necessarily apply to all instances of

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pronounced future perspective, as the balanced time perspective, for instance, correlates with heightened mindfulness as well as future perspective – possibly being able shift between appreciating current experiences and having a hopeful, optimistic view of possible future events. Additionally, Schötz et al (2016) reported that meditators scoring high on the presence and acceptance facets of mindfulness were also found to report significantly lower time pressure in comparison to controls. They, however, did not differ with respect to subjective speed of time passing. Regarding duration discrimination, the group with higher trait mindfulness scores were more accurate in duration discrimination when were presented with an 80 seconds-long task (minutes range), and were also better in visual, but not audio, reproduction task in the range of milliseconds-to-seconds. The study sample, however, consisted of 20 experienced meditators (scoring higher on trait mindfulness scores also) and 20 matched controls – and the limitation of sample size did not allow for a step-wise hierarchical regression test that could help researchers better identify relationships between study variables.

Taken together, the narrative synthesis results indicate that DM is closely linked with BTP in influencing well-being, and that individuals with higher DM tend to score higher on BTP. The focus on present moment experiences does not appear to relate to an ignorance on other time domains, but does highlight the relative weakness of hedonistic, materialistic, and pessimistic viewpoints concerning one's evaluations of own life experiences. Self-compassion, inner peace, and resilience can have positive links with both DM and a BTP – an indication that future research needs to clarify further by experimental studies incorporating longitudinal design, as well. This synthesis did not evaluate intervention-based findings, but can inform interventions on the possible uses of focusing on the variables outlined above. Finally, DM is also related to altering experiences of subjective time and duration judgments – signifying its relevance to experiencing events within a temporal framework. Further research is needed to clarify the precise mechanisms with which DM and BTP interact on shaping time-relevant cognition and ultimately, psychological well-being.

1.3 Discussion

This review focused on a very limited number of emerging studies investigating the relationships between trait mindfulness and time perspective constructs. Reviewing a total of 14 empirical cross-sectional studies incorporating

self-report measures, this review can provide a short summary of contemporary research highlights and future directions for more thorough investigation. Accordingly, current research on the relationships between DM and TPs is very new, with more than half of the articles reviewed published within the last six years. Mindfulness can be conceptualized as a metacognitive awareness that can predispose one towards assuming a balanced time perspective – having benefits on mental health as well as subjective well-being (Muro et al., 2017; Schötz et al., 2016; Seema & Sircova, 2013). In this light, emphasis on a positive view of past experiences as well as having an optimistic outlook on future possibilities seem to be vital for having a mindful attitude towards developing a BTP. Additionally, a BTP is also understood as inherently involving a hedonistic stance towards the present moment that is also infused with mindful awareness and insight – leading to a rather long-sighted, value-driven, or a eudaimonic view on the enjoyment and appreciation of the present, devoid of the short-sighted and pleasure-centered hedonism absent mindful action (Sobol-Kwapinska et al., 2016; Vowinckel et al., 2017).

Along the lines of the research reviewed, it was highlighted that mindfulness does not relate to focusing on current experiences in the moment to the degree of ignorance on other time domains. Conceptually, one can also argue that mindful attentiveness can be engaged regarding future or past events (Dreyfus, 2011), not only the present moment. DM could be seen as supportive of an active stance towards promoting a supportive and compassionate view on self's past experiences (Ge et al., 2019). Additionally, it can highlight the importance of savouring current experiences without being dependent upon seeking a continuation of pleasurable sensations through values and attitudes centring around materialism (Watson, 2019). This also is in line with the caution stated elsewhere (Gruber, Gunningham, Kirkland, & Hay, 2012) that ignorance of past or future time frames may lead to an imprisonment within the present, which could potentially lead to poorer decisions that are not supportive of one's long-term goals and, mimicking a rather present hedonistic attitude, may further stimulate various symptoms of psychopathology. Nevertheless, having an optimistic and compassionate stance towards future possibilities could be linked to higher subjective well-being, life satisfaction, and overall psychological functioning (Ge et al., 2020; Samani & Busseri, 2019). The mindful focus on valuing current experiences as an important link between the past and future can also be related to the concept of Carpe Diem – albeit only one

research was focusing on the construct among the ones analyzed in this review (Sobol-Kwapinska et al., 2016).

Several points of caution, though, are warranted. First, considering ZTPI (Zimbardo & Boyd, 1999), Worrell and others (2016) raised concerns over the lack of an exclusive focus on TPs on the basis of including confounding variables like propensity for risk taking (e.g. "Taking risks keeps my life from becoming boring"), impulsivity (e.g. "I do things impulsively", or attitudes based on conscientiousness (e.g. "It upsets me to be late for appointments") (as cited in Worrell et al., 2016, p.2). In this light, further psychometric testing and elimination of items not necessarily related to time perspective *per se* (e.g. "I make lists of things to do") were suggested to improve a better version of ZTPI. This, however, is an ongoing debate that, rather than minimizing ZTPI utility and questioning its validity, focuses on improving its internal consistency and predictive validity.

Another line of concern centres around how the BTP construct is measured. BTP was often measured as a deviation score from the optimum balance that would be expected for the discussed TPs as are measured by the ZTPI – and this method of measurement yields results that are termed as a deviation from balanced time perspective (DBTP; Stolarski et al., 2016). Lower scores on DBTP mean a more emphasized BTP profile, and hence show associations with higher life satisfaction and psychological well-being (Sobol-Kwapinska, 2016). Even though this method yielded useful insights into the nature of BTP, methodological questions have also been raised to improve its utility and perhaps grow literature basis for valid alternatives, calling for needs of further study and possibly a methodological refinement (McKay et al., 2019).

Relying on a limited number of studies looking at DM in its facet structure, mindful presence and acceptance appeared to be related to a tendency towards developing a balanced stance on time perspectives. Furthermore, nonreactivity to experience, observing, and describing facets of DM were reportedly related to a mindful decentering predisposition that also was linked with higher time perspective scores on all domains (Samani & Busseri, 2019). As proposed in Acceptance and Commitment Therapy (ACT) literature (Hayes, 2006), the concept of decentering may be a fertile ground for future research into possible links between psychological flexibility and time perspectives – holding potential implications for subjective well-being and mental health.

One important finding of note is that, among the research covered, the construct of subjective time and assessments on duration discrimination were studied in only a handful of studies (Wittmann et al., 2014; Wittmann, Rudolph, et al., 2015; Wittmann, Otten, et al., 2015). Accordingly, preliminary evidence suggested that mindfulness meditation is linked with longer subjective time possibly related to emphasizing attentiveness to present moment experiences. Similarly, individuals with higher acceptance and presence traits reportedly had lower time pressure felt – having implications on improving well-being (Schotz et al., 2016). Research on subjective time, however, was very limited and appeared not to have attracted substantial empirical focus thus far. This can be a future direction for research on establishing facet level mindfulness interactions with TPs and subjective time experiences – informing psychological interventions for better stress coping.

The narrative synthesis of 14 research articles yielded several points of consideration worth investigating for future research. The key observation from the current status of research is that mindfulness is closely related to BTP as far as time perspective is concerned, is possibly influenced by a compassionate attitude towards the self, and is supportive of valuing the present moment experiences as innately important yet not devoid of an indivisible temporal continuity, and certainly not inclusive of a short-sighted hedonism. Focusing on a non-clinical setting, this review aimed at primarily identifying variables of interest when it comes to modelling the time perspective as well as trait mindfulness concepts under a coherent framework – applicable to the variance seen in general public. This was done to first aim at variables that are promising for further investigation, as the research question was novel and a relevant earlier systematic review could not be identified to the best of authors' knowledge. Evaluating the findings, then, it can be assumed that any association with respect to a focus on Carpe Diem and the eudaimonic presence of one's temporal attitude in a future study on clinical settings can thus be informative. For one, the specifications of focus on the present moment experiences can be assessed with respect to how much flexibility a client assumes in the evaluation of temporal domains, and on how well that focus is promoting one's well being when it comes to the contrast between hedonistic or the eudaimonic focus on positive affect. For example, the possibility of a moderating role for DM between a future time domain focus and hedonistic gratification via smart phone use was reported elsewhere (Zhang et al., 2020). Furthermore, the role of DM can lead to valuable

clinical insight with respect to its relevance to BTP, as BTP can be of a primary importance in the assessment of emotion regulation skills with patients experiencing clinical levels of distress. Assessment for BTP with respect to emotion regulation in a controlled laboratory setting, for instance, can yield valuable insight concerning factors sustaining mental health symptoms in clinical levels of anxiety or depression (Kairys, Liniauskaite, Bagdonas, & Pakalniskiene, 2017).

Future studies are thus advised to aim at establishing inferences of causality in experimental and longitudinal designs – as research covered here dominantly relied on self-report measures in a cross-sectional design. What needs to be established further in future research is the elaboration upon the mechanisms of action between DM and BTP. Specifically, there is a need to clarify causal links between DM and the Carpe Diem perspective on current experiences, a eudaimonic viewpoint on the present moment, and a compassionate attitude towards self as a continuous entity along domains of time, on which constructs appear to be providing the basis for which others to help operate functionally as bases for well-being. Along this line, multiple regression analyses and inter-group mean comparison methods can be complementing the correlation-based evidence covered, guiding research to identify primary variables of causal influence on the dependent variables of well-being and life satisfaction.

References

Altun, F., & Yazici, H. (2015). The relationships between life satisfaction, gender, social security, and depressive symptoms among elderly in Turkey. *Educational Gerontology*, *41*, 305–314.

Asakawa, K. (2010). Flow experience, culture, and well-being: How do autotelic Japanese college students feel, behave, and think in their daily lives? *Journal of Happiness Studies*, *11*, 205–223.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*, 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., & Sauer, S. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329-342.

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Pers Indiv Differ.*, *93*, 63–67.

Bassi, M., Steca, P., Monzani, D., Greco, A., & Fave, A.D. (2014). Personality and optimal experience in adolescence: Implications for well-being and development. *Journal of Happiness Studies*, *15*, 829–843.

Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of*

Consumer Research, 12, 265–280.

Bergomi, C., Tschacher, W., & Kupper, Z. (2013). Measuring mindfulness: First steps towards the development of a comprehensive mindfulness scale. *Mindfulness*, *4*, 18–32.

Bergomi, C., Tschacher, W., & Kupper, Z. (2014). Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit [Construction and initial validation of a questionnaire for the comprehensive investigation of mindfulness]. *Diagnostica*, *60*, 111–125.

Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D., Carmody, J., ... Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*, 230–241.

Bluedorn, A. C. (2002). *The human organization of time: Temporal realities and experience*. Stanford, CA: Stanford University Press.

Bohlmeijer, E., Ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*, *18*(3), 308-320.

Boniwell, I., & Osin, E. (2015). Time perspective coaching. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time Perspective Theory, Review, Research and Application* (pp. 451–469). Switzerland: Springer International Publishing.

Boniwell, I., Osin, E., Linley, A. P., & Ivanchenko, G. V. (2010). A question of balance: Time perspective and well-being in British and Russian samples. *Journal of Positive Psychology*, *5*, 24–40.

Boniwell, I., & Zimbardo, P.G. (2004). Balancing time perspective in pursuit of optimal functioning. In P.A. Linley, & S. Joseph (Eds.), *Positive Psychology in Practice* (pp. 165-178). Hoboken, NJ: Wiley & Sons.

Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences*, *52*, 411–415.

Boyd, J. N., & Zimbardo, P. G. (2005). Time perspective, health and risk taking. In A. Strahman and J. Joireman (Eds.), *Understanding Behavior in the Context of Time: Theory, Research and Applications* (pp. 85–107). Mahwah, N. J: Erlbaum.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. *Journal of Consumer research*, *29*(3), 348-370.

Busseri, M. A., Malinowski, A., & Choma, B. L. (2013). Are optimists oriented uniquely toward the future? Investigating dispositional optimism from a temporally-expanded perspective. *Journal of Research in Personality*, *47*, 533–538.

Caprara, G. V., Steca, P., Alessandri, G., Abela, J. R., & McWhinnie, C.M. (2010). Positive orientation: explorations on what is common to life satisfaction, self-esteem, and optimism. *Epidemiology and Psychiatric Sciences*, *19*, 63–71.

Carter, O.L., Presti, D.E., Callistemon, C., Ungerer, Y., Liu, G.B., and Pettigrew, J.D. (2005). Meditation alters perceptual rivalry in Tibetan Buddhist monks. *Curr. Biol.* 15, R412–R413. doi:10.1016/j.cub.2005.05.043

Caruso, E. M., Gilbert, D. T., & Wilson, T. D. (2008). A wrinkle in time: Asymmetric valuation of past and future events. *Psychological Science*, *19*, 796–801.

Craig, A.D. (2009). Emotional moments across time: A possible neural basis for time perception in the anterior insula. *Phil. Trans. R. Soc. B, 364*, 1933–1942.

Cunningham, K.F., Zhang, J.W., & Howell, R.T. (2015). Time perspectives and subjective well-being: A dual-pathway framework. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time Perspective Theory, Review, Research and Application* (pp. 403–415). Switzerland: Springer International Publishing.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper & Row.

Deci, E.L., & Ryan, R.M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies*, *9*, 1–11.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*, 71–75.

Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of personality and social psychology*, *107*(5), 879.

Drake, L., Duncan, E., Sutherland, F., Abernethy, C., & Henry, C. (2008). Time perspective and correlates of well-being. *Time & Society*, *17*, 47–61.

Dreyfus, G. (2011). Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. *Contemporary Buddhism*, *12*(1), 41–54.

Droit-Volet, S., Fanget, M., and Dambrun, M. (2015). Mindfulness meditation and relaxation training increases time sensitivity. *Conscious. Cogn.* 31, 86–97. doi: 10.1016/j.concog.2014.10.007

Droit-Volet, S., Fayolle, S., Lamotte, M., and Gil, S. (2013). Time, emotion and the embodiment of timing. *Timing Time Percept.* 1, 99–126. doi:10.1163/22134468- 00002004

Droit-Volet, S., and Meck, W.H. (2007). How emotions colour our perception of time. *Trends Cogn. Sci.* 11, 504–513.

Epstein, R.M., & Krasner, M.S. (2013). Physician resilience: what it means, why it matters, and how to promote it. *Acad Med.*, *88*, 301–303.

Fan, J., McCandliss, B.D., Sommer, T., Raz, A., & Posner, M.I. (2002). Testing the efficiency and independence of attentional networks. *Journal of Cognitive Neuroscience*, *14*, 340–347.

Fieulaine, N., & Martinez, F. (2011) About the fuels of self-regulation: Time perspective and desire for control in adolescents substance use. In: Barkoukis, V. (ed.) *Psychology of Self-Regulation*. New York: Nova Science Publishers.

Flaherty, M.G., Freidin, B., and Sautu, R. (2005). Variation in the perceived passage of time: a cross-national study. *Soc. Psychol. Q.*, *68*, 400–410.

Foulkes, L., Seara-Cardoso, A., Neumann, C. S., Rogers, J. S., & Viding, E. (2014). Looking after number one: Associations between psychopathic traits and measures of social motivation and functioning in a community sample of males. *Journal of Psychopathology and Behavioral Assessment*, *36*(1), 22-29.

Fresco, D. M., Segal, Z. V., Buis, T., & Kennedy, S. (2007). Relationship of posttreatment decentering and cognitive reactivity to relapse in major depression. *Journal of Consulting and Clinical Psychology*, *75*, 447–455.

Gecht, J., Kessel, R., Forkmann, T., Gauggel, S., Drueke, B., Scherer, A., & Mainz, V. (2014). A mediation model of mindfulness and decentering: Sequential psychological constructs or one and the same? *BMC Psychology*, *2*, 18.

Germer, C. K. 2009. *The mindful path to self-compassion: Freeing yourself from destructive thoughts and emotions*, New York, NY: Guilford Press

Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re) invention of mindfulness: Comment on Brown et al. (2011). *Psychological Assessment*, *23*, 1034–1046.

Gruber, J., Gunningham, W. A., Kirkland, T., & Hay, A. C. (2012). Feeling stuck in the present? Mania proneness and history associated with present-oriented time perspective. *Emotion, 12,* 13–17.

Hall, E. T. (1989). *Beyond culture*. New York: Anchor Books.

Hall, C. W., Row, K. A., Wuensch, K. L., & Godley, K. R. (2013). The role of self-compassion in physical and psychological well-being. *The Journal of psychology*, *147*(4), 311-323.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*, 1-25.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from http://www.afhayes.com/public/process2012.pdf

Hershfield, H. E., Cohen, T. R., & Thompson, L. (2012). Short horizons and tempting situations: lack of continuity to our future selves leads to unethical decision making and behavior. *Organizational Behavior and Human Decision Processes*, *117*, 298–310.

Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual Differences*, 50: 222–227

Howell, R. T., Kern, M. L., & Lyubomirsky, S. (2007). Health benefits: meta-analytically determining the impact of wellbeing on objective health outcomes. *Health Psychology Review*, *1*, 83–136.

Huta, V., & Waterman, A.S. (2013). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of Happiness Studies*, *15*, 1425–1456.

Jevning, R.,Wallace, R.K., & Beidebach,M. (1992). The physiology of meditation: a review. A wakeful hypometabolic integrated response. *Neuroscience & Biobehavioral Reviews*, *16*, 415–424.

Jian, C., Liang-shi, Y., & Li-hua, Z. (2011). Reliability and validity of Chinese version of self-compassion scale. *Chin. J. Clin. Psychol*. 19, 734–736.

Johnson, C., Burke, C., Brinkman, S., & Wade, T. (2017). Development and validation of a multifactor mindfulness scale in youth: The Comprehensive Inventory of Mindfulness Experiences–Adolescents (CHIME-A). *Psychological Assessment*, *29*, 264.

Kabat-Zinn, J. (2005). *Coming to Our Senses*. New York: Hyperion.

Kairys A., Liniauskaitė A., Bagdonas A., Pakalniškienė V. (2017) Balanced Time Perspective: Many Questions and Some Answers. In: Kostić A., Chadee D. (eds) *Time Perspective*. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-60191-9_5

Kang, Y., Gruber, J., & Gray, J.R. (2013). Mindfulness and de-automatization. *Emotion Review*, *5*, 192–201.

Kasser, T., Ryan, R. M., Couchman, C. E., & Sheldon, K. M. (2004). *Materialistic values: Their causes and consequences.* In T. Kasser & A. D. Kanner (Eds.), *Psychology and consumer culture: The struggle for a good life in a materialistic world* (p. 11–28). American Psychological Association

Kee, Y.H., & Wang, C.K.J. (2008). Relationships between mindfulness, flow dispositions and mental skills adoption: A cluster analytic approach. *Psychology of Sport and Exercise*, *9*, 393–411.

Keough, K., Zimbardo, P.G., and Boyd, J.N. (1999). Who's smoking, drinking, and using drugs? Time perspective as a predictor of substance use. *Basic Appl. Soc. Psychol.*, *21*, 149–164.

Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual differences*, *81*, 41-46.

Kirby, J.N., Tellegen, C.L., & Steindl, S.R. (2017). A meta-analysis of compassion-based interventions: Current state of knowledge and future directions. *Behavior Therapy*, *48*, 778-792.

Kohls, N., Sauer, S., & Walach, H. (2009). Facets of mindfulness—Results of an online study investigating the Freiburg Mindfulness Inventory. *Personal. Individ. Differ.*, *46*, 224–230.

Kramer, R.S., Weger, U.W., & Sharma, D. (2013). The effect of mindfulness meditation on time perception. Consciousness and Cognition, 22, 846–852.

Lee, Y., Lin, Y., Huang, C., & Fredrickson, B.L. (2013). The construct and measurement of peace of mind. *J Happiness Stud.*, *14*, 571–590.

Liu, X., Xu, W., Wang, Y., Williams, J. M. G., Geng, Y., Zhang, Q., & Liu, X. (2015). Can inner peace be improved by mindfulness training: a randomized controlled trial. *Stress and Health*, *31*, 245-254.

McGrath, J. E., & Tschan, F. (2004). *Temporal matters in social psychology: Examining the role of time in the lives of groups and individuals*. Washington, DC: American Psychological Association.

McKay, M. T., Worrell, F. C., Zivkovic, U., Temple, E., Mello, Z. R., Musil, B., ... & Perry, J. L. (2019). A balanced time perspective: Is it an exercise in empiricism, and does it relate meaningfully to health and well-being outcomes?. *International Journal of Psychology*, *54*, 775-785.

Mello, Z. R., & Worrell, F. C. (2007*). The adolescent time inventory - English*. Berkeley, United States: Unpublished scale, The University of California.

Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K, Mu P-F. Chapter 7: Systematic reviews of etiology and risk . In: Aromataris E, Munn Z (Editors). *JBI Manual for Evidence Synthesis.* JBI, 2020.

Naish, P.L.N. (2007). "Time distortion and the nature of hypnosis and consciousness," in *Hypnosis and conscious states: The Cognitive-Neuroscience Perspective,* ed. G. Jamieson (Oxford: Oxford University Press), 271–292.

Neff, K. (2003). Self-compassion an alternative conceptualization of a healthy attitude toward oneself. *Self Identity*, *2*, 85–101.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *J. Clin. Psychol.*, *69*, 28–44.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality*, *77*, 23–50.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J.M., & Moher, D. (2021). Updating guidance for reporting systematic reviews: Development of the PRISMA 2020 statement. *Journal of Clinical Epidemiology*, *134*, 103-112.

Pavot, W., Diener, E., & Suh, E. (1998). The Temporal Satisfaction with Life Scale. *Journal of Personality Assessment*, *70*, 340.

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... & Duffy, S. (2006). Guidance on the conduct of narrative synthesis in systematic reviews. *A Product from the ESRC methods programme, Version 1*, b92.

Posner, M. I., & Petersen, S. E. (1990). The attention systems of the human brain. *Annual Review of Neuroscience, 13*, 25–42.

Preuss, U.W., Rujescu, D., Giegling, I., Watzke, S., Koller, G., Zetzsche,T., et al. (2008). Psychometric evaluation of the German version of the Barratt Impulsiveness Scale. *Nervenarzt* 79, 305–319.

Rau, H. K., & Williams, P. G. (2016). Dispositional mindfulness: A critical review of construct validation research. *Personality and Individual Differences*, *93*, 32-43.

Richardson, G.E. (2002). The metatheory of resilience and resiliency. *J Clin Psychol.*, *58*, 307–321

Richins, M. L., & Dawson, S. (1992). A consumer values perspective for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*, 303–316.

Roepke, A. M., & Seligman, M. E. (2016). Depression and prospection. *British Journal of Clinical Psychology*, *55*(1), 23-48.

Roseanu, G., Marian, M., Tomulescu, I. M., & Pusta, C. T. (2008). Personal time and psychopathology. *Annals of General Psychiatry, 7*(1), 1.

Ross, M., & Wilson, A. E. (2002). It feels like yesterday: self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology, 82*, 792–803.

Rudkin, E., Medvedev, O.N., & Siegert, R.J. (2018). The five-facet mindfulness questionnaire: Why the observing subscale does not predict psychological symptoms. *Mindfulness*, *9*, 230-242.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78.

Sauer, S., Lemke, J., Wittmann, M., Kohls, N., Mochty, U., and Walach, H. (2012). How long is now for mindfulness meditators? *Pers. Individ. Differ.*, *52*, 750–754.

Seema, R., & Sircova, A. (2013). Mindfulness a time perspective? Estonian study. *Baltic Journal of Psychology*, *14*, 4–21.

Seginer, R., and Lens, W. (2015). The motivational properties of future time perspective future orientation: Different approaches, different cultures. In *Time Perspective Theory; Review, Research and Application*, Stolarski, M., Fieulaine, N., van Beek, W., Eds. Springer-Verlag: Cham, Switzerland, 287–304.

Shapiro, S.L., Carlson, L.E., Astin, J.A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, *62*, 373–386.

Shipp, A. J., Edwards, J. R., & Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: the subjective experience of the past, present, and future. *Organizational Behavior and Human Decision Processes*, *110*, 1–22.

Sobol-Kwapinska, M. (2009). Forms of present time orientation and satisfaction with life in the context of attitudes toward past and future. Social Behavior and Personality, 37(4), 433–440.

Sobol-Kwapinska, M. (2013). Hedonism, fatalism and 'Carpe Diem': Profiles of attitudes towards the present time. Time & Society, 22(3), 371–390.

Steptoe, A.,& Wardle, J. (2012). Enjoying life and living longer. *Archives of Internal Medicine*, *172*, 273–275.

Stöber, J. (2000). Prospective cognitions in anxiety and depression: Replication and methodological extension. *Cognition and Emotion*, *14*, 725-729.

Stolarski, M., Vowinckel, J., Jankowski, K. S., & Zajenkowski, M. (2016). Mind the balance, be contented: Balanced time perspective mediates the relationship between mindfulness and life satisfaction. *Personality and Individual Differences*, *93*, 27-31.

Vowinckel, J.C., Westerhof, G.J., Bohlmeijer, E.T., & Webster, J.D. (2017). Flourishing in the now: Initial validation of a present-eudaimonic time perspective scale. *Time & Society*, *26*, 203-226.

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—The Freiburg Mindfulness Inventory (FMI). *Personal. Individ. Differ.*, *40*, 1543–1555.

Wallace, B.A., & Shapiro, S.L. (2006). Mental balance and well-being: building bridges between Buddhism and western psychology. *Am Psycho.*, *7*, 690–701.

Wang, G., Liu, L., Tan, X., & Zheng, W. (2017). The moderating effect of dispositional mindfulness on the relationship between materialism and mental health. *Personality and Individual Differences, 107*, 131–136.

Watson, D. C. (2017). Materialism, temporal perspective and well-being. *Imagination, Cognition and Personality, 37*, 45–68.

Williams, J. M. G. (2010). Mindfulness and psychological process. *Emotion*, *10*, 1–7.

Wittmann, M., and Paulus, M.P. (2008). Decision making, impulsivity and time perception. *Trends Cogn Sci. 12*, 7-12.

Wittmann, M., and Paulus, M.P. (2009). Temporal horizons in decision-making. *J. Neurosci. Psychol. Econ. 2*, 1-11.

Wittmann, M., and Schmidt, S. (2014). "Mindfulness meditation and the experience of time," in *Meditation–Neuroscientific Approaches and Philosophical Implications*, eds S.Schmidt and H.Walach (Cham:Springer-Verlag), 199–210.

Worrell, F. C., Temple, E. C., McKay, M. T., Živkovič, U., Perry, J. L., Mello, Z. R., et al. (2016). A theoretical approach to resolving the psychometric problems associated with the Zimbardo Time Perspective Inventory. *European Journal of Psychological Assessment*, *34*, 41–51.

Xu, W., Rodriguez, M.A., Zhang, Q., & Liu, X. (2015). The mediating effect of self-acceptance in the relationship between mindfulness and peace of mind. *Mindfulness*, *6*, 797–802.

Yu, X., & Zhang, J. (2007). A comparison between the Chinese version of ego-resiliency scale and Connor-Davidson Resilience Scale. *Psychol Sci*, *30*, 1169–1171.

Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being*, *7*, 340-364.

Zhang, J.W., & Howell, R.T. (2011). Do time perspectives predict unique variances in life satisfaction beyond personality traits? *Personality and Individual Differences*, *50*, 12611266.

Zhang, J.W., Howell, R.T., & Stolarski, M. (2013). Comparing three methods to measure a balanced time perspective: The relationship between a balanced time perspective and subjective well-being. *Journal of Happiness Studies*, *14*, 169–184.

Zhang, Y., Lv, S., Li, C., Xiong, Y., Zhou, C., Li, X., & Ye, M. (2020). Smartphone use disorder and future time perspective of college students: The mediating role of depression and moderating role of mindfulness. *Child and adolescent psychiatry and mental health*, *14*, 1-11.

Zimbardo, P.G., & Boyd, J.N. (1999). Putting time in perspective: A valid, reliable individual-difference metric. *J. Personal. Soc. Psychol.*, *77*, 1271–1288.

Zimbardo, P.G., & Boyd, J.N. (2008). *The Time Paradox*. New York, NY: Free Press.

Study II

**Moderating Impact of Dispositional Mindfulness in the
Relationship Between Future Expectancies and
Psychological Well-being**

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Abstract

Background: Future expectations, or prospections, regarding the occurrence of important events in a person's future have recently been hypothesized to be the main cause behind symptoms of major depression. These can influence an individual's current ability to cope with stress, and thus can predispose that individual to lowered psychological well-being. In a separate line of reasoning, mindfulness, through a secular lens, is conceptualized as a basic human skill that concerns attending to and accepting present moment experiences in a non-judgmental and compassionate way. Mindfulness has also been studied for some time now under cultivated (i.e. as trained) or dispositional (i.e. trait-like) divisions where the latter has strong implications for psychological well-being in meditators and non-meditators alike. Developing on these lines, it can also be stated that the perceived risk of occurrence as well as the vividness of imagined positive and negative self-relevant future events are also important contributors to self-report measures of psychological distress. There is, however, a lack of empirical research looking at possible links between dispositional mindfulness, as understood in its facet structure, and future expectations as understood via perceived risk of occurrence and vividness of mental imagery when prompted to imagine a given list of positive and negative prospective event item lists.

Objectives: Therefore, this research aimed at: investigating the possible moderating effect of dispositional mindfulness measured in its facet conceptualization between i) probabilistic risk of occurrence ratings of positive and negative future events and reported mental well-being (Study II), and ii) imagery vividness and reported mental well-being when prompted to imagine positive and negative future events, via self-report measures (Study III). This is an exploratory study aimed at investigating above mentioned questions to address the lack in the related field of research.

Results: Although dispositional mindfulness facets (except for *nonreactivity to inner experience*) and probabilistic risk assessments of prospective positive ($r=-.54$, $p<.001$) and negative ($r=.44$, $p<.001$) events were found to be significantly related with mental distress symptoms (measured by DASS total scores), there was no significant interaction effect between dispositional mindfulness and prospective risk assessment scores (Study II). However, there is a significant interaction effect between negative imagery vividness and *nonreactivity to inner experience* facet of

dispositional mindfulness $F_{(1,103)}=4.00$, R^2 change=.018, p<.05) (Study III). The proposed interaction effect, though, is in the edge of statistical significance (p=.048), possibly warranting caution.

Conclusion: This is an exploratory study looking at the yet unstudied potential link between prospective thoughts and dispositional nature of mindfulness in its facet conceptualizations. Findings are supportive of the proposed relationships between DASS total measures, dispositional mindfulness facets, and prospective thinking. The moderating effect of *nonreactivity to inner experience* on the relationship between negative imagery vividness and distress ratings, however, was a novel finding. More specifically, the results suggest that negative imagery vividness can predict increases in psychological distress scores only when the person has significant nonreactivity to inner experience. This finding can inform a future line of research looking into the stated variables in question. It could also possibly be more informative to include larger sample sizes with clinical levels of distress, together with experimental design focus to account for limitations of self-report measures.

Keywords: dispositional mindfulness, prospective imagery, phenomenologic characteristics, well-being

2.0 Introduction

Major depressive disorder (MDD) is a serious mental illness that, according to a recent analysis (Durisko, Mulsant & Andrews, 2015), is estimated to affect around 5% of world's population at any given time, with a lifetime prevalence of 16% and a maximal heritability percentage of 37%. Drawing conclusions from the same meta-analysis, MDD was also estimated to be the second leading disorder globally in limiting professional efficacy as well as lowering the quality of life (Durisko et al., 2015). Even sub-clinical levels of MDD symptoms were shown to be able to significantly lower the quality of life (Richards, 2011). MDD, specifically with an earlier age of onset (Agosti, 2014), can directly affect professional as well as social capabilities of individuals.

MDD is a condition that presents with cognitive faults and behavioural symptoms. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM 5) defines five key symptoms for MDD, two of them being a *depressed mood* and prevailing *anhedonia* for over a minimum of two weeks duration (American Psychiatric Association, 2013). Full remission as well as partial remission are possible outcomes of a successful therapy. The rates of full remission for patients under treatment for increased chronicity in depression are comparably lower (Klein et al., 2009) and recurrence following full remission can be the case with as much as half of the people under remission (Eaton et al., 2008; Richards, 2011). Full remission rates themselves can vary also: a rate nearing 60% was reported in a large national survey research when one-year follow-up was maintained (Kelly & Mezuk, 2017). Although in a smaller sample size, a follow-up period of three years found a higher full remission rate (Garcia-Toro et al., 2013). Countering recurrence on remission, though, is still a challenge. Focusing on factors related to vulnerability in people under remission from MDD to increase resilience, e.g. training to become flexible in problem solving across a variety of environmental stressors, can also be implemented to increase full remission rates in the long-term (Waugh & Koster, 2015). However, we can currently infer that showing some degree of MDD symptoms is possible even after full remission. This means that current approaches on treating the condition are far from adequate, and some authors even speculated that combining medical approaches with cognitive-behavioural interventions cannot eliminate this challenge. Accordingly, Roepke and Seligman highlighted the *65%*

barrier as a hypothetical upper limit for the rates of patients showing remission after any given MDD episode (Roepke & Seligman, 2016).

Literature reviewed highlights two broad causal factors behind MDD: the neurophysiological factors and cognitive factors (Roepke & Seligman, 2016; Rock, Roiser, Riedel, & Blackwell, 2014; Trivedi & Greer, 2014; McIntyre et al., 2013; Liao et al., 2013; Rive et al., 2013; Snyder, 2013). These factors do show a substantial amount of overlap, and research highlights accompanying neural correlates to various cognitive distortions or dysfunctions in the study of MDD to be very helpful in devising new treatment strategies (Schacter et al., 2012; Singh & Gotlib, 2014). Understanding cognitive factors in greater precision, both in remission and during recurrence, is a challenging task for contemporary research.

The pessimistic cognitive triad, a well-identified thought pattern closely related to specific cognitions in depression (Beck, 1995; Beck, Rush, Shaw & Emery, 1979), comprises of persistent pessimistic attitudes regarding person's self, surrounding environment involving conditions that are proximal as well as distal to self, and the future (Beck, 1976; Beck et al., 1979). Accordingly, a person showing clinical levels of MDD symptoms would be much more prone to showing inconsistencies in their logical reasoning, and a prevailing pessismism would be expected to dominate their thinking. Even though such cognitions might be observed in numerous psychopathologies other than MDD, it is the specific case with MDD that such pessimistic attitudes go so far as to dominate a person's feelings of self-worth, ability to cope or make a change, with an emphasis on a significant downvaluing of the possibility for a positive future (Beck, 1995; Haaga, Dyck & Ernst, 1991). Dysfunctional thoughts tend to dominate everyday reasoning, and a person with MDD can easily develop feelings of uncontrollable hopelessness that is different in its nature from exaggerated feelings of worry (Brown & Beck, 2002; Weissman & Beck, 1978).

2.0.1 Prospections

Being one branch of the pessimistic cognitive triad, future prospections regarding the nature as well as qualities of important variables in a person's life are recently hypothesized to be the main cause giving rise to MDD, criticizing their rather partial importance in Beck's theory of negative cognitive triad (Roepke & Seligman, 2016). This hypothesis suggests that faulty prospections are responsible for MDD symptoms, and these appear as qualitatively different from plain negative

prospections. Accordingly, negative prospections are considered to be healthy cognitions preparing the individual against future adversities, possibly having an evolutionary past in human beings following their use on increasing chances of survival (Durisko et al., 2015). Faulty prospections, on the other hand, appear as dysfunctional, inaccurate and ill-adequate cognitions regarding the risk of occurrence as well as the impact of events in future and are predominantly pessimistic in their nature in a way that it is difficult to be conceived of as having any significant use to the individual (Gilbert & Wilson, 2007; Roepke & Seligman, 2016). Such faulty prospections theoretically affect an individual's current quality of life and ability to cope with stress, and thus can predispose that individual to developing MDD symptoms.

Literature reviewed reveals that numerous studies highlighted certain prospection faults inherent in patients with MDD diagnosis as well as individuals with sub-clinical increases in depressive symptoms (studies frequently assessed university student samples in the sub-clinical spectrum). These individuals were found to engage in negative future prospections faster and imagine negative scenarios much easier than positive ones (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011; Sargalska, Miranda, & Marroquín, 2011). Additionally, numerous studies also reported that there is a tendency to allocate much less time in imagining positive future scenarios and even when it happens, there is a tendency to focus on poorer imagination with regards to emotional content as well as detail (Morina et al., 2011; Bjärehed, Sarkohi, & Andersson, 2010). Further, research also suggests that depressed individuals may feel less elated when asked to imagine future positive events happening in the moment, when compared to healthy controls (MacLeod & Salaminou, 2001). Finally, people with elevated symptoms of MDD reported possible future events that have personal value to themselves to have much less chance of occurrence when compared to probability assignments done with healthy controls (MacLeod & Byrne, 1996; MacLeod, Pankhania, Lee, & Mitchell, 1997; Stöber, 2000; Szollosi, Pajkossy, & Racsmany, 2015). One explanation regarding this finding is that future scenarios imagined less vividly (in this case, positive scenarios) get perceived as being less reliable and hence having a weaker chance of being real, shifting focus from optimistic expectations to the more concrete, more reliable pessimistic end in these individuals (Holmes, Lang, Moulds, & Steele, 2008; Holmes & Mathews, 2010). More vivid thoughts are also postulated to cause stronger emotions in people, and one study in support of this idea with regards to

patients with MDD reported that increased imagination and highlighted details with regards to suicide correlated with actual rates of committing suicide in a future time interval (Hales, Deeprose, Goodwin & Holmes, 2011).

The reconstructive memory model explanation of faulty future prospections points out that people with elevated symptoms of depression have weaker memories for positive autobiographical events; hence, it is harder for them to imagine positive future scenarios happening to them (Schacter, Addis & Buckner, 2007). Incorporating alterations in healthy executive functions in cases with MDD, it may be neurophysiologically harder for these individuals to engage in vivid positive imaginations. Weakening cognitive flexibility, inability to disregard emotional distractor stimuli and poor problem solving skills as well as inadequate stress coping can help people become predisposed towards pessimistic imaginations (Femenia, Gomez-Galan, Lindskog, & Magara, 2012; Kaymak et al., 2010; Lee, Hermens, Porter, & Redoblado-Hodge, 2012; McKinnon, Yucel, Nazarov, & MacQueen, 2009; Snyder, 2013).

The valuation model explanation would highlight faulty risk assessments regarding positive and negative future scenarios. People with MDD tend to consider the probability of negative future scenarios happening as much higher and evaluate such scenarios as more catastrophic in comparison to healthy controls (Gilbert & Wilson, 2007; Morina et al., 2011; Miloyan, Pachana, & Suddendorf, 2014). Individuals with MDD not only exaggerate probabilities for negative events, but also give more reasons and causal explanations supporting their claims (Miloyan et al., 2014). Their reasons tend to involve weak logical assumptions, like finding fault in self for misfortune, or holding a strong belief that misfortune in one event (e.g. relationships) will surely signal misfortunes in others (e.g. professional, social, health-related). Nevertheless, it may appear valid for them to hold on to. Clearly, deficits in healthy executive functioning is apparent when the valuation model is also considered. Research supports this idea: people showing clinical levels of depression tend to form negative prospections faster and easier, think less about positive future events (MacLeod & Byrne, 1996; MacLeod, Byrne, & Valentine, 1996; MacLeod & Salaminou, 2001; Macleod, Pankhania, Lee & Mitchell, 1997) forming less vivid mental imagery when they do (Morina et al., 2011; Stöber, 2000; Szollosi et al., 2015). Furthermore, they tend to feel less elated when prompted to feel positive scenarios as they are happening right now, and incorporate much more

details into their negative prospections, instead (Bjärehed et al., 2010; Holmes et al., 2008; Sargalska et al., 2011)

2.0.2 Mindfulness

2.0.2.1 Buddhist Roots. Originating from the word *sati* as was used in the Pali Canon, the renowned Buddhist scholar Bhikkhu Bodhi prefers to define mindfulness as "a stance of observation or watchfulness towards one's own experience...a 'bending back' of the light of consciousness upon the experiencing subject in its physical, sensory, and psychological dimensions." (2011, p.25). This, he argues, focuses on an active presence of attention on the subject of study. Under detailed investigation by the mental faculty of concentration, he argues, the object will eventually lay down its phenomenologic characteristics for us to examine. Mindfulness is, first and foremost, thought of as a "lucid awareness" (p.25) that identifies the mental and/or physical objects as entities we can focus on, bracketing them away from the regular flow of daily life experiences.

2.0.2.2 Secular Evaluations. Since its introduction to the scientific community (Kabat-Zinn, 2003; Williams & Kabat-Zinn, 2011), the concept of mindfulness needed to be defined in an extensive and descriptive way to help measure it as a factor linked with constructs related to psychological well-being (for a brief overview, see Baer, 2019). This psychometric aim focused on secular definitions while also minding to retain core specifications according to Buddhist traditions. Contemporary definitions include "paying attention to the present moment" (Kabat-Zinn, 2003) with purpose and in a non-judgmental way; or "awareness of present experience" (Bishop et al., 2004) with emphasis on acceptance with a kind and friendly attitude.

Mindfulness, then, is a term that originated from Buddhist traditions, and is conceptualized as a basic human skill that concerns attending to and accepting present moment experiences in a non-judgmental, and compassionate way (Kabat-Zinn, 2003). This requires focus of attention on the moment-by-moment experiences one lives through, and striving not to evaluate, classify, organize, or analyze thoughts as well as feelings in general (i.e. the self-acceptance nature of mindfulness; Kabat-Zinn, 2003; Teper & Inzlicht, 2014; Rau & Williams, 2016).

Literature on mindfulness has grown substantially in the last two decades (Williams & Kabat-Zinn, 2011), and only recently mindfulness has begun to be conceptualized under *state* (i.e. cultivated) or *dispositional* (i.e. trait) headings where

the latter has strong implications for links with substantial health benefits encompassing psychological well-being (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Coffey & Hartman, 2008).

Minding the inherent difficulties in defining and explaining the concept, several self-report tools have been devised in recent years to try and measure mindfulness (van Dam et al., 2018). Such tools focus both on the conceptualizations of mindfulness as a *state*, where present moment awareness with nonjudgmental acceptance is measured following a brief training on mindfulness skills (usually in the form of a formal or informal practice including meditation or yoga; see Jazaieri & Shapiro, 2017) or a *trait* (i.e. *disposition*, hence *dispositional mindfulness*) where a general tendency to focus on current experience with a non-jugmental attitude is measured. Most self-report measures, though, focused on the trait conceptualizations of mindfulness in general public and/or college student samples, as prior experience with mindfulness meditation or related practices is not a must. Amongst such, the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), and the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004) can be given as frequently used and validated scales.

There is research advice on possible advantages of using multi-faceted trait mindfulness measures as facet-level interactions can be more reliably interpreted than single-score measures alongside with indicators of psychological well-being as well as distress (Rau & Williams, 2016). For instance, FFMQ facets *acting with awareness* and *nonreactivity* were reported to show the strongest link with the mindfulness construct in general (Baer et al., 2006; Baer et al., 2008; Short, Mazmanian, Oinonen, & Mushquash, 2016). FFMQ facet measures also demonstrate negative correlations with the personality trait neuroticism (Giluk, 2009; Hanley, 2016), as well as increased symptoms of distress, including depressive and anxiety symptoms (Brown & Ryan, 2003). Positive correlations with psychological well-being (Short et al., 2016), facilitation of adaptive stress responses (focusing on the single facet *acting with awareness*; Donald, Atkins, Parker, Christie, & Ryan, 2016) and emotion regulation (Stevenson, Millings & Emerson, 2019) were recently reported, as well.

2.0.3 The Rationale and Purpose of Current Research

Probability assessments of the occurrence of negative as well as positive

future events demonstrate significant differences in individuals with increased anxiety or depressive symptoms in comparison to healthy controls (for an extensive review, see Roepke & Seligman, 2016; for underlying cognitive biases and neural correlates, see Sharot & Garrett, 2016). People can show variation in their reactions to mental events that hold the potential to affect quality of life, much like the potential inherent in the variation shown in reacting to physical stressors encountered during life experiences (Ogden, 2012). Given the established observation that future expectancies hold significant differences between individuals with increased anxiety and/or depressive symptoms and healthy individuals (Roepke & Seligman, 2016), and taking into consideration the observable link between mindfulness and psychological distress, it may very well be possible that mindfulness, analyzed in its facet structure, has links with future expectancies.

Earlier research established a link between mindfulness and psychological well-being (Rau & Williams, 2016; Coffey & Hartman, 2008), and DM as a construct has recently acquired fresh research attention as a multifaceted trait (Hollis-Walker & Colosimo, 2011; Giluk, 2009; Baer et al., 2006). Alongside with these points, it can be possible that trait mindfulness, analyzed in its facet structure, can have links with future expectancies. The assumption related to DM is that distancing thoughts from prospections can be a protective measure against the focus on negative prospections. Brown, Ryan and Creswell (2007), for instance, reported that adults with a secure attachment history are thought to be able to focus a greater amount of attention on the present moment *mindfully* (that is to say, in a non-reactive way that is prone towards a non-judgmental attitude) thanks to these individuals needing to be less defensive, or less on guard, towards perceived threats of isolation leading to feelings of insecurity. The hypothesis gained initial support (Pepping & Duvenage, 2016) in that individuals with secure attachment histories (assessing reports on childhood experiences of parental warmth and rejection) reported significantly higher DM scores.

The possible relation between DM and positive prospections can lead to the idea that an increased focus on positive prospections may help an individual better observe the desired and value-focused goals, and evaluate current actions, cognitions, and emotions in line with such goals - a reasoning in line with the Mindfulness-to-Meaning Theory (MMT; Garland, Farb, Goldin, & Fredrickson, 2015). Accordingly, the MMT explains the involvement of mindfulness in underscoring positive variables, specifications, or instances in one's personal as

well as contextual events; and, this focus can then help establish decisions that are better informed by personal values. Hence, mindfulness as a disposition can be linked with a heightened readiness to observe mental phenomena with active concentration; leading to more vivid imaginations of positive scenarios (thought to be in line with personal values and goals), less vivid imagination of negative scenarios (thought to be otherwise), and a positive bias aimed at motivating current mood towards fulfilling esteemed goals.

To this date, research on the field combining future expectations, anxiety and depression symptom measures, and dispositional mindfulness as is understood in a facet-level structure is lacking. The principal research question, therefore, can be stated as: Do mindfulness traits appear in relation to one's probability evaluations of future event occurrences in predicting important indicators of psychological well-being? This is an exploratory study that will look at the detailed nature of how DM facets may be involved in moderating the effect of prospective cognitions on symptoms of anxiety and depression as assessed via self-report measures. More specifically, to our current knowledge, no prior study has focused on the link between *dispositional mindfulness* in moderating the relationship between probabilistic future expectancy ratings and measures of psychological well-being. Measuring DM with the five facet model can provide us with a wider perspective on what aspects of mindfulness are related with prospections; and, the dispositional nature of the construct, as opposed to trained mindfulness setup, can also aid in the generalizability of findings from participants who have not experienced formal mindfulness training before.

2.1 Method

This thesis is composed of three sections and the latter two are empirical studies – hence, the identification of Study II and Study III, respectively. In Study II, the moderating effect of dispositional mindfulness facets in the relationship between probability expectancies of future events and current indicators of depressive, anxiety and stress symptoms were assessed. Study III, all else being similar to Study II, focused on imagery vividness of possible future events in the stated relationship instead. Details with respect to Study III will be outlined in its respective section.

2.1.1 Participants and Procedure

Study II initially recruited 217 university students and following data cleaning and outlier removal (details of which are given in the Results section), a resulting final number of 204 participants were included in the analysis (81 male and 123 female) with a mean age of 20.92 (sd=2.37). Demographic characteristics are outlined on Table 1.

Data collection was based on pen-and-paper distribution of questionnaires, conducted in course settings with the voluntary permission of course instructors to allocate time for voluntary students fluent in English who wished to participate. In total, filling out the test forms took around 25 to 30 minutes to complete, on average. Informed consent forms were distributed and collected in full confidentiality, which clearly outlined the privacy of participants with regards to the anonymous and voluntary nature of their contributions. No extra course grades or any other incentives were offered for participation. Participants were full time students in major universities in Cyprus, and the procedure was reviewed by the Social Sciences Ethics Review Board (SSERB) of the University of Nicosia (UNic) on 24th July 2019, with the approval number SSERB 47.

2.1.2 Materials

The survey included the informed consent form alongside with four separate questionnaires in addition to the *Demographic Variables Questionnaire*. This questionnaire assessed information with regards to the age, gender, recent psychiatric diagnoses (for the last six months), use of prescribed or recreational psychoactive drugs for the last six months, and whether the individual practices any form of a regular mindfulness meditation practice for a minimum of 15 minutes, daily (as it can impact on dispositional mindfulness measure validity; see Baer et al., 2008). Participants who reported a recent psychiatric diagnosis, recent use of a psychoactive substance, and daily mindfulness meditation practice were not included. This was done to ensure data collection was based on dispositional, not trained, aspects of mindfulness and to minimize bias introduced by confounding variables related to mental functioning.

Following the *Demographic Variables Questionnaire* researchers introduced the battery of following quantitative measures in shifting orders:

2.1.2.1 Subjective Probability Task (SPT). The SPT (MacLeod, Byrne, & Valentine, 1996; Stöber, 2000; Holmes et al., 2008) consists of 30 one-sentence items that describe personally relevant possible future events or

experiences. 20 of these sentences referred to negative experiences or situations (e.g. "You will get the blame for things going wrong", "You will be involved in an accident", or "You will have health problems"), and 10 referred to positive, or desirable experiences or situations (e.g. "You will be able to cope easily with pressure", "You will have lots of energy and enthusiasm", or "People will admire you"). Cronbach α values for *positive* and *negative* item groups (each forming a subscale) in the original study were 0.86 and 0.90, respectively (MacLeod, Byrne & Valentine, 1996). In the current study, the Cronbach α values for *positive* and *negative* item groups were 0.81 and 0.90, respectively. Participants are expected to rate the probability of occurrence they think best fits each item on a one to seven Likert-type scale, where "1" indicates "not at all likely to occur" and "7" indicates "extremely likely to occur".

2.1.2.2 The Five-Facet Mindfulness Questionnaire (FFMQ). The FFMQ (Baer et al., 2006) is a 39 item (one sentence descriptions) questionnaire that was initially developed by Baer and colleagues in 2006 by organizing specific items from numerous measures of mindfulness that were developed up till that day. The factors are: *nonreactivity to inner experience* (Cronbach's α= 0.66; e.g. "In difficult situations, I can pause without immediately reacting"), *observing* (α= 0.70; e.g. "I notice how my emotions express themselves through my body"), *acting with awareness* (α= 0.80; e.g. "I find myself preoccupied with the future or the past"), *describing with words* (α= 0.79; e.g. "It's hard for me to find the words to describe what I'm thinking"), and *nonjudging* of experience (α= 0.81; e.g. "I think some of my emotions are bad or inappropriate and I shouldn't feel them"). This multi-faceted measure of mindfulness was reported to be a valid and informative measure of dispositional mindfulness, alongside with its comparative superiority over single-score measures and significant associations with measures of psychological well-being (Rau & Williams, 2016).

2.1.2.3 World Health Organization Quality of Life - BREF Measure (WHOQOL-BREF). The WHOQOL–BREF (Utsey, Chae, Brown & Kelly, 2002) is a widely used scale that assesses quality of life. This 26-item questionnaire is the shortened version of the original 100 item scale. Five-point Likert-type one sentence items focus on four domains of human life: *physical health*, psychological health, *social relationships*, and *environmental factors*, by asking for instance, "How healthy is your physical environment?" Internal consistency

measures (Cronbach's α values) were reported to be 0.86 for physical health, 0.76 for psychological health, 0.66 for social relationships, and 0.80 for environmental factors (World Health Organization Group, 1998). The same study reported a significant positive correlation between the BREF version and the 100 item version, also (r= 0.90). In the current study, the Cronbach α value for the overall score was 0.90.

2.1.2.4 Depression Anxiety Stress Scale 21-Item Short Form (DASS – 21). The DASS-21 (Antony, Bieling, Cox, Enns & Swinson, 1998) is a Likert-type 21-item questionnaire that can differentially assess for symptoms of stress, anxiety, and depression through its tripartite factor structure. Each factor is comprised of seven one-sentence items that are rated from zero to three, where higher scores indicate higher agreement with the statement. The *stress* subscale examines tendencies to overreact to stressful conditions and symptoms of tension in general; the *anxiety* subscale focuses primarily on physical manifestations of stress response and fear; and the *depression* subscale focuses exclusively on dysphoria and cognitions centring around worthlessness as well as anhedonia (Antony et al., 1998). Cronbach's α values for stress, anxiety, and depression subscales were reported to be 0.91, 0.87, and 0.94, respectively. In the current study, the Cronbach α for overall DASS-21 score was 0.90.

2.1.3 Statistical Analysis

Initially a descriptive analysis was conducted to identify and, if necessary, eliminate outliers. Following that, exploration of assumption validities for the regression analyses that followed were conducted (for details, see Appendix A).

The first multiple regression analysis conducted was a hierarchical regression analysis that incorporated a stepwise method. Accordingly, the age and gender variables were taken in the first step, future expectation probability ratings were taken in the second step, FFMQ facet scores were taken in the third step, and quality of life measure was taken in the fourth and final step. The predicted variable was *DASS total* scores.

Following the hierarchical regression analysis, a moderated multiple regression analyses was conducted with FFMQ facet scores that showed significant correlations in the hierarchical model. The PROCESS macro developed by Hayes (2012) with a bootstrap sample of 1000 (as the default for indirect effects) was incorporated into the SPSS Statistics for Windows, version 20, and Model 1 was

chosen as the simple moderation model for the analysis that followed. Accordingly, the moderating effect of each FFMQ facet was assessed in the relationship between probability expectancies of future events and DASS total scores.

It is worthwhile to note that only the facets showing significance in correlation with *DASS total* scores were included in this analysis, and each facet was included in a separate Model 1 independently, as moderating variables. The predictor variables were SPT scores (separate for *positive* and *negative* factors), the consequent variable was DASS total scores, and covariates were age, gender, and WHOQOL-BREF scores.

2.2 Results

2.2.1 Demographic Characteristics

The study included data from 217 participants prior to data cleaning. These participants reported no psychiatric diagnosis as well as no prescribed or recreational psychoactive drug use up to six months prior to data collection. Of these, people who did not indicate their gender (n=7), who demonstrated an extreme outlier age (n=1), and who provided a significant number of missing data on the WHOQOL-BREF measure (n=2) were removed. Data were also assessed for multivariate outliers using a Mahalanobis distance test (Tabachnik & Fidell, 2013). The test involved continuous variables of DASS total scores, prospection ratings, quality of life overall scores, the five facets of the FFMQ, and age of participants. Accordingly, two further cases were identified as multivariate outliers and were removed prior to the analysis. This last step resulted in a total of 204 participants whose demographic characteristics are outlined on Table 2.1. Accordingly, participants were from 47 different countries, of which Turkey (26.0%), Cyprus (14.7%), and Iran (6.9%) were the more frequently reported. All of the participants were university undergradute students and data was collected face-to-face within the lecture hour slots allocated for research purposes.

Table 2.1

Demographic Variables

	N	percentage (%)	
Gender			
female	123	60.3%	
male	81	39.7%	
total	204		
Country of origin			
Turkey	53	26.0%	
Cyprus	30	14.7%	
Iran	14	6.9%	
Palestine	11	5.4%	
Jordan	10	4.9%	
Other	86	42.16%	
	M^a	SD	
Age	20.92	2.37	

[a] N=204: 81 male [39.7%] and 123 female [60.3%]. All of the participants were university undergraduate students.

The FFMQ facets were measured individually (N=204): observing (M= 25.71, sd= 5.59), *describing* (M= 25.85, sd= 5.75), *acting with awareness* (M= 26.43, sd= 5.89), nonjudging (M= 23.55, sd= 6.35), and *nonreactivity* (M= 21.39, sd= 4.47). The SPT-Pos mean score was 47.32 (sd= 9.45), and SPT-Neg mean was 66.53 (sd= 19.83). DASS total score mean was 45.80 (sd=23.35), and WHOQOL-BREF score mean was 54.67 (out of 100; sd= 19.83).

2.2.2 Hierarchical Regression Analysis

Numerous assumptions should meet prior to the decision to conduct a hierarchical regression analysis (Field, 2013; Tabachnick & Fidell, 2013). Accordingly, we checked for the assumptions of *no multicollinearity*, *residual normality*, *uncorrelatedness*, *homoscedasticity* and *linearity* between independent and dependent variables. We already checked for extreme outliers and multivariate outliers, and all individual data collected came from a different person, verifying a further assumption of *independence*.

Assumption check with the above mentioned assumptions went on without indicating a significant issue to detain us from using our data as it is for a hierarchical regression analysis. For all the tests conducted as part of a formal assumption check, please consult Appendix A. The correlations between variables of interest, though, are given below in Table 2.2.

Table 2.2

Basic Correlation Coefficients Between Independent Variables (IVs) and the Dependent Variable (DV).

	DV	IVs							
	dass_total	overall_QoL	ffmq. observing	ffmq. describing	ffmq. actaware	ffmq. nonjudging	ffmq. nonreactivity	spt.pos	spt.neg
DV									
dass_total	-	-.53**	.15*	-.37**	-.47**	-.33**	-.05	-.40**	.44**
IVs									
overall_QoL		-	.05	.44**	.41**	.29**	.09	.53**	-.40**
ffmq.observing			-	.10	-.21**	-.27**	.41**	.16*	-.01
ffmq.describing				-	.39**	.29**	.15*	.30**	-.34**
ffmq.actaware					-	.47**	-.12	.26**	-.44**
ffmq.nonjudging						-	-.29**	.05	-.40**
ffmq.nonreactivity							-	.34**	.06
spt.pos								-	-.17*
spt.neg									-

Note. DV is *dass_total* (total DASS score). IVs are: *overall_QoL* (the *overall quality of life* score); FFMQ facets as *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*), *ffmq.nonjudging* (*nonjudging of experience*), and *ffmq.nonreactivity* (*nonreactivity to inner experience*); SPT factors as *spt.pos* (*positive prospections*) and *spt.neg* (*negative prospections*).
*p<.05, **p<.01

2.2.2.1 Analysis Results. A hierarchical regression analysis was conducted to analyse the effects of prospective thoughts and dispositional mindfulness scores on DASS total scores as the DV (for the overall model summary, see Table 4). It is worthwhile to note that variable *nonreactivity to inner experience* did not show a significant correlation with the DV, and hence was not included in the hierarchical regression model (see Table 2.2). Furthermore, one more multivariate outlier was removed prior to the analysis, resulting in N=203. All the other variables were taken in the hierarchical regression analysis, including the age and gender variables to be entered in the first step – accounting for their confounding effects on total variance (for the stepwise model summary, see Table 2.4).

Table 2.3

Hierarchical Regression Overall Analysis Summary for DASS Total Scores as the DV

	R^2	*F*	Durbin-Watson test statistic
Model Summary[i]			
	.437	F(9,194)= 16.73**	2.147[ii]

[i] predictors (IVs): gender and age (step 1); *spt.pos* (*positive prospections*) and *spt.neg* (*negative prospections*) (step 2); *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*) and *ffmq.nonjudging* (*nonjudging of experience*) (step 3); *overall_QoL* (the *overall quality of life* score) (step 4). N= 203.
[ii]Durbin-Watson test statistic is very close to 2.000, which means that there is no evidence for autocorrelation, i.e. repeating patterns in regression analysis (see Tabachnick & Fidell, 2013).
**p<.01

The overall regression model (Table 2.3) predicted approximately 43.7% of variance in DASS total (R^2=.437, F(9,194)= 16.73, p<0.001). Moving on to the stepwise model analysis (Table 2.4), age and gender variables in the first step

predicted approximately 0.5% of variance in DASS total (F(2,201)= .53), and neither was a significant predictor. After controlling for age and gender, step two predicted approximately 30.0% of variance (F(2,199)= 42.93; p<0.001), where both *positive* and *negative prospection* scores were significant predictors (p<.01, for both) – with lower *positive prospection* scores and higher *negative prospection* scores associated with greater *DASS total* scores. On the third step, controlling for prospective thoughts alongside with age and gender, we saw an approximate 9.7% of added prediction of variance due to the inclusion of four sub-scales of the FFMQ scale (F(4,195)= 7.92; p<0.001).

Table 2.4

Hierarchical Regression Stepwise Analysis Summary for DASS Total Scores as the DV

Variable	Cumulative		Simultaneous	
	R² change	*F-change*	*β*	*P*
Step 1	<.005	F(2,201)= .53		
age			-.03	.55
gender			<.03	.65
Step 2	.300	F(2,199)= 42.93***		
spt.pos			-.19	.005**
spt.neg			.24	.003**
Step 3	.097	F(4,195)= 7.92***		
ffmq.observing			.16	.009**
ffmq.describing			-.07	.275
ffmq.actaware			-.15	.032**
ffmq.nonjudging			-.04	.532
Step 4	.035	F(1,194)= 11.98**		
overall_QoL			-.25	.001**

Note. predictors (IVs): gender and age (step 1); *spt.pos* (*positive prospections*) and *spt.neg* (*negative prospections*) (step 2); *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*) and *ffmq.nonjudging* (*nonjudging of experience*) (step 3); *overall_QoL* (the *overall quality of life* score) (step 4). N= 203. The Case-Variable Ratio is 23:1.
*p<.05, **p<.01, ***p<.001

Of these subscales, only the *observing* and *acting with awareness* were significant predictors of *DASS total* scores (p<.01, for both). Interestingly, while *acting with awareness* was negatively associated with *DASS total*, *observing* subscale was positively associated with DASS total scores (β values are -.15 and .16, respectively). The final step was the addition of *overall quality of life* scores that resulted in a significant addition of the prediction of 3.5% variance (R²=.035, F(1,194)= 11.98; p<0.01).

2.2.3 Moderated Regression Analysis

The moderated regression analysis using the PROCESS macro (v3.3 update on 2017; Hayes, 2012, downloaded from www.processmacro.org) essentially

checks for the same assumptions as it is also an OLS based logistic regression modeling procedure. Hence, we will directly move on to the results of analysis. Please note, however, that with the given number of variables, multivariate outlier removal of one further case was not necessary – resulting in N=204.

   2.2.3.1 Analysis Results. We can see from Table 2.4 that *positive prospection* and *negative prospection* scores, both as antecedent variables, showed significant corrleation in the hierarchical regression analysis. As moderator variables, however, we can only highlight *observing* and *acting with awareness* facets of the FFMQ. Taking *overall quality of life*, *age* and *gender* variables as covariates; and, the *DASS total* scores as the outcome variable, we tested Model 1 of PROCESS in two separate cases. *Case 1* is when *positive prospection* is taken as the antecedent variable, and *Case 2* is when *negative prospection* is taken, instead (Figures 2.1 and 2.2, respectively). Both cases are subdivided into *i* and *ii*, one each for each FFMQ facet that showed correlation on the hierarchical regression analysis.

Figure 2.1
The Statistical Diagram of Case 1i
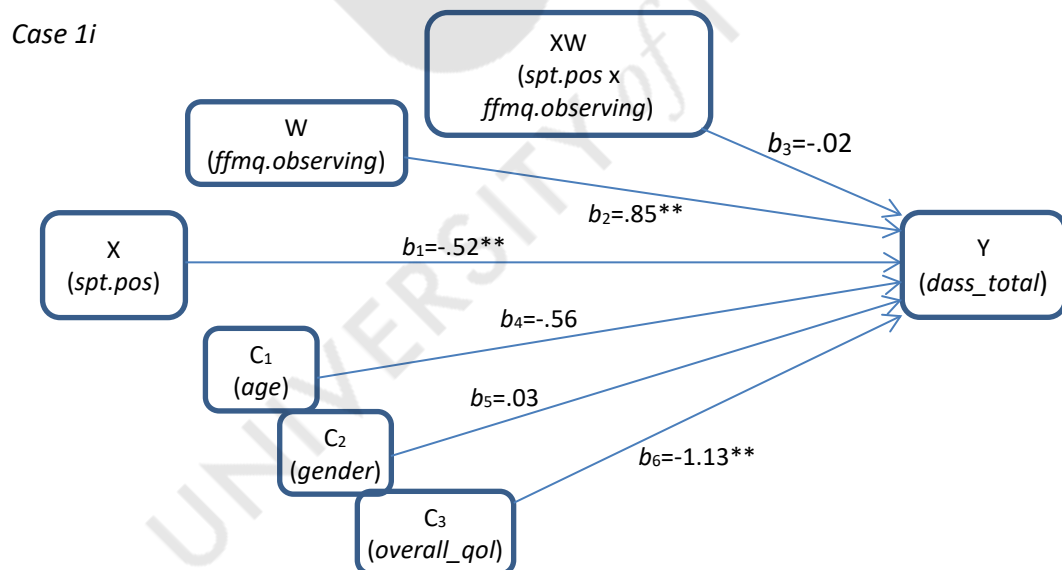
Note. X: *spt.pos* (antecedent variable), positive prospections; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*; *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.observing* (moderating variable), observing facet of FFMQ; XW: *spt.pos* x *ffmq.observing*, the interaction effect in predicting Y. N=204. The Case-Variable Ratio is 34:1.
**$p<.01$

   Accordingly, the main effects of *positive prospection* (b_1=-.52, $t(197)$=-2.94, $p<.01$) and *observing* (b_2=.85, $t(197)$=3.48, $p<.001$) both predict *DASS total* scores significantly (Table 2.5). Looking at the covariate adjustors, we can see that *age* (b_4=-.56, $t(197)$=-.97, $p=.33$) and *gender* (b_5=.03, $t(197)$=.01, $p=.99$) do not predict

DASS total scores, but *overall quality of life* (b_6=-1.13, t(197)=-6.07, p=<.001) does predict very significantly. Finally, addition of the interaction between *positive prospection* and *observing* (F(1,197)=.48, R^2 change=.002, p=.488) was not significant on *DASS total* scores.

Table 2.5
Results from the Case 1i Moderated Regression Analysis Examining the Moderation of Positive Prospections on DASS Total Scores by the Observing Facet of the FFMQ, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	*p*	*LLCI*	*ULCI*
Constant	i_Y	119.601	15.774	7.582	<.001***	88.493	150.708
spt.pos (X)	b_1	-.522	.178	-2.943	.004**	-.872	-.172
ffmq.observing (W)	b_2	.854	.246	3.475	<.001***	.369	1.338
spt.pos x ffmq.observing (XW)	b_3	-.019	.027	-.695	.488	-.072	.034
age (C₁)	b_4	-.561	.578	-.970	.333	-1.700	.579
gender (C₂)	b_5	.030	2.872	.011	.992	-5.633	5.693
overall_qol (C₃)	b_6	-1.133	.187	-6.074	<.001***	-1.501	-.765

	F	**R^2 change**	**p**
interaction effect (*XW*)	F(1,197)=.483	.002	.488

Model Summary	
	R^2 = .346, MSE = 367.257
	F(6,197) = 17.393, p<.001

***p<.001, **p<.01
N = 204

Focusing on *Case 1ii*, the main effects of *positive prospection* (b_1=-.37, t(197)=-2.18, p=.03) and *acting with awareness* (b_2=-1.19, t(197)=-4.88, p<.001) scores both predict *DASS total* scores significantly (Table 2.6). Looking at the covariate adjustors, we can see that *age* (b_4=-.63, t(197)=-1.13, p=.26) and *gender* (b_5=.31, t(197)=.11, p=.91) do not predict *DASS total* scores, but *overall quality of life* (b_6=-.87, t(197)=-4.51, p=<.001) scores do again predict very significantly. Finally, addition of the interaction between *positive prospection* and *acting with awareness* scores (F(1,197)=.30, R^2 change<.001, p=.863) was not significant on *DASS total* scores.

Figure 2.2
The Statistical Diagram of Case 1ii

Case 1ii

Note. X: *spt.pos* (antecedent variable), positive prospections; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*; *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.actaware* (moderating variable), acting with awareness facet of FFMQ; XW: *spt.pos* x *ffmq.actaware*, the interaction effect in predicting Y. N=204. The Case-Variable Ratio is 34:1.
**p<.01, *p<.05

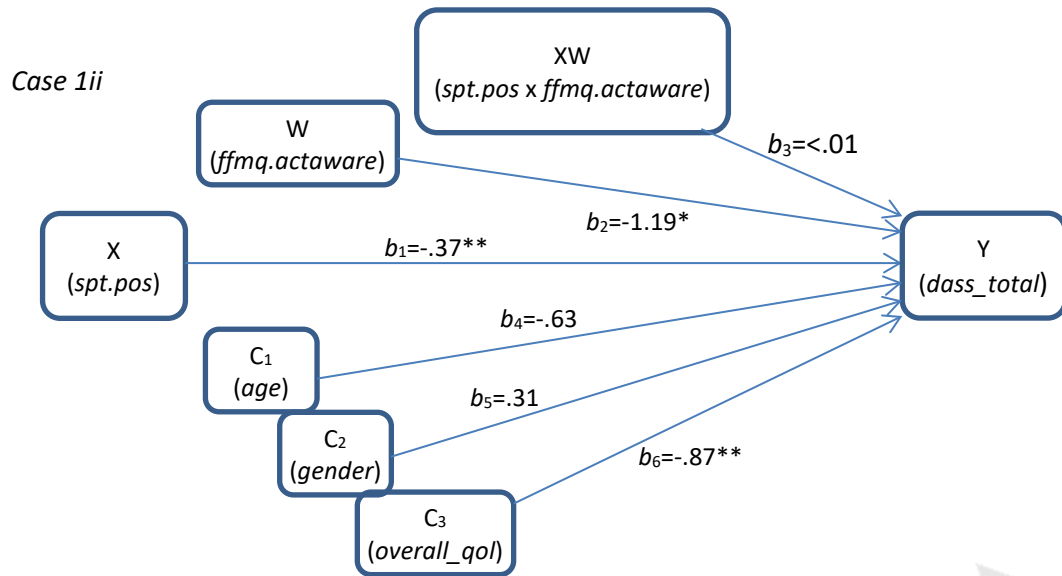**Table 2.6**
Results from the Case 1ii Moderated Regression Analysis Examining the Moderation of Positive Prospections on DASS Total Scores by the Acting With Awareness Facet of the FFMQ, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	p	LLCI	ULCI
Constant	i_Y	105.920	15.713	6.741	<.001***	74.933	136.907
spt.pos (X)	b_1	-.369	.169	-2.179	.031*	-.702	-.035
ffmq. actaware (W)	b_2	-1.192	.244	-4.877	<.001***	-1.674	-.710
spt.pos x ffmq. actaware (XW)	b_3	.004	.021	.173	.863	-.038	.046
age (C₁)	b_4	-.630	.560	-1.126	.262	-1.735	.474
gender (C₂)	b_5	.309	2.796	.110	.912	-5.204	5.822
overall_qol (C₃)	b_6	-.867	.192	-4.514	<.001***	-1.246	-.488

	F	**R² change**	**p**
interaction effect (*XW*)	F(1,197)=.300	<.001	.863

Model Summary	R² = .381,	MSE = 347.825
	F(6,197) = 20.199,	p<.001

***p<.001, *p<.05

N = 204

Below are the analysis results for *Case 2i* (Figure 3.2) and *Case 2ii* (Figure 4.2), respectively.

The main effects of *negative prospection* (b_1=.33, t(197)=4.55, p<.001) and *observing* (b_2=.74, t(197)=3.09, p<.001) scores both predict *DASS total* scores significantly (Table 2.7). Looking at the covariate adjustors, the variables *age* (b_4=-.15, t(197)=-.27, p=.79) and *gender* (b_5=-4.49, t(197)=-1.62, p=.11) do not predict

DASS total scores. The *overall quality of life* (b_6=-1.15, t(197)=-7.05, p=<.001) scores, on the other hand, shows a highly significant prediction on DV. Finally, addition of the interaction between *negative prospection* and *observing* (F(1,197)=.65, R^2 change=.002, p=.423) scores was not significant on *DASS total*.

Figure 3.2
The Statistical Diagram of Case 2i
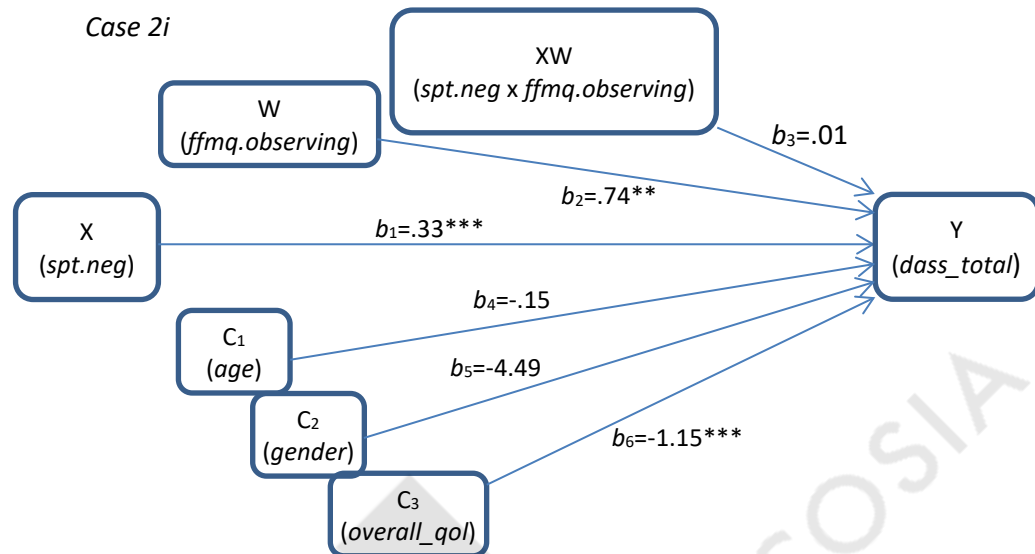
Note. X: *spt.neg* (antecedent variable), negative prospections; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*; *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.observing* (moderating variable), observing facet of FFMQ; XW: *spt.neg* x *ffmq.observing*, the interaction effect in predicting Y. N=204. The Case-Variable Ratio is 34:1.
***p<.001, **p<.01

Table 2.7
Results from the Case 2i Moderated Regression Analysis Examining the Moderation of Negative Prospections on DASS Total Scores by the Observing Facet of the FFMQ, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	p	LLCI	ULCI
Constant	i_Y	117.982	14.857	7.941	<.001***	88.682	147.282
spt.neg (X)	b_1	.333	.073	4.546	<.001***	.189	.478
ffmq.observing (W)	b_2	.739	.239	3.087	.002**	.267	1.210
spt.neg x ffmq.observing (XW)	b_3	.009	.011	.803	.423	-.013	.031
age (C1)	b_4	-.150	.564	-.265	.791	-1.263	.964
gender (C2)	b_5	-4.487	2.762	-1.624	.106	-9.935	.960
overall_qol (C3)	b_6	-1.148	.163	-7.048	<.001***	-1.470	-.827

	F	R^2 change	p
interaction effect (*XW*)	F(1,197)=.645	.002	.423

Model Summary	R^2 = .383, MSE = 346.393
	F(6,197) = 20.418, p<.001

***p<.001, **p<.01
N = 204

Moving on to *Case 2ii*, the main effects of *negative prospection* (b_1=.24, t(197)=3.10, p<.01) and *acting with awareness* (b_2=-.94, t(197)=-3.65, p<.001) scores both predict *DASS total* scores significantly (Table 2.8). The covariate

adjustors *age* (b_4=-.34, t(197)=-.61, p=.54) and *gender* (b_5=-3.36, t(197)=-1.19, p=.23) do not predict *DASS total* scores, whereas the covariate *overall quality of life* (b_6=-.96, t(197)=-5.69, p=<.001) scores appear to have a highly significant prediction. Finally, addition of the interaction between *negative prospection* and *acting with awareness* (F(1,197)=.32, R^2 change<.001, p=.574) scores was not significant on *DASS total*.

Figure 4.2
The Statistical Diagram of Case 2ii
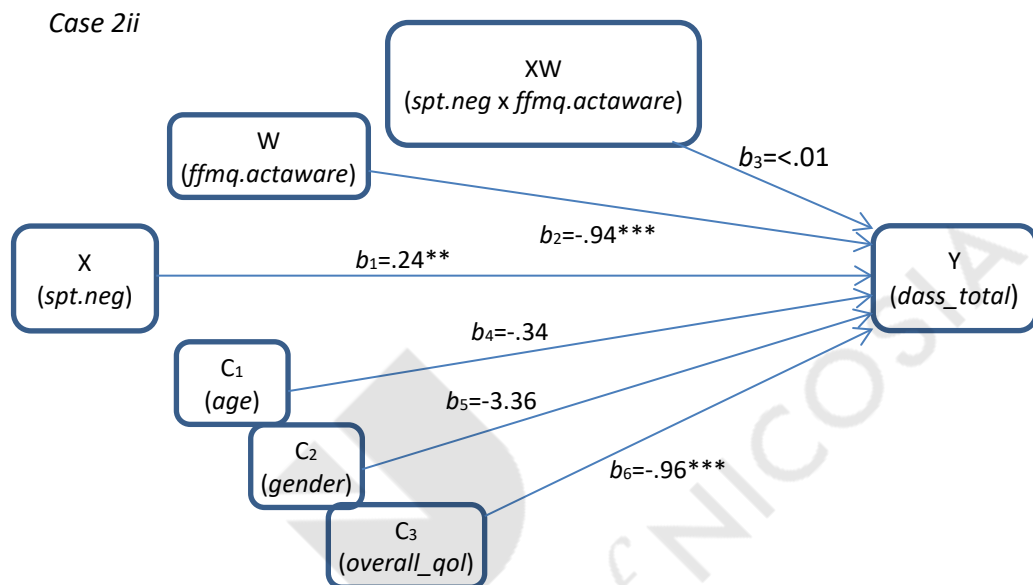
Note. X: *spt.neg* (antecedent variable), negative prospections; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*; *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.actaware* (moderating variable), acting with awareness facet of FFMQ; XW: *spt.neg* x *ffmq.actaware*, the interaction effect in predicting Y. N=204. The Case-Variable Ratio is 34:1.
***p<.001,**p<.01

Table 2.8
Results from the Case 2ii Moderated Regression Analysis Examining the Moderation of Negative Prospections on DASS Total Scores by the Acting With Awareness Facet of the FFMQ, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	p	LLCI	ULCI
Constant	i_Y	110.171	14.914	7.387	<.001***	80.760	139.581
spt.neg (X)	b_1	.242	.078	3.097	.002**	.088	.396
ffmq. actaware (W)	b_2	-.939	.258	-3.645	<.001***	-1.446	-.431
spt.neg x ffmq. actaware (XW)	b_3	.006	.010	.564	.574	-.014	.025
age (C1)	b_4	-.338	.554	-.609	.543	-1.431	.755
gender (C2)	b_5	-3.363	2.820	-1.193	.234	-8.922	2.197
overall_qol (C3)	b_6	-.957	.168	-5.694	<.001***	-1.289	-.626

	F	R^2 change	p
interaction effect (XW)	F(1,197)=.318	.001	.574

Model Summary	R^2 = .395,	MSE = 339.698
	F(6,197) = 21.467,	p<.001

***p<.001, **p<.01

N = 204

Study III

3.0 Introduction

It is a well-observed finding that executive functions, mediated dominantly by the prefrontal cortex, in individuals with major depressive disorder (MDD) show significant declines in comparison to healthy controls (Dalgleish et al., 2007; Lee et al., 2012; Roca, Vives, Lopez-Navarro, Garcia-Campayo & Gili, 2015; Rock et al., 2014). The executive function group involves strategical thinking, organising existing as well as acquired knowledge, flexibility or perseverance in choices and attitudes, evaluating alternative perspectives, working memory and allocation of attention on objects of focus. Loss of cognitive performance in, notably, shifting attentional focus, coming up with alternative explanations or engaging in cognitive flexibility, is prevalent from the very beginning of depression and is shown to be able to persist (Lee et al., 2012). Further findings also indicate that even though focusing on unhealthy thought content may be helpful in the earlier stages of psychotherapy, the risk for their continual negative effects in later stages is still significantly high (McIntyre et al., 2013).

When taken into consideration, these observations may mean that focusing on positive stimuli, and hence inevitably altering mood towards more positive ends by inducing underlying neural circuitry in support for the healthier (Damasio, 1994), can be very challenging for numerous individuals with MDD, much more so when they are focused primarily on negative thought content and are unable to shift their attention to alternative ways of thinking. Such an underlying neurophysiology can then very clearly aid in a worsening prognosis of the disease, making it even harder for therapies to consider substantial change in a relatively short duration (Chen et al., 2013; Femenia et al., 2012; Marchetti, Koster, Sonuga-Barke & de Raedt, 2012; Snyder, 2013).

Cognitive changes are accompanied by a further emphasis on prospective thoughts, or future thinking. Originally postulated by Beck and colleagues (Beck et al., 1976) and later refined as a general cognitive factor in the etiology of mental disorders (Beck, 1995; Haaga et al., 1991), prospective thoughts were thought to be one of the main ways of thinking that can increase one's susceptibility to develop depression. Accordingly, having a pessimistic attitude towards the content and personal impact of possible future events would be considered as having a negative effect on current mood, increasing one's susceptibility to depression (MacLeod &

Byrne, 1996; MacLeod, Pankhania, et al., 1997; Stöber, 2000; Szollosi et al., 2015). The more recent ideas of Roepke and Seligman (2016) took this one step further and emphasized prospective thoughts as the main causal factor behind depression. Not in contrast to this reasoning, literature reviewed highlighted that certain prospection faults can persist in patients with MDD diagnosis as well as in individuals with sub-clinical increases in depressive symptoms. Such individuals, in numerous studies, were found to engage in negative future prospections faster, while at the same time find it easier to imagine negative scenarios in comparison to positive ones (Morina et al., 2011; Sargalska et al., 2011). Additionally, there are reports on how they may allocate much less time in imagining positive future scenarios and when they do, how they may rely on poorer imagination with regards to emotional content as well as detail (Morina et al., 2011; Bjärehed et al., 2010). Earlier research already reported that such individuals can be under risk for feeling less elated when asked to imagine future positive events happening in the moment when compared to healthy controls (MacLeod & Salaminou, 2001; Stöber, 2000; MacLeod, Pankhania, et al., 1997; MacLeod & Byrne, 1996). People with elevated symptoms of MDD may feel that possible future events that have personal value to them to have much less chance of occurrence when compared to probability assessments done with healthy controls (Szollosi et al., 2015). One earlier explanation regarding this finding was that future scenarios imagined less vividly (in this case, positive scenarios) get perceived as being less reliable and hence having a weaker chance of being real, shifting focus from optimistic expectations to the more concrete, more reliable pessimistic end in these people (Holmes & Mathews, 2010; Holmes et al., 2008), and research seems to have provided at least partial support for this idea. More vivid thoughts are also postulated to cause stronger emotions in people, and one finding in support of this idea with regards to patients with MDD reported that increased imagination and highlighted details with regards to suicide correlated with actual rates of committing suicide in a future time interval (Hales et al., 2011).

The reconstructive memory model explanation of faulty future prospections can point out here that people with elevated symptoms of depression have weaker memories for positive autobiographical events; hence, it is harder for them to imagine positive future scenarios happening to them (Morina et al., 2011; Schacter, Addis & Buckner, 2007). Weakening cognitive flexibility, inability to disregard emotional distractor stimuli and poor strategical skills in problem solving as well as

stress coping can direct people towards pessimistic imaginations (Femenia et al., 2012; Kaymak et al., 2010; Lee et al., 2012; McKinnon et al., 2009; Snyder, 2013). Lehner & D'Argembeau (2016) also reported that when future imagery is related to personal goals, having a closer link to autobiographical content, it leads to a stronger feeling of actually going into the future and experiencing the event. These would highlight the role of executive functions in how realistic an event feels for that person. Furthermore, the valuation model explanation would highlight faulty risk assessments regarding positive and negative future scenarios (Miloyan et al., 2014; Morina et al., 2011). People with MDD tend to consider the probability of negative future scenarios happening as much higher and evaluate such scenarios as more catastrophic in comparison to healthy controls (Miloyan et al, 2014; Morina et al., 2011; Gilbert & Wilson, 2007). Individuals with MDD not only exaggerate probabilities for negative events, but also give more reasons and causal explanations supporting their claims (Miloyan et al., 2014). Their reasons tend to involve weak logical assumptions; nevertheless, it appears as valid for them to hold on to. Clearly, deficits in healthy executive functioning is hinted at when the valuation model is also considered.

3.0.1 Phenomenologic Characteristics

The level of inherent details within future imagery, their vividness in mental experience, the extent to which individuals can tailor sound or emotions to such events, as if the events are happening in the moment, or the ease with which individuals can actually create positive future events (with respect to negative events) are all examples to what can be collectively termed as the *phenomenologic* (also referred to as *phenomenal,* see Szpunar Spreng & Schacter, 2014) characteristics of future prospection (for a recent review, see Szpunar *et al.*, 2014). Numerous studies reported earlier that self-report assessments (based on Likert scales) of vividness ratings do show a significant decrease for positive future events as depression scores increase (Morina et al., 2011; Holmes et al., 2008; Stöber, 2000), and a recent study reported that in a non-depressed sample, higher depression scores were correlated with lower positive phenomenologic qualities as well as higher negative phenomenologic qualities (Szollosi et al., 2015). In addition to having a mixed finding that was also reported to be possibly caused by comorbid anxiety scores, this study also employed a wide range of phenomenologic qualities and reported lower ratings of accessibility, sound tone detail and certainty of

accuracy in imagination, in addition to lower fluency as well as vividness scores, as depression scores increased. In contrast, vividness scores for negative future events, in several earlier studies, were also not shown to increase as depression scores increased in a number of previous studies (Morina et al., 2011; Stöber, 2000) – adding to the current lack of clarity in this line of research. Studying on a patient sample showing significant symptoms of dysphoria, another recent study also reported that as depression scores increased, phenomenologic characteristics like vividness, auditory details, imagined bodily experience and evoked emotion intensities showed a significant decrease, as were again assessed via self-report measures (Andersen & Evans, 2015). Incorporation of phenomenologic data in studies of future imagination were, however, reported to still be at an early stage, and future interventions were hypothesized to aid a significant deal from systematic assessment of such data as part of strategical conceptualizations for effective intervention in depression (Holmes, Blackwell, Heyes, Renner & Raes, 2016; Edmondson & MacLeod, 2015).

The trait, or dispositional, nature of mindfulness can be related with more vivid imaginations of positive future expectations and a heightened readiness for positive reappraisal, focusing on conceptualizing stressors in ways that promote growth and resiliency (Hanley & Garland, 2014; Baer et al., 2008; Cui et al., 2007). For example, Short and colleagues (2016) reported a mediating role for executive functions and self-regulation on the relationship between dispositional mindfulness (assessed by FFMQ) and well-being. Imagery vividness, as part of executive function cluster, was hinted on earlier (Bedford, 2012) to be possibly linked with individual differences in either mindfulness meditation practice, or possibly mindfulness as is understood in a trait level basis. Kharlas and Frewen (2016), for instance, reported that mindful observation is positively correlated with imagery vividness, and that other facets assessed by FFMQ need to be addressed more in detail to uncover a possibly complex interaction between mindfulness facets and imagery vividness. Therefore, mindfulness as a disposition can be linked with a heightened readiness to observe mental phenomena, leading to more vivid imaginations of positive scenarios (thought to be in line with personal values and goals), less vivid imagination of negative scenarios (thought to be otherwise), and a positive bias aimed at motivating current mood towards fulfilling esteemed goals.

Taking into consideration the above points emphasized, the principal research question can hence be stated as: Do facets of mindfulness disposition

relate to imagined future event scenario vividness in predicting one's current psychological well-being indicators? Relying on the possibility of vividness ratings as an important indicator of well-being through how they relate to future imagery salience, It can be fruitful to continue to the next stage in this analysis by focusing an the possible moderation effect of DM facets in the relationship between psychological well-being and future event imagery vividness, for positive as well as negative personally-relevant event scenarios.

3.1 Method

3.1.1 Participants and Procedure

Study III participant recruitment was conducted online via distributing questionnaires over Google Forms. This stage focused on the general public, and participants over 18 years of age who voluntarily wished to contribute were given the informed consent form as well as the same *Demographic Variables Questionnaire* in Study II. Likewise, participants who reported prior mindfulness meditation practice and psychoactive drug use or recent psychiatric diagnoses were not included in the analysis. Following data cleaning and outlier removal, a total of 110 participants (32 male and 78 female) with a mean age of 30.33 (sd=10.04) were recruited.

In total, filling out the test forms took on average 25 minutes to complete. Participants were informed with regards to the anonymous and voluntary nature of their contributions, and again, no incentives were offered for participation.

3.1.2 Materials

Materials at this stage included the online versions of DASS-21 and WHOQOL-BREF measures used in Study II. The Cronbach α values for DASS-21 and WHOQOL-BREF were found to be 0.94 and 0.87, respectively. The SPT used in Study II was changed into *Prospective Imagery Task* (PIT; Morina et al., 2011; Holmes et al., 2008; based on Stöber, 2000) in Study III. PIT used 10 positive items and 10 negative items listed under SPT, chosen from the list as was originally used in MacLeod, Byrne and Valentine (1996) and later on in Stöber (2000). Items required the participant to form a mental image related to the possible future events stated (e.g. "You will be able to cope easily with pressure" or "People will dislike you") and then rate the vividness associated with each mental imagery, on a Likert

scale from 1 (*no image at all*) to 5 (*very vivid*). Morina and others (2011) reported an internal consistency of α= 0.87 for the positive items subscale and α= 0.83 for the negative items subscale. For the current study, the Cronbach α values were 0.83 and 0.86 for the positive and negative subscales, respectively.

Finally, the FFMQ used in Study II was changed into FFMQ Short Form (FFMQ-SF; Bohlmeijer, Klooster, Fledderus, Veehof, & Baer, 2011). FFMQ-SF is a 24 item questionnaire that was developed directly from the full length FFMQ (Baer et al., 2006) on a sample of participants showing a wide range of mild-to-severe depressive symptoms (Bohlmeijer et al., 2011). Reliability of individual facets were reported in this version to be: *nonreactivity to inner experience* (5 items, α= 0.72), *observing* (4 items, α= 0.67), *acting with awareness* (5 items, α= 0.91), *describing with words* (5 items, α= 0.81), and *nonjudging of experience* (5 items, α= 0.80). A recent study by Medvedev, Norden, Krägeloh, & Siegert (2018) reported a Rasch analysis of this scale with a decent model fit for use in general population (χ2(40) = 55.65, PSI=0.60, p > .05).

3.1.3 Statistical Analysis

Study III statistical analysis was conducted in the identical structure and order as Study II; hence, please refer to the section under Study II for the description of data analysis procedure.

3.2 Results

3.2.1 Demographic Characteristics

The study included data from 128 participants prior to data cleaning, and none reported a recent psychiatric diagnosis. However, 15 reported recent recreational psychoactive drug use, one participant was found to be an extreme outlier with respect to age, and 2 further cases were identified as multivariate outliers and were removed prior to the anaysis. The outlier test was done by calculating a Mahalanobis distance (Tabachnik & Fidell, 2013) and involved continuous variables of DASS total scores, prospective imagery ratings, quality of life overall scores, the five facets of FFMQ-SF, and age of participants. Finally, a total of 110 participants whose demographic characteristics are outlined on Table 3.1 were included in the research. Accordingly, participants were from 30 different countries, of which Turkey

(30.0%), Cyprus (18.2%), and United Kingdom (UK; 13.6%) were the more frequently reported. All of the participant data was collected online.

Table 3.1
Demographic Variables

	N	percentage (%)
Gender		
female	78	70.9%
male	32	29.1%
total	110	
Country of origin		
Turkey	33	30.0%
Cyprus	20	18.2%
UK	15	13.6%
Other	42	38.2%
	M^a	SD
Age	30.33	10.04

[a] *N*=110: 32 male [29.1%] and 78 female [70.9%].

3.2.1.1 Descriptive Measures of Variables. The FFMQ-SF facets were measured individually (*N*=110): *observing* (*M*= 15.26, *sd*= 2.83), *describing* (*M*= 18.17, *sd*= 3.83), *acting with awareness* (*M*= 17.73, *sd*= 4.32), *nonjudging* (*M*= 14.98, *sd*= 3.95), and *nonreactivity* (*M*= 15.09, *sd*= 3.41). The *positive imagery* mean score was 37.03 (*sd*= 6.29), and *negative imagery* mean was 28.39 (*sd*= 7.92). *DASS total* score mean was 19.50 (*sd*=13.02), and *overall quality of life* score mean was 54.55 (out of 100; *sd*= 8.28).

3.2.2 Hierarchical Regression Analysis

Numerous assumptions should meet prior to the decision to conduct a hierarchical regression analysis (Field, 2013; Tabachnick & Fidell, 2013). Accordingly, we checked for the assumptions of *no multicollinearity*, *residual normality*, *uncorrelatedness*, *homoscedasticity* and *linearity* between independent and dependent variables. We already checked for extreme outliers and multivariate outliers, and all individual data collected came from a different person, verifying a further assumption of *independence*.

Assumption check with the above mentioned assumptions went on without indicating a significant issue to detain us from using our data as it is for a hierarchical regression analysis. For all the tests conducted as part of a formal assumption check, please consult Appendix B. The correlations between variables of interest are given below in Table 3.2.

Table 3.2

Basic Correlation Coefficients Between Independent Variables (IVs) and the Dependent Variable (DV).

	DV	IVs							
	dass_total	overall_QoL	ffmq. observing	ffmq. describing	ffmq. actaware	ffmq. nonjudging	ffmq. nonreactivity	pit.pos	pit.neg
DV									
dass_total	-	-.61**	.06	-.34**	-.52**	-.52**	-.49**	-.41**	.48**
IVs									
overall_QoL		-	.14	.28**	.29**	.35**	.39**	.44**	-.36**
ffmq.observing			-	.21*	.09	-.07	.09	.16	.06
ffmq.describing				-	.41**	.28**	.18	.21*	-.28**
ffmq.actaware					-	.49**	.19*	.24*	-.37**
ffmq.nonjudging						-	.36**	.32**	-.31**
ffmq.nonreactivity							-	.46**	-.23*
pit.pos								-	-.04
pit.neg									-

Note. DV is *dass_total* (total DASS score). IVs are: *overall_QoL* (the *overall quality of life* score); FFMQ-SF facets as *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*), *ffmq.nonjudging* (*nonjudging of experience*), and *ffmq.nonreactivity* (*nonreactivity to inner experience*); PIT factors as *pit.pos* (*positive imagery*) and *pit.neg* (*negative imagery*).
*p<.05, **p<.01

3.2.2.1 Analysis Results. A hierarchical regression analysis was conducted to analyse the effects of prospective imagery and dispositional mindfulness scores on DASS total scores as the DV (for the overall model summary, see Table 3.3). The variable *observing* did not show a significant correlation with the DV, and thus was not included in the hierarchical regression model (see Table 3.2). All the other variables were taken in the hierarchical regression analysis, including the age and gender variables to be entered in the first step – accounting for their confounding effects on total variance (for the stepwise model summary, see Table 3.4).

Table 3.3

Hierarchical Regression Overall Analysis Summary for DASS Total Scores as the DV

	R^2	F	Durbin-Watson test statistic
Model Summary[i]			
	.616	F(9,100)= 17.842***	1.951[ii]

[i] predictors (IVs): gender and age (step 1); *pit.pos* (*positive imagery*) and *pit.neg* (*negative imagery*) (step 2); *ffmq.nonreactivity* (*nonreactivity to inner experience*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*) and *ffmq.nonjudging* (*nonjudging of experience*) (step 3); *overall_QoL* (the *overall quality of life* score) (step 4). N= 110.
[ii] Durbin-Watson test statistic is very close to 2.000, which means that there is no evidence for autocorrelation, i.e. repeating patterns in regression analysis (see Tabachnick & Fidell, 2013).
***p<.01

The overall regression model (Table 3.3) predicted approximately 61.6% of variance in DASS total (R^2=.616, F(9,100)= 17.84, p<0.001). Regarding the stepwise model analysis (Table 3.4), age and gender variables in the first step predicted approximately 5.3% of variance in DASS total (F(2,107)= 5.26), and neither was a significant predictor. After controlling for age and gender, step two

predicted approximately 33.2% of variance (F(2,105)=30.09; p<0.001), where only the *negative imagery* score was a significant predictor (p<.05) – with higher *negative imagery* scores associated with greater *DASS total* scores. On the third step, controlling for prospective thoughts alongside with age and gender, a further 14.0% of added prediction of variance due to the inclusion of four sub-scales of the FFMQ-SF was observed (F(4,101)= 8.09; p<0.001). Of these subscales, only the *nonreactivity to inner experience* (p<.05) and *acting with awareness* (p<.01) were significant predictors of *DASS total* scores. Both subscales were negatively associated with *DASS total* scores (β values are -.19 and -.23, respectively). The final step was the addition of *overall quality of life* scores that resulted in a significant addition of the prediction of 5.5% variance (R^2=.055, F(1,100)= 14.23; p<0.001). As predicted, higher *DASS total* scores are associated with lower *overall quality of life* scores (β=-.30; t=-3.77, p<0.001).

Table 3.4
Hierarchical Regression Stepwise Analysis Summary for DASS Total Scores as the DV

Variable	Cumulative		Simultaneous	
	R^2 change	F-change	β	p
Step 1	.089	F(2,107)= 5.26**		
age			-.13	.054
gender			<.01	.984
Step 2	.332	F(2,105)= 30.09***		
pit.pos			-.09	.230
pit.neg			.16	.029*
Step 3	.140	F(4,101)= 8.09***		
ffmq.nonreactivity			-.19	.017*
ffmq.describing			-.01	.910
ffmq.actaware			-.23	.005**
ffmq.nonjudging			-.13	.088
Step 4	.055	F(1,100)= 14.23***		
overall_QoL			-.30	<.001***

Note. predictors (IVs): gender and age (step 1); *pit.pos* (*positive imagery*) and *pit.neg* (*negative imagery*) (step 2); *ffmq.nonreactivity* (*nonreactivity to inner experience*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*) and *ffmq.nonjudging* (*nonjudging of experience*) (step 3); *overall_QoL* (the *overall quality of life* score) (step 4). N= 110. The Case-Variable Ratio is 11:1.
*p<.05, **p<.01, ***p<.001

3.2.3 Moderated Regression Analysis

The moderated regression analysis using the PROCESS macro (v3.3 update on 2017; Hayes, 2012, downloaded from www.processmacro.org) essentially checks for the same assumptions as it is also an OLS based logistic regression modeling procedure. The results of analysis conducted are as follows:

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3.2.3.1 Analysis Results. We can see from Table 3.4 that only *negative imagery* scores, as an antecedent variable, showed significant corrleation in the hierarchical regression analysis with *DASS total* scores as the outcome variable. Likewise, the moderation effect could reliably be tested for only with the FFMQ-SF facets of *acting with awareness* and *nonreactivity to inner experience*. Taking *overall quality of life*, *age* and *gender* variables as covariates; and, the *DASS total* scores as the outcome variable, the Model 1 of PROCESS in two separate cases were analysed. *Case 1* is when *nonreactivity to inner experience* is taken as the moderating variable, and *Case 2* is when *acting with awareness* is taken, instead (Figures 3.1 and 3.3, respectively).

Figure 3.1
The Statistical Diagram of Case 1
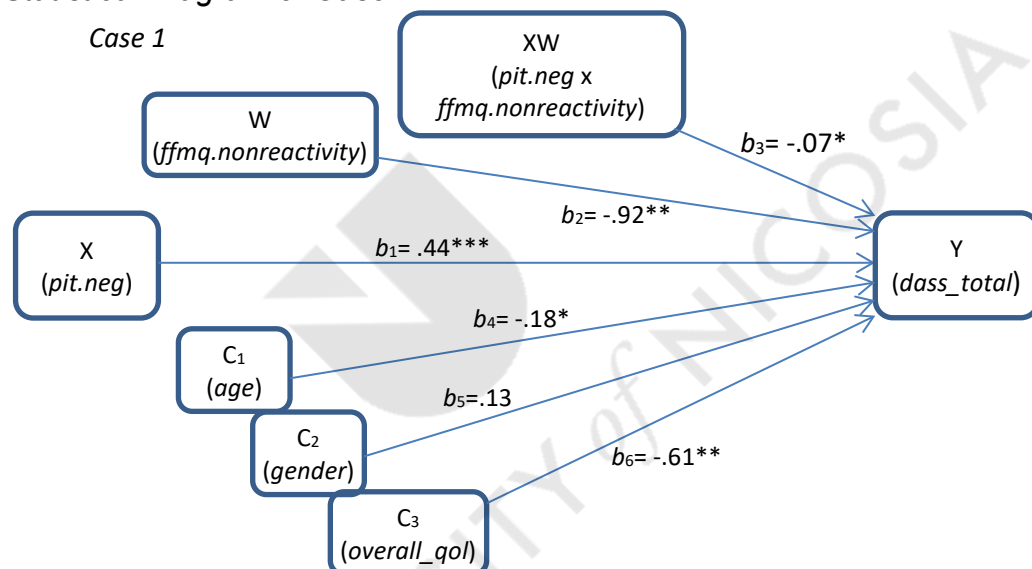
Note. X: *pit.neg* (antecedent variable), negative imagery; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*, and *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.nonreactivity* (moderating variable), nonreactivity to inner experience facet of FFMQ-SF; XW: *pit.neg* x *ffmq.nonreactivity*, the interaction effect in predicting Y. N=110. The Case-Variable Ratio is 19:1.
*p<.05, **p<.01, ***p<.001

Accordingly, the main effects of *negative imagery* (b_1=.44, t(110)=-3.59, p<.001) and *nonreactivity to inner experience* (b_2=-.92, t(110)=-3.07, p<.001) both predict *DASS total* scores significantly (Table 3.5). Looking at the covariate adjustors, we can see that *age* (b_4=-.18, t(110)=-2.04, p=.04) shows a significant prediction, while *gender* (b_5=.13, t(110)=.06, p=.95) does not. The *overall quality of life* (b_6=-.61, t(110)=-4.93, p=<.001) score did also show a significant prediction on *DASS total* scores. Finally, addition of the interaction between *negative imagery* and *nonreactivity to inner experience* (F(1,103)=4.00, R^2 change=.018, p<.05) was significant on *DASS total* scores.

Figure 3.2 below depicts a visual representation of the interaction effect, where for different values of *nonreactivity to inner experience*, the relationship between *negative imagery* scores and *DASS total* scores change. Accordingly, the more vivid negative imagery one reports to experience, the higher an associated DASS total score appears (t=6.96, sd=7.92, p<.001) – however, this is significantly more so when that same individual also reports less nonreactivity to inner experience (t=-2.00, sd=3.42, p<.05). In conclusion, the more reactivity to inner experience one reports to have, the more likely it is that negative imagery vividness will be associated with higher DASS total scores for that individual. However, it is worthwhile noting that the *b* value magnitude is approximately .07, indicating a moderate to weak effect, and the *p* value is on the edge of .05 significance (with .048).

Figure 3.2
The Visualisation of the Moderating Effect of Nonreactivity to Inner Experience Facet
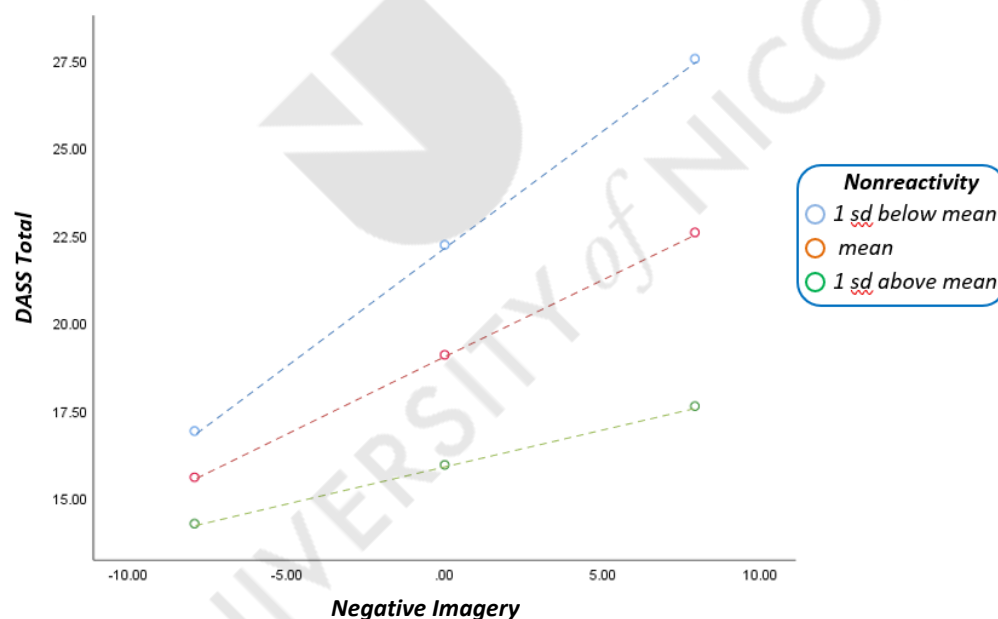
Note. Negative imagery scores (x-axis) versus DASS total scores (y-axis), with respect to mean, 1 sd below and above mean values of nonreactivity to inner experience (visible on the Legend). Please note that negative imagery scores were mean centered prior to analysis, hence the zero value represents the mean, and 1 *sd* for negative imagery is approximately 7.92 (above and below the mean were indicated by circles). Note the slope difference apparent in between lines drawn across different values of nonreactivity to inner experience facet of FFMQ-SF.

Table 3.5

Results from the Case 1 Moderated Regression Analysis Examining the Moderation of Negative Imagery on DASS Total Scores by the Nonreactivity Inner Experience Facet of the FFMQ-SF, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	p	LLCI	ULCI
Constant	i_Y	57.597	8.281	6.955	<.001***	41.172	74.021
pit.neg (X)	b_1	.442	.123	3.588	<.001***	.198	.686
ffmq.nonreactivity (W)	b_2	-.920	.299	-3.074	.003**	-1.513	-.327
pit.neg x ffmq.nonreactivity (XW)	b_3	-.067	.034	-2.001	.048*	-.134	-.001
age (C₁)	b_4	-.182	.089	-2.038	.044*	-.360	-.005
gender (C₂)	b_5	.125	2.076	.060	.952	-3.991	4.242
overall_qol (C₃)	b_6	-.608	.123	-4.930	<.001***	-.852	-.363
	F			**R^2 change**			**p**
interaction effect (XW)	F(1,103) = 4.003			.018			.048*
Model Summary					R^2 = .544, F(6,103) = 20.497,		MSE = 81.736 p<.001

*p<.05, **p<.01, ***p<.001
N = 110

Focusing on *Case 2*, the main effects of *negative imagery* (b_1=-.29, t(110)=2.33, p=.02) as well as the moderating variable *acting with awareness* (b_2=-.91, t(110)=-4.15, p<.001) predicted *DASS total* scores significantly (Table 3.6). The covariate adjustors *age* (b_4=-.18, t(110)=-2.02, p=.046) and *overall quality of life* (b_6=-.70, t(110)=-6.08, p=<.001) predicted the outcome variable significantly, while *gender* (b_5=-2.52, t(110)=-1.32, p=.19) did not. Finally, addition of the interaction between *negative imagery* and *acting with awareness* scores (F(1,103)=.01, R^2 change<.001, p=.91) was not significant on *DASS total* scores.

Figure 3.3

The Statistical Diagram of Case 2
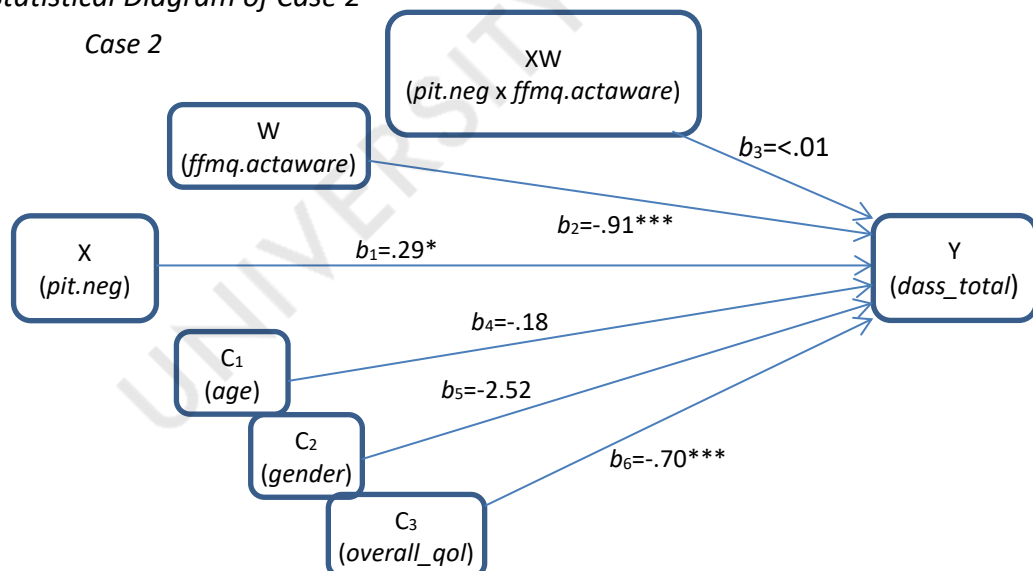
Note. X: *pit.neg* (antecedent variable), negative imagery; Y: *dass_total* (outcome variable), DASS total scores; C1, C2, C3: *age*, *gender*; *overall_qol* (overall WHOQOL-BREF scores), respectively (covariates); W: *ffmq.actaware* (moderating variable), acting with awareness facet of FFMQ-SF; XW: *pit.neg* x *ffmq.actaware*, the interaction effect in predicting Y. N=110. The Case-Variable Ratio is 19:1.
*p<.05, ***p<.001

Table 3.6
Results from the Case 2 Moderated Regression Analysis Examining the Moderation of Negative Imagery on DASS Total Scores by the Acting With Awareness Facet of the FFMQ-SF, Controlled by Age, Gender, and Overall Quality of Life.

		coefficient	SE	t	*p*	*LLCI*	*ULCI*
Constant	i_Y	66.227	7.448	8.892	<.001***	51.456	80.998
pit.neg (X)	b_1	.291	.125	2.331	.022*	.043	.539
ffmq.actaware (W)	b_2	-.909	.219	-4.150	<.001***	-1.343	-.475
pit.neg x ffmq.actaware (XW)	b_3	-.003	.026	-.111	.912	-.054	.049
age (C₁)	b_4	-.180	.089	-2.024	.046*	-.356	-.004
gender (C₂)	b_5	-2.519	1.912	-1.317	.191	-6.310	1.273
overall_qol (C₃)	b_6	-.698	.115	-6.080	<.001***	-.926	-.470

	F	**R^2 change**	***p***
interaction effect (*XW*)	F(1,103)=.012	<.001	.912

Model Summary	R^2 = .551,	MSE = 80.490
	F(6,103) = 21.080,	p<.001

***p<.001, *p<.05

N = 110

3.3 Discussion

The studies presented include two stages where dispositional mindfulness facets were assessed for their possible moderation effect on the relationship between prospection and mental well-being. Study II focused specifically on the occurrence likelihood of future negative or positive events, while Study III focused on how vivid the mental imagery of the events happening in future would be. In this light, vividness in imagination would indirectly be related to executive functions, and directly be understood through phenomenologic characteristics of mental imagery.

Hierarchical regression analysis in Study II demonstrated that positive as well as negative prospection likelihood scores (likelihood of occurrence for positive and negative events, respectively) are related to DASS total scores. More specifically, the higher positive prospection scores shown, the lower the distress scores reported. Furthermore, in line with earlier research (for a recent study, see Medvedev et al., 2018), higher scores for the facets of *describing*, *acting with awareness*, and *nonjudging of experience* were related to lower scores of mental distress. The observing facet of FFMQ, however, showed a contrasting result where higher scores of *observing* were related to higher scores of distress – indicating higher depressive symptom severity reports for people with higher dispositional mindfulness as is understood via the *observing* facet.

The FFMQ *observing* facet was earlier reported to be possibly misleading (Bergomi, Tschacher, & Kupper, 2013; Baer et al., 2008), and a plausible

explanation given to it is that FFMQ does not address the full scope of "observing" as a mindfulness skill, underscoring the limited scope of bodily awareness and sensory perception but rather ignoring one's emotional awareness as should be related to a dispositional nature of mindfulness to begin with (Rudkin, Medvedev, & Siegert, 2018). This can be a possible reason behind current finding in the *observing* facet as it can be argued that a disposition towards perception of bodily sensations (Solano Lopez & Moore, 2018; for a recent review, see Mallorquí-Bagué, Bulbena, Pailhez, Garfinkel, & Critchley, 2016) and overattentiveness to threatening or negative stimuli (Gilbert & Wilson, 2007) do positively correlate with increased symptoms of distress. Lack of focus on emotional awareness in FFMQ *observing* facet was also reported to be a possible reason behind misleading inferences from the findings relying on that construct (Medvedev, Norden, Krägeloh, & Siegert, 2018).

Nevertheless, results of the moderated regression analysis showed that even though two facets of DM (namely, *observing*, and *acting with awareness*) did show significance in the amount of added predicted variance on DASS total scores, none showed a significant moderation effect on the relationship between prospection scores and DASS total scores. Hence, it can be stated that in the given student sample, DM facets did not show a significant moderation effect on the relationship between risk assessments of prospections and mental health. There can be numerous possible evaluations of this finding; however, it is worthwhile to highlight the possibility that probabilistic risk assessment of future events might have felt short of assuming personal relevance to participants. This can be an important point of consideration, giving that earlier research identified autobiographical memory to be a significant contributor for prospective thinking (Miloyan et al., 2014; Morina et al., 2011), and episodic autobiographical memory was contrasted to semantic autobiographical memory in its essence of assuming personal relevance of memories to one's self (Abram, Picard, Navarro, & Piolino, 2014; Prebble, Addis, & Tippett, 2013), also referred to as a collection of self-defining memories (Blagov & Singer, 2004). If the participants did not feel the item sentence to be self-relevant, it could very well have led to less emphasis on the realistic assumption of the scenario, hence a lower risk rating for items. As personal experiences can modulate the content and ease with which future events are imagined (Schacter & Addis, 2007; Szpunar, Spreng, & Schacter, 2014), the unaccounted-for self-relevant autobiographical histories could have impacted study results. Additionally, the

nature of participant sample, a non-clinical student sample, would in all likelihood have felt short of assuming depressive symptoms of a clinically relevant degree, giving a rather narrow window of variance on mental well-being scores.

The above discussed points could have impacted findings to a degree that a moderation effect between prospection and DM was not observed, based purely on risk assessment evaluations. Study III, on the other hand, focused on phenomenologic characteristics of prospections. Study III incorporated a recruitment strategy to assess for a possible moderation effect in a general public sample that is distinct from an exclusively college student sample. Furthermore, the focus on prospections was on imagery vividness, an indicator of phenomenologic characteristics, and not on risk assessment of probability of occurrence. In this light, it would be safe to assume that items that were considered to be self-relevant would lead to more vivid prospective imagery, highlighting an effect of variance that possibly was absent in a purely risk assessment account. Nevertheless, the hierarchical regression analysis conducted showed that only negative, and not positive, imagery vividness was a significant predictor of DASS total scores. This was followed by FFMQ facets of *nonreactivity to inner experience* and *acting with awareness*, both showing significance in added predicted variance over DASS total scores. This meant that the less reactive one is to his or her inner experience, or the more aware of own actions and consequences one is, the less psychological distress one reports to have. It was interesting to note that *observing* facet did not show significance in this stage, as an earlier study (Kharlas & Frewen, 2016) reported to have identified the mindful observing trait (defined as a disposition towards enhanced awareness of multi-sensory stimuli) in strong positive correlation with imagery vividness. It can be argued that for previously discussed reasons the *observing* facet would possibly lead to an interpretation that should have been taken with caution.

The moderated regression analysis in Study III highlighted a significant interaction effect between negative imagery vividness and *nonreactivity to inner experience* facet, and failed to highlight a similar effect between *acting with awareness* facet. This finding suggests that individuals having more vivid imaginations of future negative events do show a significant increase in their psychological distress scores, and this relationship appears to hold when the same individuals also show significant reactivity towards their own experiences, and not hold if they are not reactive in this manner. This is an important finding that suggests

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a possible way DM can moderate the relationship between future event imagery vividness and subjective mental well-being.

Previous research highlighted a possible link between earlier attachment history, as is related to the concept of self, and current assessment of mindfulness traits (Brown, Ryan, & Creswell, 2007; Ryan & Brown, 2003), and that secure attachment histories were significantly related to a disposition towards being less defensive, and less reactive to one's own mental experience in the present moment (Pepping & Duvenage, 2016). Identification with a self-concept, Ryan and Brown argued (2003, p. 75), "catalyzes defensive activities that, although perhaps useful to preserving self-esteem, are not likely to serve many salutary ends." The moderation effect observed can be given as a further support to this end, highlighting the role of reactivity to mental experience in the link between negative imagery vividness and psychological distress reported. Furthermore, studies focusing on the big five personality traits (for an extensive review, see Rau & Williams, 2016; Costa & McCrae, 1992) highlighted a negative relationship between neuroticism and DM (Giluk, 2009). Neuroticism is primarily related to a tendency to be reactive to one's own thoughts and bodily sensations, a predisposition towards negative affect, and overall poorer subjective well-being (Diener, Oishi, & Lucas, 2003), possibly exacerbating symptoms of psychological distress (Barnhofer & Chittka, 2010). In this light, a further role of neuroticism can be that it could increase predisposition towards reactivity to inner experience, which in turn could help construct the link between negative prospective imagery vividness and detrimental effects on mental well-being. Future studies are advised to assess for personality dimensions alongside prospection and DM assessments to investigate this possible link more in depth.

Failure to observe significant correlation between positive imagery vividness and higher subjective well-being reports was not supportive of the Mindfulness-to-Meaning Theory (MMT; Garland, Goldin, & Fredrickson, 2015). Study II reported a significant relationship between positive future event risk assessments and subjective mental well-being, as was also previously reported elsewhere (Edmondson & MacLeod, 2015). However, this relationship was not reported to be moderated through any facets of the DM measure. To this end, a focus on personally-relevant esteemed goals and personal values assessment could be potentially more informative than focusing solely on DM facets, as value-relevant future events have a strong link with current indicators of subjective well-being

(Hayes et al., 2006). Value-based assessments and the effect of personal goals on current mental health are rather well understood through the construct of psychological flexibility and Acceptance-and-Commitment Therapy (ACT) processes (Hayes, Luoma, Bond, Masuda, & Lillis, 2006); however, one should be cautious in designing a study that focuses on value-based cognitions as they are reported to be closely related to DM measures (Assaz, Roche, Kanter, & Oshiro, 2018), possibly inviting the problem of multicollinearity in a multiple regression analysis.

This study relied exclusively on self-report measures and even though the validity of such a measure in assessing DM has been advocated rather vigorously (Baer, 2019), the lack of clinical observation and reliance on Internet-only recruitment for Study III are clear limitations in the interpretation of results. It should also be noted that Study III used a short form for FFMQ (FFMQ-SF; Bohlmeijer et al., 2011) and even though the scale was validated, it is still advisable to evaluate Study III findings with caution as the scale reliability has yet to be replicated in a wider scope. The study has a limited but an adequate sample size when earlier research focusing both on student and public samples are considered (for comparable sample sizes, see Medvedev et al., 2018). Another limitation of the study is that its research question is novel, which means, to the best of authors' awareness, comparable evidence in literature is lacking. The results discussed, however, are informative on a previously unreported possible link on how DM can be linked with future expectations and mental imagery. Hitherto unmentioned, both Study II and Study III took overall quality of life measures as covariates in the moderated regression models outlined. This was done to account for the variance added by the current reported quality of life as the primary focus of the research was on subjective mental well-being scores and it is possible for one to report a high quality of life also with a significant indication for mental distress. Hence, accounting for quality of life scores was designed to keep the study focus on the dependent variable in question.

Implications can be of clinical significance as the focus on future imagery is recently recognized to a greater extent as potentially beneficial in therapy (Holmes, Blackwell, Heyes, Renner, & Raes, 2016; Rief et al., 2015; Szollosi et al., 2015; Miloyan et al., 2014; Vilhauer et al., 2012). Incorporating specific future simulations as either a protective measure against or an intervention to address a current depressive episode can be beneficial specifically because worsening depressive

symptoms do likely affect specific future positive mental imagery (Addis, Hach, & Tippett, 2016). In light of findings from Study III, reactivity to inner experiences can be highlighted as a valuable point of clinical assessment for patients showing symptoms of depression. Quoting the advocated central role of prospective thoughts in sustaining depressive symptoms (Roepke & Seligman, 2016), it can further be speculated that vividness of mental imagery when it comes to imagined negative future events should be central to clients already showing reactivity to their inner experiences (eg. a critical and judgmental evaluation upon themselves on the basis of feeling certain emotions), and thus interventions focusing on cognitive reframing of prospective thinking for addressing depressogenic thoughts with these clients could benefit to a significant extent by also analyzing the DM tendency for reactivity, and hence could fall short of clinical utility without an insight onto such. Likewise, reactivity to inner experience can be seen as a protective factor against depressogenic mental imagery and can be incorporated into preventative cognitive-behavioural interventions not necessarily assuming a mindfulness-based stress reduction approach, or as a primary variable of focus with such interventions during the course of treatment. Considering a possible contribution of DM facets, future interventions that rely on improving mindfulness skills can additionally focus on enhancing positive specific mental imagery vividness as well as abating negative imagery vividness in an extended set of interventions. Given the suggested moderation effect, heightened vividness for negative prospections can be exacerbated by several facets of DM that could need further clinical attention due to a persistent ill effect on mental well-being.

Future research should also focus on personality trait assessments as well as personal value and goal evaluations in uncovering the possible link reported between reactivity to inner experience and negative prospective mental imagery, specifically. As Ernst, Scoboria, and D'Argembeau (2019) suggested, seeing personal relevance in imagined future events is an important contributor to imagery vividness and believability. To address this point, they incorporated a design where participant-generated and experimenter-generated future events are rated and evaluated on the basis of how relevant these hypothetical events are for participants – and personal goals and values were found to be positively related to the more detailed content and increased believability of imagined future events. Alongside this line of reasoning, future studies incorporating trait mindfulness and future imagery vividness measures could be substantially more informative if they address

participant goals and detailed justifications on why and how such imagined events seem to be relevant to self, rather than relying solely on self-report measures. In this light, a potential moderation effect of mindfulness facets can be studied in detail via relevance to specific and highly believable, personally-relevant future events – guiding personally-tailored interventions both for current episodes of depression and for more informed prevention.

3.4 Conclusion

This study aimed at examining the possible link between risk assessments of negative and positive future events as well as the imagery vividness of imagined prospective events with dispositional mindfulness in its facet structures. Findings suggest that negative imagery vividness is related with higher psychological distress, but mainly through the moderating effect of one's increased reactivity to inner experience – a finding that, to authors' knowledge, demonstrated for the first time a possible link between dispositional mindfulness and negative prospective imagery in predicting psychological distress. Future studies are advised to work on larger sample sizes and implement experimental design to account for limitations of studying with self-report measures.

References

Abram, M., Picard, L., Navarro, B., & Piolino, P. (2014). Mechanisms of remembering the past and imagining the future – New data from autobiographical memory tasks in a lifespan approach. *Consciousness and Cognition*, *29*, 76-89.

Addis, D.R., Hach, S., & Tippett, L.J. (2016). Do strategic processes contribute to the specificity of future simulation in depression? *British Journal of Clinical Psychology*, *55*, 167-186.

Agosti, V. (2014). Predictors of remission from chronic depression: a prospective study in a nationally representative sample. *Comprehensive Psychiatry*, *55*, 463-467.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association Publishing.

Andersen, R.J. & Evans, G.L. (2015). Mental time travel in dysphoria: Differences in the content and subjective experience of past and future episodes. *Consciousness and Cognition*, *37*, 237-248.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales (DASS) in clinical groups and a community sample. *Psychological Assessment*, 10, 176-181.

Assaz, D.A., Roche, B., Kanter, J.W., & Oshiro, C.K.B. (2018). Cognitive defusion in acceptance and commitment therapy: What are the basic processes of change? *The Psychological Record*, *68*, 405-418.

Baer, R. (2019). Assessment of mindfulness by self-report. *Current Opinion in Psychology*, 28, 42-48.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*(3), 191-206.

Baer, R.A., Smith, G.T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*, 27-45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., & Sauer, S. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329-342.

Barnhofer, T., & Chittka, T. (2010). Cognitive reactivity mediates the relationship between neuroticism and depression. *Behaviour Research and Therapy*, *48*(*4*), 275–281.

Beck, A.T. (1976). *Cognitive Therapy and the Emotional Disorders*. New York, NY: International Universities Press.

Beck, A.T., Rush, A. J., Shaw, B.F. & Emery, G. (1979). *Cognitive Therapy of Depression*. The Guilford Press: New York.

Beck, J.S. (1995). *Cognitive Therapy: Basics and Beyond*. The Guilford Press: New York.

Bedford, F. L. (2012). A perception theory in mind–body medicine: guided imagery and mindful meditation as cross-modal adaptation. *Psychonomic bulletin & review*, *19*(1), 24-45.

Bergomi, C., Tschacher, W., & Kupper, Z. (2013). The assessment of mindfulness with self-report measures: Existing scales and open issues. *Mindfulness*, *4*, 191-202.

Bhikkhu Bodhi (2011) What does mindfulness really mean? A canonical perspective, Contemporary Buddhism, *12*(1), 19-39.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z.V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical psychology: Science and Practice*, 11, 230-241.

Bjärehed, J., Sarkohi, A. & Andersson, G. (2010). Less positive or more negative? Future-directed thinking in mild to moderate depression. *Cognitive Behaviour Therapy*, *39*, 37-45.

Blagov, P. S., & Singer, J. A. (2004). Four dimensions of self-defining memories (specificity, meaning, content, and affect) and their relationships to self-restraint, distress, and repressive defensiveness. *Journal of Personality*, *72*, 481–512.

Bohlmeijer, E., Ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*, *18*(3), 308-320.

Brown, G.P. & Beck, A.T. (2002). Dysfunctional attitudes, perfectionism and models of vulnerability to depression. G.L. Flett & P.L. Hewitt (Eds.), In *Perfectionism: Theory, research and treatment* (s. 231-251). Washington: USA.

Brown, K.W., & Ryan, R.M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*, 822-848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Addressing fundamental questions about mindfulness. *Psychological Inquiry*, *18*(4), 272-281.

Chen, A.C., Oathes, D.J., Chang, C., Bradley, T., Zhou, Z.-W., Williams, L.M., Glover, G.H., Deisseroth, K. & Etkin, A. (2013). Causal interactions between fronto-parietal central executive and default-mode networks in humans. *PNAS*, *110*, 19944-19949.

Coffey, K.A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, *13*, 79-91.

Costa, P.T., Jr., &McCrae, R.R. (1992). *NEO-PI-R professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.

Cui, X., Jeter, C. B., Yang, D., Montague, P. R., & Eagleman, D. M. (2007). Vividness of mental imagery: individual variability can be measured objectively. *Vision research*, *47*(4), 474-478.

Dalgleish, T., Williams, J.M.G., Golden, A.M.J., Perkins, N., Barrett, L.F., Barnard, P.J., Au Yeung, C., Murphy, V., Elward, R., Tchanturia, K. & Watkins, E. (2007). Reduced specificity of autobiographical memory and depression: the role of executive control. *Journal of Experimental Psychology: General*, *136*, 23-42.

Damasio, A. (1994) *Descartes' error: Emotion, reason and the human brain*. New York: Avon Books.

Diener, E., Oishi, S., & Lucas, R.E. (2003). Personality, culture, and subjective wellbeing: emotional and cognitive evaluations of life. *Annual Review of Psychology*, *54*, 403–425.

Donald, J.N., Atkins, P.W.B., Parker, P.D., Christie, A.M., & Ryan, R.M. (2016). Daily stress and the benefits of mindfulness: Examining the daily and longitudinal

relations between present-moment awareness and stress responses. *Journal of Research in Personality*, *65*, 30-37.

Durisko, Z., Mulsant, B.H. & Andrews, P.W. (2015). An adaptationist perspective on the etiology of depression. *Journal of Affective Disorders*, *172*, 315-323.

Eaton, W.W., Shao, H., Nestadt, G., Lee, B.H., Bienvenu, J. & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives in General Psychiatry*, *65*, 513-520.

Edmondson, O.J.H. & MacLeod, A.K. (2015). Pschological well-being and anticipated positive personal events: their relationship to depression. *Clinical Psychology and Psychotherapy*, *22*, 418-425.

Ernst, A., Scoboria, A., & D'Argembeau, A. (2019). On the role of autobiographical knowledge in shaping belief in the future occurrence of imagined events. *Quarterly Journal of Experimental Psychology, 00*, 1-14.

Femenia, T., Gomez-Galan, M., Lindskog, M. & Magara, S. (2012). Dysfunctional hippocampal activity affects emotion and cognition in mood disorders. *Brain Research*, *1476*, 58-70.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage Publication.

Garcia-Toro, M., Rubio, J.M., Gili, M., Roca, M., Jin, C.J., Liu, S.-M., Bastianoni, C., & Blanco, C. (2013). Persistence of chronic major depression: A national prospective study. *Journal of Affective Disorders*, *151*, 306-312.

Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015). The mindfulness-to-meaning theory: extensions, applications, and challenges at the attention–appraisal–emotion interface. *Psychological Inquiry*, *26*(4), 377-387.

Gilbert, D.T. & Wilson, T.D. (2007). Prospection: Experiencing the future. *Science*, *317*, 1351-1354.

Giluk, T.L. (2009). Mindfulness, big five personality, and affect: A meta-analysis. *Personality and Individual Differences*, *47*, 805-811.

Haaga, D.A.F., Dyck, M.J. & Ernst, D. (1991). Empirical status of cognitive theory of depression. *Psychological Bulletin*, *110*, 215-236.

Hales, S.A., Deeprose, C., Goodwin, G.M. & Holmes, E.A. (2011). Cognitions in bipolar affective disorder and unipolar depression: Imagining suicide. *Bipolar Disorders*, *13*, 651-661.

Hanley, A.W. (2016). The mindful personality: Associations between dispositional mindfulness and the five factor model of personality. *Personality and Individual Differences*, *91*, 154-158.

Hanley, A. W., & Garland, E. L. (2014). Dispositional mindfulness co-varies with self-reported positive reappraisal. *Personality and individual differences*, *66*, 146-152.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling [White paper]. Retrieved from http://www.afhayes.com/ public/process2012.pdf.

Hayes, A. F., & Cai, L. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior research methods*, *39*(4), 709-722.

Hayes, S.C., Luoma, J.B., Bond, F.W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44, 1-25.

Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual differences*, *50*(2), 222-227.

Holmes, E.A., Lang, T.J., Moulds, M.L. & Steele, A.M. (2008). Prospective and positive mental imagery deficits in dysphoria. *Behaviour Research and Therapy*, *46*, 976-981.

Holmes, E.A. & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review*, *30*, 349-362.

Holmes, E.A., Blackwell, S.E., Heyes, S.B., Renner, F. & Raes, F. (2016). Mental imagery in depression: Phenomenology, potential mechanisms and treatment implications. *Annual Reviews in Clinical Psychology*, *12*, 249-280.

Jazaieri, H., & Shapiro, S. (2017). Mindfulness and well-being. In *The happy mind: Cognitive contributions to well-being* (pp. 41-58). Springer, Cham.

Kabat-Zinn, J (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*, 144-156.

Kaymak, S.U., Demir, B., Şentürk, S., Tatar, İ., Aldur, M.M. & Uluğ, B. (2010). Hippocampus, glucocorticoids and neurocognitive functions in patients with first-episode major depressive disorders. *European Archives of Psychiatry and Clinical Neuroscience*, *260*, 217-223.

Kelly, K.M., & Mezuk, B. (2017). Predictors of remission from generalized anxiety disorder and major depressive disorder. *Journal of Affective Disorders*, *208*, 467-474.

Kharlas, D. A., & Frewen, P. (2016). Trait mindfulness correlates with individual differences in multisensory imagery vividness. *Personality and individual differences*, *93*, 44-50.

Klein, D.N., Arnow, B.A., Barkin, J.L., Dowling, F., Kocsis, J.H., Leon, A.C., Manber, R., Rothbaum, B.O., Trivedi, M.H., & Wisniewski, S.R. (2009). Early adversity in chronic depression: clinical correlates and response to pharmacotherapy. *Depression and Anxiety*, *26*, 701-710.

Lee, R.S.C., Hermens, D.F., Porter, M.A. & Redoblado-Hodge, M.A. (2012). A meta-analysis of cognitive deficits in first-episode Major Depressive Disorder. *Journal of Affective Disorders*, *140*, 113-124.

Lehner, E., & D'Argembeau, A. (2016). The role of personal goals in autonoetic experience when imagining future events. *Consciousness and Cognition*, *42*, 267-276.

Liao, Y., Huang, X., Wu, Q., Yang, C., Kuang, W., & Du, M. (2013). Is depression a disconnection syndrome? Meta-analysis of diffusion tensor imaging studies in patients with MDD. *Journal of Psychiatry & Neuroscience*, *38*, 49-56.

MacLeod, A. K., & Byrne, A. (1996). Anxiety, depression, and the anticipation of future positive and negative experiences. Journal of Abnormal Psychology, 105(2), 286– 289.

MacLeod, A.K., Byrne, A., & Valentine, J.D. (1996). Affect, emotional disorder, and future-directed thinking. Cognition and Emotion, 10, 69-86.

MacLeod, A.K., Pankhania, B., Lee, B. & Mitchell, D. (1997). Parasuicide, depression and the anticipation of positive and negative future experiences. *Psychological Medicine*, 27, 973-977.

MacLeod, A.K., Rose, G.S. & Williams, J.M.G. (1993). Components of hopelessness about the future in parasuicide. *Cognitive Therapy and Research*, 17, 441-455.

MacLeod, A.K. & Salaminiou, E. (2001). Reduced future-thinking in depression: Cognitive and affective factors. *Cognition and Emotion*, *15*, 99-107.

MacLeod, A.K., Tata, P., Tyrer, P., Schmidt, U., Davidson, K., & Thompson, S. (2005). Hopelessness and positive and negative future thinking in parasuicide. *British Journal of Clinical Psychology*, *44*, 495-504.

MacLeod, A.K., Tata, P., Kentish, J., Carroll, F. & Hunter, E. (1997). Anxiety, depression and explanation-based pessimism for future positive and negative events. *Clinical Psychology and Psychotherapy*, *4*, 15-24.

Mallorquí-Bagué, N., Bulbena, A., Pailhez, G., Garfinkel, S.N., & Critchley, H.D. (2016). Mind-body interactions in anxiety and somatic symptoms. *Harvard Review of Psychiatry*, *24*(*1*), 53-60.

Marchetti, I., Koster, E.H.W, Sonuga-Barke, E.J. & de Raedt, R. (2012). The default mode network and recurrent depression: A neurobiological model of cognitive risk factors. *Neuropsychology Reviews*, *22*, 229-251.

McIntyre, R.S., Cha, D.S., Soczynska, J.K., Woldeyohannes, H.O., Gallaugher, L.A., Kudlow, P., Alsuwaidan, M. & Baskaran, A. (2013). Cognitive deficits and functional outcomes in major depressive disorder: Determinants, substrates, and treatment interventions. *Depression and Anxiety*, *30*, 515-527.

McKinnon, M.C., Yucel, K., Nazarov, A. & MacQueen, G.M. (2009). A meta-analysis examining clinical predictors of hippocampal volume in patients with major depressive disorder. *Journal of Psychiatry & Neuroscience*, *34*, 41-54.

Medvedev, O.N., Norden, P.A., Krägeloh, C.U., & Siegert, R.J. (2018). Investigating Unique Contributions of Dispositional Mindfulness Facets to Depression, Anxiety, and Stress in General and Student Populations. *Mindfulness*, *9*, 1757–1767.

Miloyan, B., Pachana, N.A. & Suddendorf, T. (2014). The future is here: A review of foresight systems in anxiety and depression. *Cognition and Emotion*, *28*, 795-810.

Morina, N., Deeprose, C., Pusowski, C., Schmid, M. & Holmes, E. (2011). Prospective mental imagery in patients with major depressive disorder or anxiety disorders. *Journal of Anxiety Disorders*, *25*, 1032-1037.

Ogden, J. (2012). *Health Psychology: A Textbook*. 5th ed. Berkshire: McGraw Hill.

Pepping, C. A., & Duvenage, M. (2016). The origins of individual differences in dispositional mindfulness. *Personality and Individual Differences*, *93*, 130-136.

Prebble, S. C., Addis, D. R., & Tippett, L. J. (2013). Autobiographical memory and sense of self. *Psychological Bulletin, 139*(4), 815–840.

Rau, H. K., & Williams, P. G. (2016). Dispositional mindfulness: A critical review of construct validation research. *Personality and Individual Differences*, *93*, 32-43.

Richards, D. (2011). Prevalence and clinical course of depression: A review. Clinical Psychology Review, *31*, 1117-1125.

Rief, W., Glombiewski, J.A., Gollwitzer, M., Schubö, A., Schwarting, R. & Thorwart, A. (2015). Expectancies as core features of mental disorders. *Current Opinion in Psychiatry*, *28*, 378-385.

Rive, M.M., van Rooijen, G., Veltman, D.J., Phillips, M.L., Schene, A.H. & Ruhe, H.G. (2013). Neural correlates of dysfunctional emotion regulation in major depressive disorder: A systematic review of neuroimaging studies. *Neuroscience and Biobehavioural Reviews*, 37, 2529-2553.

Roepke, A. M., & Seligman, M. E. (2016). Depression and prospection. *British Journal of Clinical Psychology*, *55*(1), 23-48.

Roca, M., Vives, M., Lopez-Navarro, E., Garcia-Campayo, J. & Gili, M. (2015). Cognitive impairments and depression: a critical review. *Actas Esp Psiquiatr*, *43*, 187-93.

Rock, P.L., Roiser, J.P., Riedel, W.J. & Blackwell, A.D. (2014). Cognitive impairment in depression: a systematic review and meta-analysis. *Psychological Medicine*, *44*, 2029-2040.

Rudkin, E., Medvedev, O.N., & Siegert, R.J. (2018). The five-facet mindfulness questionnaire: Why the observing subscale does not predict psychological symptoms. *Mindfulness*, *9*, 230-242.

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: Basic needs, mindfulness, and the authentic self. *Psychological Inquiry, 14*, 71-76.

Sargalska, J., Miranda, R. & Marroquín, B. (2011). Being certain about an absence of the positive: Specificity in relation to hopelessness and suicidal ideation. *International Journal of Cognitive Therapy*, *4*, 104-116.

Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: the prospective brain. *Nature Reviews Neuroscience, 8*, 657–661.

Schacter, D.L., Addis, D.R., Hassabis, D., Martin, V.C., Spreng, R.N. & Szpunar, K.K. (2012). The future of memory: Remembering, imagining, and the brain. *Neuron*, *76*, 677-694.

Sharot, T. & Garrett, N. (2016). Forming beliefs: Why valence matters. *Trends in Cognitive Sciences*, *20*, 25-33.

Short, M. M., Mazmanian, D., Oinonen, K., & Mushquash, C. J. (2016). Executive function and self-regulation mediate dispositional mindfulness and well-being. *Personality and Individual Differences*, *93*, 97-103.

Singh, M.K. & Gotlib, I.H. (2014). The neuroscience of depression: Implications for assessment and intervention. *Behaviour Research and Therapy*, *62*, 60-73.

Snyder, H.R. (2013). Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychology Bulletin*, *139*, 81-132.

Solano Lopez, A. L., & Moore, S. (2019). Dimensions of Body-Awareness and Depressed Mood and Anxiety. *Western Journal of Nursing Research*, *41*(6), 834-853.

Stevenson, J. C., Millings, A., & Emerson, L. M. (2019). Psychological well-being and coping: The predictive value of adult attachment, dispositional mindfulness, and emotion regulation. *Mindfulness*, *10*(2), 256-271.

Stöber, J. (2000). Prospective cognitions in anxiety and depression: Replication and methodological extension. *Cognition and Emotion*, *14*, 725-729.

Szollosi, A., Pajkossy, P. & Racsmany, M. (2015). Depressive symptoms are associated with the phenomenal characteristics of imagined positive and negative future events. *Applied Cognitive Psychology*, *29*, 762-767.

Szpunar, K. K., Spreng, R. N., & Schacter, D. L. (2014). A taxonomy of prospection: Introducing an organizational framework for future-oriented cognition. *Proceedings of the National Academy of Sciences*, *111*(52), 18414-18421.

Tabachnick, B.G., & Fidell, L.S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Allyn and Bacon.

Teper, R., & Inzlicht, M. (2014). Mindful acceptance dampens neuroaffective reactions to external and rewarding performance feedback. *Emotion*, *14*, 105-114.

Trivedi, M.H. & Greer, T.L. (2014). Cognitive dysfunction in unipolar depression: Implications for treatment. *Journal of Affective Disorders*, *152*, 19-27.

Utsey, S.O., Chae, M.H., Brown, C.F., & Kelly, D. (2012). Effect of ethnic group membership on ethnic identity, race-related stress, and quality of life. *Cultural Diversity and Ethnic Minority Psychology*, *8*, 366-377.

van Dam, N.T., van Vugt, M.K., Vago, D.R., Schmalzl, L., Saron, C.D., Olendzki, A., Meissner, T., Lazar, S.W., Kerr, C.E., Gorchov, J., & Fox, K.C. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, *13*(1), 36-61.

Waugh, C. E., & Koster, E. H. (2015). A resilience framework for promoting stable remission from depression. *Clinical psychology Review*, *41*, 49-60.

Weissman, A.N. & Beck, A.T. (1978). *Development and validation of the Dysfunctional Attitude Scale: a preliminary investigation. Paper presented at the meeting of the American Education Research Association*, Toronto: Canada.

Williams, J.M.G., & Kabat-Zinn, J. (2011). Mindfulness: diverse perspectives on its meaning, origins, and multiple applications at the intersection of science and dharma. *Contemporary Buddhism: An Interdisciplinary Journal*, *12*, 1-18.

World Health Organization Group. (1998). Group development of the World Health Organization WHOQOL–Brief quality of life assessment. *Psychological Medicine*, 28, 551–558.

Discussion

This thesis includes three separate studies, of which the first is a systematic review (Study I) and the further two are cross-sectional analytical studies (Study II and III, respectively). The systematic review focused on the limited yet emerging research of TP and DM in predicting subjective well-being, with a further emphasis on BTP as an important variable that can guide further research. Cross-sectional studies focused on analysing relationships between DM and prospective thinking, or more specifically, the probabilistic risk assessment of future positive and negative events (Study II) and imagery vividness ratings of such (Study III), in predicting self-report measures of psychological distress.

The systematic review (Study I) investigated peer-reviewed analytical cross-sectional studies looking into the relationships between TP and DM in predicting mental well-being. Review of 14 articles revealed that the construct of BTP is related to DM in supporting subjective well-being and against psychological distress. Further examination revealed the very limited current status of research on Carpe Diem (Sobol-Kwapinska et al., 2016) perspective as inherently linked to savouring the current moment mindfully – a potentially fruitful area deserving further examination. Additionally, mindfulness appears to be a metacognitive capability helpful in shifting temporal focus to support adaptive stress coping, aiding the individual to overcome short-sigthed hedonistic tendencies into an appreciation of eudaimonic meaning of actions and events that support long-term goals (Vowinckel et al., 2017). Supporting an adaptive temporal focus, DM in its facet conceptualizations holds a promising avenue for clinical research that takes temporal dimensions in the assessment of functional stress coping and psychological well-being. Future research is advised to focus on the flexibility advocated by a BTP profile, informed by DM tendencies as well as a Carpe Diem profile, in assessing attitudes towards positive affect with respect to hedonistic or eudaimonic dimensions. In this light, BTP holds the most promise in guiding experimental research to clarify causal inferences that can be made on emotion regulation strategies while facing stressors, and this can guide psychotherapy interventions for patients that can benefit from mindfulness-based cognitive skills training. Addressing the cross-sectional design focus as a limitation of this systematic review, future studies assuming a longitudinal design that tap into the incorporation of BTP-DM dimensions on emotion regulation with

psychotherapeutical interventions can further inform health professionals on mechanisms of change as applied to real-life experiences.

Study II highlighted that even though *acting with awareness* and *observing* facets of DM can predict a significant amount of variance of psychological distress, they failed to moderate the relationship between distress and positive as well as negative prospective event risk assessment scores. It could be argued that risk assessment of events failed to evoke personal relevance to subjects, resulting in a mild impact on imagination that was not possible to lead to measurable risk assessment variation (Schacter & Addis, 2007; Abram, Picard, Navarro, & Piolino, 2014; Szpunar, Spreng, & Schacter, 2014). The sole focus on college student samples could also contribute to the lack of a significant moderation effect. To address this limitation, Study III involved an online sample from general population. Study III focused on vividness ratings of imagined prospective scenarios and unlike Study II, it could identify a significant (albeit a borderline significance of .046) moderation effect of *nonreactivity to inner experience* on the relationship between negative prospective imagery vividness and psychological distress. This could be an important finding, as, to the authors' knowledge, this is the first time a DM variable was found to moderate a relationship between prospective imagery and psychological distress – that which can imply a fruitful avenue in clinical settings for developing case formulations in subjects with heightened distress symptoms. More specifically, cognitive reframing centred around prospective imagery can experience limitations in patients with a disposition towards reacting to their inner experiences, and thus an assessment and a possible primary intervention focus on mindfulness skills can enhance clinical utility of cognitive-behavioural interventions. It could be argued that reacting to one's inner experiences can be due to an earlier insecure attachment history (Brown, Ryan, & Creswell, 2007), where a self-protecting tendency can hinder a fuller appreciation of current experiences (Pepping & Duvenage, 2016). This could, arguably, influence an appreciation of future imagery as the continuation of the construct of self is highlighted in imagining a future in continuity with this construct (Prebble, Addis, & Tippett, 2013). In addition, the personality trait of neuroticism (Costa & McCrae, 1992) has earlier been shown to be related to lower DM (Giluk, 2009; Rau & Williams, 2016) and psychological distress (Barnhofer & Chittka, 2010), and it could also be linked to the current finding of the moderation effect that focuses on reactivity to inner experience. Limitations pertaining to the empirical studies conducted in this thesis include the fact that

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research conducted did not account for neuroticism, or involve an assessment of earlier attachment history, and these variables remain as possible contributors to regression models utilized in this thesis that could only be examined in future studies addressing them. The current findings highlight that assessing for DM and prospective thoughts, or more specifically, phenomenal characteristics of prospective imagery, at the same time can help uncover important metacognitive avenues for more focused psychological interventions. In this light, negative imagery vividness and reactivity to inner experience offer the most readily highlighted link that can further be examined in future clinical studies aimed at improving cognitive-behavioural interventions' clinical effectiveness.

In conclusion, the three studies covered by this thesis focused on existing gaps in the current status of literature into the roles that mindfulness in its facet, predisposition-based conceptualizations play in the sustenance of mental well-being. Taken together with prospective thinking, imagery vividness, and time perspective research, the studies presented highlight new routes for future research to examine moderation by mindfulness traits in depth, and the role time perspectives may have in relation to interventions focusing on mindfulness both as a metacognitive trait and as a time perspective that supports a balanced, functional shift between domains of time.

References

Abram, M., Picard, L., Navarro, B., & Piolino, P. (2014). Mechanisms of remembering the past and imagining the future – New data from autobiographical memory tasks in a lifespan approach. *Consciousness and Cognition*, *29*, 76-89.

Addis, D.R., Hach, S., & Tippett, L.J. (2016). Do strategic processes contribute to the specificity of future simulation in depression? *British Journal of Clinical Psychology*, *55*, 167-186.

Agosti, V. (2014). Predictors of remission from chronic depression: a prospective study in a nationally representative sample. *Comprehensive Psychiatry*, *55*, 463-467.

Altun, F., & Yazici, H. (2015). The relationships between life satisfaction, gender, social security, and depressive symptoms among elderly in Turkey. *Educational Gerontology*, *41*, 305–314.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association Publishing.

Andersen, R.J. & Evans, G.L. (2015). Mental time travel in dysphoria: Differences in the content and subjective experience of past and future episodes. *Consciousness and Cognition*, *37*, 237-248.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales (DASS) in clinical groups and a community sample. *Psychological Assessment*, 10, 176-181.

Asakawa, K. (2010). Flow experience, culture, and well-being: How do autotelic Japanese college students feel, behave, and think in their daily lives? *Journal of Happiness Studies*, *11*, 205–223.

Assaz, D.A., Roche, B., Kanter, J.W., & Oshiro, C.K.B. (2018). Cognitive defusion in acceptance and commitment therapy: What are the basic processes of change? *The Psychological Record*, *68*, 405-418.

Baer, R. (2019). Assessment of mindfulness by self-report. *Current Opinion in Psychology*, 28, 42-48.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*(3), 191-206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*, 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., & Sauer, S. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329-342.

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Pers Indiv Differ.*, *93*, 63–67.

Bassi, M., Steca, P., Monzani, D., Greco, A., & Fave, A.D. (2014). Personality and optimal experience in adolescence: Implications for well-being and development. *Journal of Happiness Studies*, *15*, 829–843.

Barnhofer, T., & Chittka, T. (2010). Cognitive reactivity mediates the relationship between neuroticism and depression. *Behaviour Research and Therapy*, *48*(*4*), 275–281.

Beck, A.T. (1976). *Cognitive Therapy and the Emotional Disorders*. New York, NY: International Universities Press.

Beck, A.T., Rush, A. J., Shaw, B.F. & Emery, G. (1979). *Cognitive Therapy of Depression*. The Guilford Press: New York.

Beck, J.S. (1995). *Cognitive Therapy*: *Basics and Beyond*. The Guilford Press: New York.

Bedford, F. L. (2012). A perception theory in mind–body medicine: guided imagery and mindful meditation as cross-modal adaptation. *Psychonomic bulletin & review*, *19*(1), 24-45.

Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research, 12*, 265–280.

Bergomi, C., Tschacher, W., & Kupper, Z. (2013). Measuring mindfulness: First steps towards the development of a comprehensive mindfulness scale. *Mindfulness*, *4*, 18–32.

Bergomi, C., Tschacher, W., & Kupper, Z. (2014). Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit [Construction and initial validation of a questionnaire for the comprehensive investigation of mindfulness]. *Diagnostica*, *60*, 111–125.

Bhikkhu Bodhi (2011) What does mindfulness really mean? A canonical perspective, Contemporary Buddhism, *12*(1), 19-39.

Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D., Carmody, J., ... Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*, 230–241.

Bjärehed, J., Sarkohi, A. & Andersson, G. (2010). Less positive or more negative? Future-directed thinking in mild to moderate depression. *Cognitive Behaviour Therapy*, *39*, 37-45.

Blagov, P. S., & Singer, J. A. (2004). Four dimensions of self-defining memories (specificity, meaning, content, and affect) and their relationships to self-restraint, distress, and repressive defensiveness. *Journal of Personality*, *72*, 481–512.

Bluedorn, A. C. (2002). *The human organization of time: Temporal realities and experience*. Stanford, CA: Stanford University Press.

Bohlmeijer, E., Ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*, *18*(3), 308-320.

Boniwell, I., & Osin, E. (2015). Time perspective coaching. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time Perspective Theory, Review, Research and Application* (pp. 451–469). Switzerland: Springer International Publishing.

Boniwell, I., Osin, E., Linley, A. P., & Ivanchenko, G. V. (2010). A question of balance: Time perspective and well-being in British and Russian samples. *Journal of Positive Psychology*, *5*, 24–40.

Boniwell, I., & Zimbardo, P.G. (2004). Balancing time perspective in pursuit of optimal functioning. In P.A. Linley, & S. Joseph (Eds.), *Positive Psychology in Practice* (pp. 165-178). Hoboken, NJ: Wiley & Sons.

Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences*, *52*, 411–415.

Boyd, J. N., & Zimbardo, P. G. (2005). Time perspective, health and risk taking. In A. Strahman and J. Joireman (Eds.), *Understanding Behavior in the Context of Time: Theory, Research and Applications* (pp. 85–107). Mahwah, N. J: Erlbaum.

Brown, G.P. & Beck, A.T. (2002). Dysfunctional attitudes, perfectionism and models of vulnerability to depression. G.L. Flett & P.L. Hewitt (Eds.), In *Perfectionism: Theory, research and treatment* (s. 231-251). Washington: USA.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Addressing fundamental questions about mindfulness. *Psychological Inquiry*, *18*(4), 272-281.

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. *Journal of Consumer research*, *29*(3), 348-370.

Busseri, M. A., Malinowski, A., & Choma, B. L. (2013). Are optimists oriented uniquely toward the future? Investigating dispositional optimism from a temporally-expanded perspective. *Journal of Research in Personality*, *47*, 533–538.

Caprara, G. V., Steca, P., Alessandri, G., Abela, J. R., & McWhinnie, C.M. (2010). Positive orientation: explorations on what is common to life satisfaction, self-esteem, and optimism. *Epidemiology and Psychiatric Sciences*, *19*, 63–71.

Carter, O.L., Presti, D.E., Callistemon, C., Ungerer, Y., Liu, G.B., and Pettigrew, J.D. (2005). Meditation alters perceptual rivalry in Tibetan Buddhist monks. *Curr. Biol.* 15, R412–R413. doi:10.1016/j.cub.2005.05.043

Caruso, E. M., Gilbert, D. T., & Wilson, T. D. (2008). A wrinkle in time: Asymmetric valuation of past and future events. *Psychological Science*, *19*, 796–801.

Chen, A.C., Oathes, D.J., Chang, C., Bradley, T., Zhou, Z.-W., Williams, L.M., Glover, G.H., Deisseroth, K. & Etkin, A. (2013). Causal interactions between fronto-parietal central executive and default-mode networks in humans. *PNAS*, *110*, 19944-19949.

Coffey, K.A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, *13*, 79-91.

Costa, P.T., Jr., &McCrae, R.R. (1992). *NEO-PI-R professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.

Craig, A.D. (2009). Emotional moments across time: A possible neural basis for time perception in the anterior insula. *Phil. Trans. R. Soc. B*, *364*, 1933–1942.

Cui, X., Jeter, C. B., Yang, D., Montague, P. R., & Eagleman, D. M. (2007). Vividness of mental imagery: individual variability can be measured objectively. *Vision research*, *47*(4), 474-478.

Cunningham, K.F., Zhang, J.W., & Howell, R.T. (2015). Time perspectives and subjective well-being: A dual-pathway framework. In M. Stolarski, N. Fieulaine, & W. van Beek (Eds.), *Time Perspective Theory, Review, Research and Application* (pp. 403–415). Switzerland: Springer International Publishing.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper & Row.

Dalgleish, T., Williams, J.M.G., Golden, A.M.J., Perkins, N., Barrett, L.F., Barnard, P.J., Au Yeung, C., Murphy, V., Elward, R., Tchanturia, K. & Watkins, E. (2007). Reduced specificity of autobiographical memory and depression: the role of executive control. *Journal of Experimental Psychology: General*, *136*, 23-42.

Damasio, A. (1994) *Descartes' error: Emotion, reason and the human brain*. New York: Avon Books.

Deci, E.L., & Ryan, R.M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies*, *9*, 1–11.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*, 71–75.

Diener, E., Oishi, S., & Lucas, R.E. (2003). Personality, culture, and subjective wellbeing: emotional and cognitive evaluations of life. *Annual Review of Psychology*, *54*, 403–425.

Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of personality and social psychology*, *107*(5), 879.

Donald, J.N., Atkins, P.W.B., Parker, P.D., Christie, A.M., & Ryan, R.M. (2016). Daily stress and the benefits of mindfulness: Examining the daily and longitudinal relations between present-moment awareness and stress responses. *Journal of Research in Personality*, *65*, 30-37.

Drake, L., Duncan, E., Sutherland, F., Abernethy, C., & Henry, C. (2008). Time perspective and correlates of well-being. *Time & Society*, *17*, 47–61.

Dreyfus, G. (2011). Is mindfulness present-centred and non-judgmental? A discussion of the cognitive dimensions of mindfulness. Contemporary Buddhism, 12(1), 41–54.

Droit-Volet, S., Fanget, M., and Dambrun, M. (2015). Mindfulness meditation and relaxation training increases time sensitivity. *Conscious. Cogn.* 31, 86–97. doi: 10.1016/j.concog.2014.10.007

Droit-Volet, S., Fayolle, S., Lamotte, M., and Gil, S. (2013). Time, emotion and the embodiment of timing. *Timing Time Percept.* 1, 99–126. doi:10.1163/22134468- 00002004

Droit-Volet, S., and Meck, W.H. (2007). How emotions colour our perception of time. *Trends Cogn. Sci.* 11, 504–513.

Durisko, Z., Mulsant, B.H. & Andrews, P.W. (2015). An adaptationist perspective on the etiology of depression. *Journal of Affective Disorders*, *172*, 315-323.

Eaton, W.W., Shao, H., Nestadt, G., Lee, B.H., Bienvenu, J. & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives in General Psychiatry*, *65*, 513-520.

Edmondson, O.J.H. & MacLeod, A.K. (2015). Pschological well-being and anticipated positive personal events: their relationship to depression. *Clinical Psychology and Psychotherapy*, *22*, 418-425.

Epstein, R.M., & Krasner, M.S. (2013). Physician resilience: what it means, why it matters, and how to promote it. *Acad Med.*, *88*, 301–303.

Ernst, A., Scoboria, A., & D'Argembeau, A. (2019). On the role of autobiographical knowledge in shaping belief in the future occurrence of imagined events. *Quarterly Journal of Experimental Psychology*, *00*, 1-14.

Fan, J., McCandliss, B.D., Sommer, T., Raz, A., & Posner, M.I. (2002). Testing the efficiency and independence of attentional networks. *Journal of Cognitive Neuroscience*, *14*, 340–347.

Femenia, T., Gomez-Galan, M., Lindskog, M. & Magara, S. (2012). Dysfunctional hippocampal activity affects emotion and cognition in mood disorders. *Brain Research*, *1476*, 58-70.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage Publication.

Fieulaine, N., & Martinez, F. (2011) About the fuels of self-regulation: Time perspective and desire for control in adolescents substance use. In:

Barkoukis, V. (ed.) *Psychology of Self-Regulation*. New York: Nova Science Publishers.

Flaherty, M.G., Freidin, B., and Sautu, R. (2005). Variation in the perceived passage of time: a cross-national study. *Soc. Psychol. Q.*, *68*, 400–410.

Foulkes, L., Seara-Cardoso, A., Neumann, C. S., Rogers, J. S., & Viding, E. (2014). Looking after number one: Associations between psychopathic traits and measures of social motivation and functioning in a community sample of males. *Journal of Psychopathology and Behavioral Assessment*, *36*(1), 22-29.

Fresco, D. M., Segal, Z. V., Buis, T., & Kennedy, S. (2007). Relationship of posttreatment decentering and cognitive reactivity to relapse in major depression. *Journal of Consulting and Clinical Psychology*, *75*, 447–455.

Garcia-Toro, M., Rubio, J.M., Gili, M., Roca, M., Jin, C.J., Liu, S.-M., Bastianoni, C., & Blanco, C. (2013). Persistence of chronic major depression: A national prospective study. *Journal of Affective Disorders*, *151*, 306-312.

Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015). The mindfulness-to-meaning theory: extensions, applications, and challenges at the attention–appraisal–emotion interface. *Psychological Inquiry*, *26*(4), 377-387.

Gecht, J., Kessel, R., Forkmann, T., Gauggel, S., Drueke, B., Scherer, A., & Mainz, V. (2014). A mediation model of mindfulness and decentering: Sequential psychological constructs or one and the same? *BMC Psychology*, *2*, 18.

Germer, C. K. 2009. *The mindful path to self-compassion: Freeing yourself from destructive thoughts and emotions*, New York, NY: Guilford Press.

Gilbert, D.T. & Wilson, T.D. (2007). Prospection: Experiencing the future. *Science*, *317*, 1351-1354.

Giluk, T.L. (2009). Mindfulness, big five personality, and affect: A meta-analysis. *Personality and Individual Differences*, *47*, 805-811.

Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re) invention of mindfulness: Comment on Brown et al. (2011). *Psychological Assessment*, *23*, 1034–1046.

Gruber, J., Gunningham, W. A., Kirkland, T., & Hay, A. C. (2012). Feeling stuck in the present? Mania proneness and history associated with present-oriented time perspective. *Emotion, 12,* 13–17.

Haaga, D.A.F., Dyck, M.J. & Ernst, D. (1991). Empirical status of cognitive theory of depression. *Psychological Bulletin*, *110*, 215-236.

Hales, S.A., Deeprose, C., Goodwin, G.M. & Holmes, E.A. (2011). Cognitions in bipolar affective disorder and unipolar depression: Imagining suicide. *Bipolar Disorders*, *13*, 651-661.

Hall, E. T. (1989). *Beyond culture*. New York: Anchor Books.

Hall, C. W., Row, K. A., Wuensch, K. L., & Godley, K. R. (2013). The role of self-compassion in physical and psychological well-being. *The Journal of psychology*, *147*(4), 311-323.

Hanley, A.W. (2016). The mindful personality: Associations between dispositional mindfulness and the five factor model of personality. *Personality and Individual Differences*, *91*, 154-158.

Hanley, A. W., & Garland, E. L. (2014). Dispositional mindfulness co-varies with self-reported positive reappraisal. *Personality and individual differences*, *66*, 146-152.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling [White paper]. Retrieved from http://www.afhayes.com/ public/process2012.pdf.

Hayes, A. F., & Cai, L. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior research methods*, *39*(4), 709-722.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*, 1-25.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from http://www.afhayes.com/public/process2012.pdf

Hershfield, H. E., Cohen, T. R., & Thompson, L. (2012). Short horizons and tempting situations: lack of continuity to our future selves leads to unethical decision making and behavior. *Organizational Behavior and Human Decision Processes*, *117*, 298–310.

Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual Differences*, 50: 222–227.

Holmes, E.A., Lang, T.J., Moulds, M.L. & Steele, A.M. (2008). Prospective and positive mental imagery deficits in dysphoria. *Behaviour Research and Therapy*, *46*, 976-981.

Holmes, E.A. & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review*, *30*, 349-362.

Holmes, E.A., Blackwell, S.E., Heyes, S.B., Renner, F. & Raes, F. (2016). Mental imagery in depression: Phenomenology, potential mechanisms and treatment implications. *Annual Reviews in Clinical Psychology*, *12*, 249-280.

Howell, R. T., Kern, M. L., & Lyubomirsky, S. (2007). Health benefits: meta-analytically determining the impact of wellbeing on objective health outcomes. *Health Psychology Review*, *1*, 83–136.

Huta, V., & Waterman, A.S. (2013). Eudaimonia and its distinction from hedonia: Developing a classification and terminology for understanding conceptual and operational definitions. *Journal of Happiness Studies*, *15*, 1425–1456.

Jevning, R.,Wallace, R.K., & Beidebach,M. (1992). The physiology of meditation: a review. A wakeful hypometabolic integrated response. *Neuroscience & Biobehavioral Reviews*, *16*, 415–424.

Jazaieri, H., & Shapiro, S. (2017). Mindfulness and well-being. In *The happy mind: Cognitive contributions to well-being* (pp. 41-58). Springer, Cham.

Jian, C., Liang-shi, Y., & Li-hua, Z. (2011). Reliability and validity of Chinese version of self-compassion scale. *Chin. J. Clin. Psychol*. 19, 734–736.

Johnson, C., Burke, C., Brinkman, S., & Wade, T. (2017). Development and validation of a multifactor mindfulness scale in youth: The Comprehensive Inventory of Mindfulness Experiences–Adolescents (CHIME-A). P*sychological Assessment*, *29*, 264.

Kabat-Zinn, J (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, *10*, 144-156.

Kabat-Zinn, J. (2005). *Coming to Our Senses*. New York: Hyperion.

Kairys A., Liniauskaitė A., Bagdonas A., Pakalniškienė V. (2017) Balanced Time Perspective: Many Questions and Some Answers. In: Kostić A., Chadee D. (eds) *Time Perspective*. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-60191-9_5

Kang, Y., Gruber, J., & Gray, J.R. (2013). Mindfulness and de-automatization. *Emotion Review*, *5*, 192–201.

Kasser, T., Ryan, R. M., Couchman, C. E., & Sheldon, K. M. (2004). *Materialistic values: Their causes and consequences.* In T. Kasser & A. D. Kanner (Eds.), *Psychology and consumer culture: The struggle for a good life in a materialistic world* (p. 11–28). American Psychological Association.

Kaymak, S.U., Demir, B., Şentürk, S., Tatar, İ., Aldur, M.M. & Uluǧ, B. (2010). Hippocampus, glucocorticoids and neurocognitive functions in patients with first-episode major depressive disorders. *European Archives of Psychiatry and Clinical Neuroscience*, *260*, 217-223.

Kee, Y.H., & Wang, C.K.J. (2008). Relationships between mindfulness, flow dispositions and mental skills adoption: A cluster analytic approach. *Psychology of Sport and Exercise*, *9*, 393–411.

Kelly, K.M., & Mezuk, B. (2017). Predictors of remission from generalized anxiety disorder and major depressive disorder. *Journal of Affective Disorders*, *208*, 467-474.

Keough, K., Zimbardo, P.G., and Boyd, J.N. (1999). Who's smoking, drinking, and using drugs? Time perspective as a predictor of substance use. *Basic Appl. Soc. Psychol.*, *21*, 149–164.

Kharlas, D. A., & Frewen, P. (2016). Trait mindfulness correlates with individual differences in multisensory imagery vividness. *Personality and individual differences*, *93*, 44-50.

Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual differences*, *81*, 41-46.

Kirby, J.N., Tellegen, C.L., & Steindl, S.R. (2017). A meta-analysis of compassion-based interventions: Current state of knowledge and future directions. *Behavior Therapy*, *48*, 778-792.

Klein, D.N., Arnow, B.A., Barkin, J.L., Dowling, F., Kocsis, J.H., Leon, A.C., Manber, R., Rothbaum, B.O., Trivedi, M.H., & Wisniewski, S.R. (2009). Early adversity in chronic depression: clinical correlates and response to pharmacotherapy. *Depression and Anxiety*, *26*, 701-710.

Kohls, N., Sauer, S., & Walach, H. (2009). Facets of mindfulness—Results of an online study investigating the Freiburg Mindfulness Inventory. *Personal. Individ. Differ.*, *46*, 224–230.

Kramer, R.S., Weger, U.W., & Sharma, D. (2013). The effect of mindfulness meditation on time perception. Consciousness and Cognition, 22, 846–852.

Lee, R.S.C., Hermens, D.F., Porter, M.A. & Redoblado-Hodge, M.A. (2012). A meta-analysis of cognitive deficits in first-episode Major Depressive Disorder. *Journal of Affective Disorders*, *140*, 113-124.

Lee, Y., Lin, Y., Huang, C., & Fredrickson, B.L. (2013). The construct and measurement of peace of mind. *J Happiness Stud.*, *14*, 571–590.

Lehner, E., & D'Argembeau, A. (2016). The role of personal goals in autonoetic experience when imagining future events. *Consciousness and Cognition*, *42*, 267-276.

Liao, Y., Huang, X., Wu, Q., Yang, C., Kuang, W., & Du, M. (2013). Is depression a disconnection syndrome? Meta-analysis of diffusion tensor imaging studies in patients with MDD. *Journal of Psychiatry & Neuroscience*, *38*, 49-56.

Liu, X., Xu, W., Wang, Y., Williams, J. M. G., Geng, Y., Zhang, Q., & Liu, X. (2015). Can inner peace be improved by mindfulness training: a randomized controlled trial. *Stress and Health*, *31*, 245-254.

MacLeod, A. K., & Byrne, A. (1996). Anxiety, depression, and the anticipation of future positive and negative experiences. Journal of Abnormal Psychology, 105(2), 286–289.

MacLeod, A.K., Byrne, A., & Valentine, J.D. (1996). Affect, emotional disorder, and future-directed thinking. Cognition and Emotion, 10, 69-86.

MacLeod, A.K., Pankhania, B., Lee, B. & Mitchell, D. (1997). Parasuicide, depression and the anticipation of positive and negative future experiences. *Psychological Medicine*, 27, 973-977.

MacLeod, A.K., Rose, G.S. & Williams, J.M.G. (1993). Components of hopelessness about the future in parasuicide. *Cognitive Therapy and Research*, 17, 441-455.

MacLeod, A.K. & Salaminiou, E. (2001). Reduced future-thinking in depression: Cognitive and affective factors. *Cognition and Emotion*, *15*, 99-107.

MacLeod, A.K., Tata, P., Tyrer, P., Schmidt, U., Davidson, K., & Thompson, S. (2005). Hopelessness and positive and negative future thinking in parasuicide. *British Journal of Clinical Psychology*, *44*, 495-504.

MacLeod, A.K., Tata, P., Kentish, J., Carroll, F. & Hunter, E. (1997). Anxiety, depression and explanation-based pessimism for future positive and negative events. *Clinical Psychology and Psychotherapy*, *4*, 15-24.

Mallorquí-Bagué, N., Bulbena, A., Pailhez, G., Garfinkel, S.N., & Critchley, H.D. (2016). Mind-body interactions in anxiety and somatic symptoms. *Harvard Review of Psychiatry*, *24*(*1*), 53-60.

Marchetti, I., Koster, E.H.W, Sonuga-Barke, E.J. & de Raedt, R. (2012). The default mode network and recurrent depression: A neurobiological model of cognitive risk factors. *Neuropsychology Reviews*, *22*, 229-251.

McGrath, J. E., & Tschan, F. (2004). *Temporal matters in social psychology: Examining the role of time in the lives of groups and individuals*. Washington, DC: American Psychological Association.

McIntyre, R.S., Cha, D.S., Soczynska, J.K., Woldeyohannes, H.O., Gallaugher, L.A., Kudlow, P., Alsuwaidan, M. & Baskaran, A. (2013). Cognitive deficits and functional outcomes in major depressive disorder: Determinants, substrates, and treatment interventions. *Depression and Anxiety*, *30*, 515-527.

McKay, M. T., Worrell, F. C., Zivkovic, U., Temple, E., Mello, Z. R., Musil, B., ... & Perry, J. L. (2019). A balanced time perspective: Is it an exercise in empiricism, and does it relate meaningfully to health and well-being outcomes?. *International Journal of Psychology*, *54*, 775-785.

McKinnon, M.C., Yucel, K., Nazarov, A. & MacQueen, G.M. (2009). A meta-analysis examining clinical predictors of hippocampal volume in patients with major depressive disorder. *Journal of Psychiatry & Neuroscience*, *34*, 41-54.

Medvedev, O.N., Norden, P.A., Krägeloh, C.U., & Siegert, R.J. (2018). Investigating Unique Contributions of Dispositional Mindfulness Facets to Depression, Anxiety, and Stress in General and Student Populations. *Mindfulness*, *9*, 1757–1767.

Mello, Z. R., & Worrell, F. C. (2007*). The adolescent time inventory - English*. Berkeley, United States: Unpublished scale, The University of California.

Miloyan, B., Pachana, N.A. & Suddendorf, T. (2014). The future is here: A review of foresight systems in anxiety and depression. *Cognition and Emotion*, *28*, 795-810.

Moola S, Munn Z, Tufanaru C, Aromataris E, Sears K, Sfetcu R, Currie M, Qureshi R, Mattis P, Lisy K, Mu P-F. Chapter 7: Systematic reviews of etiology and

risk . In: Aromataris E, Munn Z (Editors). *JBI Manual for Evidence Synthesis.* JBI, 2020.

Morina, N., Deeprose, C., Pusowski, C., Schmid, M. & Holmes, E. (2011). Prospective mental imagery in patients with major depressive disorder or anxiety disorders. *Journal of Anxiety Disorders*, *25*, 1032-1037.

Naish, P.L.N. (2007). "Time distortion and the nature of hypnosis and consciousness," in *Hypnosis and conscious states: The Cognitive-Neuroscience Perspective,* ed. G. Jamieson (Oxford: Oxford University Press), 271–292.

Neff, K. (2003). Self-compassion an alternative conceptualization of a healthy attitude toward oneself. *Self Identity*, *2*, 85–101.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *J. Clin. Psychol.*, *69*, 28–44.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality*, *77*, 23–50.

Ogden, J. (2012). *Health Psychology: A Textbook*. 5th ed. Berkshire: McGraw Hill.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J.M., & Moher, D. (2021). Updating guidance for reporting systematic reviews: Development of the PRISMA 2020 statement. *Journal of Clinical Epidemiology*, *134*, 103-112.

Pavot, W., Diener, E., & Suh, E. (1998). The Temporal Satisfaction with Life Scale. *Journal of Personality Assessment*, *70*, 340.

Pepping, C. A., & Duvenage, M. (2016). The origins of individual differences in dispositional mindfulness. *Personality and Individual Differences*, *93*, 130-136.

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... & Duffy, S. (2006). Guidance on the conduct of narrative synthesis in systematic reviews. *A Product from the ESRC methods programme, Version 1*, b92.

Posner, M. I., & Petersen, S. E. (1990). The attention systems of the human brain. *Annual Review of Neuroscience*, *13*, 25–42.

Prebble, S. C., Addis, D. R., & Tippett, L. J. (2013). Autobiographical memory and sense of self. *Psychological Bulletin, 139*(4), 815–840.

Preuss, U.W., Rujescu, D., Giegling, I., Watzke, S., Koller, G., Zetzsche,T., et al. (2008). Psychometric evaluation of the German version of the Barratt Impulsiveness Scale. *Nervenarzt* 79, 305–319.

Rau, H. K., & Williams, P. G. (2016). Dispositional mindfulness: A critical review of construct validation research. *Personality and Individual Differences*, *93*, 32-43.

Richards, D. (2011). Prevalence and clinical course of depression: A review. Clinical Psychology Review, *31*, 1117-1125.

Richardson, G.E. (2002). The metatheory of resilience and resiliency. *J Clin Psychol.*, *58*, 307–321

Richins, M. L., & Dawson, S. (1992). A consumer values perspective for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*, 303 – 316.

Rief, W., Glombiewski, J.A., Gollwitzer, M., Schubö, A., Schwarting, R. & Thorwart, A. (2015).   Expectancies as core features of mental disorders. *Current Opinion in Psychiatry*, *28*, 378-385.

Rive, M.M., van Rooijen, G., Veltman, D.J., Phillips, M.L., Schene, A.H. & Ruhe, H.G. (2013). Neural correlates of dysfunctional emotion regulation in major depressive disorder: A systematic review of neuroimaging studies. *Neuroscience and   Biobehavioural Reviews*, 37, 2529-2553.

Roepke, A. M., & Seligman, M. E. (2016). Depression and prospection. *British Journal of Clinical Psychology*, *55*(1), 23-48.

Roca, M., Vives, M., Lopez-Navarro, E., Garcia-Campayo, J. & Gili, M. (2015). Cognitive impairments and depression: a critical review. *Actas Esp Psiquiatr*, *43*, 187-93.

Rock, P.L., Roiser, J.P., Riedel, W.J. & Blackwell, A.D. (2014). Cognitive impairment in depression: a systematic review and meta-analysis. *Psychological Medicine*, *44*, 2029-2040.

Roseanu, G., Marian, M., Tomulescu, I. M., & Pusta, C. T. (2008). Personal time and psychopathology. *Annals of General Psychiatry, 7*(1), 1.

Ross, M., & Wilson, A. E. (2002). It feels like yesterday: self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology*, *82*, 792–803.

Rudkin, E., Medvedev, O.N., & Siegert, R.J. (2018). The five-facet mindfulness questionnaire: Why the observing subscale does not predict psychological symptoms. *Mindfulness*, *9*, 230-242.

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: Basic needs, mindfulness, and the authentic self. *Psychological Inquiry*, *14*, 71-76.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78.

Sargalska, J., Miranda, R. & Marroquín, B. (2011). Being certain about an absence of the positive: Specificity in relation to hopelessness and suicidal ideation. *International Journal of Cognitive Therapy*, *4*, 104-116.

Sauer, S., Lemke, J., Wittmann, M., Kohls, N., Mochty, U., and Walach, H. (2012). How long is now for mindfulness meditators? *Pers. Individ. Differ.*, *52*, 750–754.

Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: the prospective brain. *Nature Reviews Neuroscience*, *8*, 657–661.

Schacter, D.L., Addis, D.R., Hassabis, D., Martin, V.C., Spreng, R.N. & Szpunar, K.K. (2012). The future of memory: Remembering, imagining, and the brain. *Neuron*, *76*, 677-694.

Seema, R., & Sircova, A. (2013). Mindfulness a time perspective? Estonian study. *Baltic Journal of Psychology*, *14*, 4–21.

Seginer, R., and Lens, W. (2015). The motivational properties of future time perspective future orientation: Different approaches, different cultures. In *Time Perspective Theory; Review, Research and Application*, Stolarski, M., Fieulaine, N., van Beek, W., Eds. Springer-Verlag: Cham, Switzerland, 287–304.

Shapiro, S.L., Carlson, L.E., Astin, J.A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, *62*, 373–386.

Sharot, T. & Garrett, N. (2016). Forming beliefs: Why valence matters. *Trends in Cognitive Sciences*, *20*, 25-33.

Short, M. M., Mazmanian, D., Oinonen, K., & Mushquash, C. J. (2016). Executive function and self-regulation mediate dispositional mindfulness and well-being. *Personality and Individual Differences*, *93*, 97-103.

Shipp, A. J., Edwards, J. R., & Lambert, L. S. (2009). Conceptualization and measurement of temporal focus: the subjective experience of the past, present, and future. *Organizational Behavior and Human Decision Processes*, *110*, 1–22.

Singh, M.K. & Gotlib, I.H. (2014). The neuroscience of depression: Implications for assessment and intervention. *Behaviour Research and Therapy*, *62*, 60-73.

Snyder, H.R. (2013). Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychology Bulletin*, *139*, 81-132.

Sobol-Kwapinska, M. (2009). Forms of present time orientation and satisfaction with life in the context of attitudes toward past and future. Social Behavior and Personality, 37(4), 433–440.

Sobol-Kwapinska, M. (2013). Hedonism, fatalism and 'Carpe Diem': Profiles of attitudes towards the present time. Time & Society, 22(3), 371–390.

Solano Lopez, A. L., & Moore, S. (2019). Dimensions of Body-Awareness and Depressed Mood and Anxiety. *Western Journal of Nursing Research*, *41*(6), 834-853.

Steptoe, A.,& Wardle, J. (2012). Enjoying life and living longer. *Archives of Internal Medicine*, *172*, 273–275.

Stevenson, J. C., Millings, A., & Emerson, L. M. (2019). Psychological well-being and coping: The predictive value of adult attachment, dispositional mindfulness, and emotion regulation. *Mindfulness*, *10*(2), 256-271.

Stöber, J. (2000). Prospective cognitions in anxiety and depression: Replication and methodological extension. *Cognition and Emotion*, *14*, 725-729.

Stolarski, M., Vowinckel, J., Jankowski, K. S., & Zajenkowski, M. (2016). Mind the balance, be contented: Balanced time perspective mediates the relationship between mindfulness and life satisfaction. *Personality and Individual Differences*, *93*, 27-31.

Szollosi, A., Pajkossy, P. & Racsmany, M. (2015). Depressive symptoms are associated with the phenomenal characteristics of imagined positive and negative future events. *Applied Cognitive Psychology*, *29*, 762-767.

Szpunar, K. K., Spreng, R. N., & Schacter, D. L. (2014). A taxonomy of prospection: Introducing an organizational framework for future-oriented cognition. *Proceedings of the National Academy of Sciences*, *111*(52), 18414-18421.

Tabachnick, B.G., & Fidell, L.S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Allyn and Bacon.

Teper, R., & Inzlicht, M. (2014). Mindful acceptance dampens neuroaffective reactions to external and rewarding performance feedback. *Emotion*, *14*, 105-114.

Trivedi, M.H. & Greer, T.L. (2014). Cognitive dysfunction in unipolar depression: Implications for treatment. *Journal of Affective Disorders*, *152*, 19-27.

Utsey, S.O., Chae, M.H., Brown, C.F., & Kelly, D. (2012). Effect of ethnic group membership on ethnic identity, race-related stress, and quality of life. *Cultural Diversity and Ethnic Minority Psychology*, *8*, 366-377.

van Dam, N.T., van Vugt, M.K., Vago, D.R., Schmalzl, L., Saron, C.D., Olendzki, A., Meissner, T., Lazar, S.W., Kerr, C.E., Gorchov, J., & Fox, K.C. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, *13*(1), 36-61.

Vowinckel, J.C., Westerhof, G.J., Bohlmeijer, E.T., & Webster, J.D. (2017). Flourishing in the now: Initial validation of a present-eudaimonic time perspective scale. *Time & Society*, *26*, 203-226.

Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—The Freiburg Mindfulness Inventory (FMI). *Personal. Individ. Differ.*, *40*, 1543–1555.

Wallace, B.A., & Shapiro, S.L. (2006). Mental balance and well-being: building bridges between Buddhism and western psychology. *Am Psycho.*, 7, 690–701.

Wang, G., Liu, L., Tan, X., & Zheng, W. (2017). The moderating effect of dispositionalmindfulness on the relationship between materialism and mental health. *Personality and Individual Differences, 107*, 131–136.

Watson, D. C. (2017). Materialism, temporal perspective and well-being. *Imagination, Cognition and Personality, 37*, 45–68.

Waugh, C. E., & Koster, E. H. (2015). A resilience framework for promoting stable remission from depression. *Clinical psychology Review*, *41*, 49-60.

Weissman, A.N. & Beck, A.T. (1978). *Development and validation of the Dysfunctional Attitude Scale: a preliminary investigation. Paper presented at the meeting of the American Education Research Association*, Toronto: Canada.

Williams, J. M. G. (2010). Mindfulness and psychological process. *Emotion*, *10*, 1–7.

Williams, J.M.G., & Kabat-Zinn, J. (2011). Mindfulness: diverse perspectives on its meaning, origins, and multiple applications at the intersection of science and dharma. *Contemporary Buddhism: An Interdisciplinary Journal*, *12*, 1-18.

Wittmann, M., and Paulus, M.P. (2008). Decision making, impulsivity and time perception. *Trends Cogn Sci. 12*, 7-12.

Wittmann, M., and Paulus, M.P. (2009). Temporal horizons in decision-making. *J. Neurosci. Psychol. Econ. 2*, 1-11.

Wittmann, M., and Schmidt, S. (2014). "Mindfulness meditation and the experience of time," in *Meditation–Neuroscientific Approaches and Philosophical Implications*, eds S.Schmidt and H.Walach (Cham:Springer-Verlag), 199–210.

World Health Organization Group. (1998). Group development of the World Health Organization WHOQOL–Brief quality of life assessment. *Psychological Medicine*, 28, 551–558.

Worrell, F. C., Temple, E. C., McKay, M. T., Živkovič, U., Perry, J. L., Mello, Z. R., et al. (2016). A theoretical approach to resolving the psychometric problems associated with the Zimbardo Time Perspective Inventory. *European Journal of Psychological Assessment, 34*, 41–51.

Xu, W., Rodriguez, M.A., Zhang, Q., & Liu, X. (2015). The mediating effect of self-acceptance in the relationship between mindfulness and peace of mind. *Mindfulness*, *6*, 797–802.

Yu, X., & Zhang, J. (2007). A comparison between the Chinese version of ego-resiliency scale and Connor-Davidson Resilience Scale. *Psychol Sci*, *30*, 1169–1171.

Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being*, 7, 340-364.

Zhang, J.W., & Howell, R.T. (2011). Do time perspectives predict unique variances in life satisfaction beyond personality traits? *Personality and Individual Differences*, *50*, 12611266.

Zhang, J.W., Howell, R.T., & Stolarski, M. (2013). Comparing three methods to measure a balanced time perspective: The relationship between a balanced time perspective and subjective well-being. *Journal of Happiness Studies*, *14*, 169–184.

Zhang, Y., Lv, S., Li, C., Xiong, Y., Zhou, C., Li, X., & Ye, M. (2020). Smartphone use disorder and future time perspective of college students: The mediating

role of depression and moderating role of mindfulness. *Child and adolescent psychiatry and mental health, 14*, 1-11.

Zimbardo, P.G., & Boyd, J.N. (1999). Putting time in perspective: A valid, reliable individual-difference metric. *J. Personal. Soc. Psychol., 77*, 1271–1288.

Zimbardo, P.G., & Boyd, J.N. (2008). *The Time Paradox*. New York, NY: Free Press.

Appendices

Appendix A: *Summary of Reviewed Article Characteristics and Key Findings Derived*

Study	Country	Sample Size	Gender (% female)	Age Range and Mean (in years)	Method of Recruitment	Type of Outcome Measurement	Mediating/ Moderating Variable	Key Findings
Drake et al., 2008	UK	260	34.6	16-83; N/A	University and word-of-mouth	Self-report (MAAS)	N/A	BTP correlated positively with MAAS; also, higher mindfulness was associated with more favourable perception of past
Ge et al., 2019	China	754	57.3	17-27; 20.6	University	Self-report (FFMQ)	Self-compassion (SCS)	Significant direct effect of trait mindfulness on BTP; also, self-compassion partially mediated the relationship between trait mindfulness and BTP.
Ge et al., 2020	China	366	41.5	18-55; 33.7	University	Self-report (online) (MAAS)	Resilience (CD-RISC); Inner peace (PoM)	Resilience and inner peace fully mediated the negative relationship between PN perspective and trait mindfulness in meditators, and partially mediated in non-meditators.
Muro et al., 2017	Spain	377	62.3	18-35; 19.5	University	Self-report (MAAS)	N/A	BTP showed significant positive correlations with trait mindfulness and life satisfaction; PN and FP perspectives showed negative correlation, while both PF and PH perspectives showed negative correlation with mindfulness; mindfulness and PP perspective predicted higher life satisfaction.
Samani & Busseri, 2019	Canada	305	74.4	18-40; 30.6	Amazon MTurk online platform	Self-report (online) (FFMQ)	N/A	Facets of dispositional mindfulness showed significant positive correlation with present and future temporal focus; higher mindfulness was associated with more positive evaluations in all three time domains; mindfulness facets grouped under optimism and decentering were speculated to be related to healthier TP orientation.
Schötz et al., 2016	Germany	40	50	21-50; 39.9	University and word-of-mouth	Self-report and Experimental (FMI)	N/A	The PF perspective correlated significantly with mindful presence and acceptance in meditators; Meditators reported lower time pressure, more accurate duration discrimination, and better visual reproduction in the range of milliseconds-to-seconds.

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Seema & Sircova, 2013	Estonia	892 total/ i) 610 – correlational analysis ii) 697 - EFA	76.4 i) N/A ii) N/A	18-54; 23.3 i) N/A ii) N/A	University	Self-report (online) (MAAS)	N/A	The PN, PH, and PF perspectives showed negative correlations with trait mindfulness; BTP correlated positively with trait mindfulness and SWB.
Sobol-Kwapinska et al., 2016	Poland	238	57.9	19-65; 32.5	N/A (questionnaires received from psychologists by hand)	Self-report (MAAS)	Carpe Diem (CDS)	CD perspective did not correlate significantly with trait mindfulness; however, showed a significant moderation effect on the relationship between trait mindfulness and basic psychological needs fulfilment – specifically, the need for competence.
Stolarski et al., 2016	Poland	i) 219 ii) 191 iii) 124	i) 73 ii) 72.2 iii) 54	i) 18-40; 21.2 ii) 18-56; 24.9 iii) 19-43; 24.3	i) University – mostly psychology students ii) via Facebook iii) Psychology students and word-of-mouth	i) Self-report ii) Self-report (online) iii) Self-report (online) (FFMQ; FMI; MAAS)	BTP (ZTPI)	Overall trait mindfulness correlated positively with BTP; BTP mediated the relationship between trait mindfulness and life satisfaction.
Vowinckel et al., 2017	Netherlands	151	55.6	18-58; 25.7	University, ad hoc sampling	Self-report (FFMQ)	N/A	Mindfulness and flow concepts were reportedly part of a present-eudaimonia time perspective that enhances the scope of BTP; FFMQ DM facets were positively correlated with present-eudaimonic scale; the PN correlated negatively with most facets (except observing); the PH correlated positively with most facets (except nonreactivity).
Watson, 2019	Canada	404	74.3	N/A; 20.4	University psychology undergraduate students	Self-report (online) (MAAS)	Trait Mindfulness (MAAS)	Trait mindfulness partially mediated the negative relationship between materialism and BTP – findings were significant for materialistic values as well as non-generosity, envy, and possessiveness.
Wittmann et al., 2014	Germany	63	50	19-34; 24.6	University students and word-of-mouth	Self-report and Experimental (FMI; CHIME)	N/A	The PP perspective correlated positively with mindful acceptance; PN correlated negatively with mindful acceptance, decentering, and openness; FP correlated positively with acting

								with awareness and mindful insight; impulsivity correlated negatively with acting with awareness, presence, insight, and decentering.
Wittmann, Otten, et al., 2015	Germany	84	N/A	21-50; N/A	University, advertisements on meditation centers, word-of-mouth	Self-report and Experimental (FMI)	N/A	In comparison to meditators, non-meditators were significantly more likely to score higher on the PN perspective; participants with meditation practice scored higher on motor impulsiveness in comparison to matched controls; meditators reported significantly slower felt passage of time.
Wittmann, Rudolph, et al., 2015	Germany	423	71.4	17-81; 34.2	Social media and convenience sampling	Self-report and Self-report (online) (FMI)	N/A	The PH perspective correlated positively with faster passage of subjective time retrospectively within the last week; FP correlated positively with subjective passage of time typically experienced; the PH and PP perspectives correlated positively, and the PN perspective correlated negatively, with mindful presence.

Mindfulness measures: *CHIME*: Comprehensive Inventory of Mindfulness Experience (Bergomi, Tschacher, & Kupper, 2013); *FFMQ*: Five-Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006); *FMI*: Freiburg Mindfulness Inventory (Kohls, Sauer, & Walach, 2009); *MAAS*: Mindful Attention and Awareness Scale (Brown & Ryan, 2003).

Mediator/Moderator measures: *CD-RISC*: Connor-Davidson Resilience Scale – Chinese Version (Yu & Zhang, 2007); *CDS*: Carpe Diem Scale (Sobol-Kwapinska, 2013); *PoM*: Peace of Mind Scale (Lee, Lin, Huang, & Fredrickson, 2013); *SCS*: Self-Compassion Scale – Chinese Version (Jian, Liang-Shi, & Li-hua, 2011); *ZTPI*: Zimbardo Time Perspective Scale (Zimbardo & Boyd, 1999)

Appendix B: *Quality Assessment Scores Based on JBI Critical Appraisal Tool for Cross-Sectional Studies*

Study	1. Inclusion criteria clearly defined	2. Participants and setting described clearly	3. Exposure measurement was valid and reliable	4. Objective and standard criteria used for measurement	5. Confounding factors identified	6. Strategies to deal with confounding factors stated	7. Outcomes measured in a valid and reliable way	8. Appropriate statistical analysis used	Total (/8)
Drake et al., 2008	1	1	1	1	0	0	1	-	**5**
Ge et al., 2019	-	1	1	1	1	1	1	1	**7**
Ge et al., 2020	1	1	1	1	1	1	1	1	**8**
Muro et al., 2017	1	-	1	1	0	0	1	1	**5**
Samani & Busseri, 2019	1	1	1	1	-	-	1	1	**6**
Schötz et al., 2016	1	1	1	1	1	-	-	1	**6**
Seema & Sircova, 2013	0	-	1	1	-	0	1	1	**4**
Sobol-Kwapinska et al., 2016	0	-	1	1	-	-	1	1	**4**
Stolarski et al., 2016	1	1	-	1	-	0	-	1	**4**
Vowinckel et al., 2017	1	1	1	1	1	1	1	1	**8**
Watson, 2019	-	1	1	1	-	0	1	-	**4**
Wittmann et al., 2014	1	1	1	1	1	1	1	1	**8**
Wittmann, Otten, et al., 2015	1	1	1	1	1	-	1	1	**7**
Wittmann, Rudolph, et al., 2015	-	1	1	1	-	1	1	1	**6**

Range: 4-8
Frequencies: 4 (n=4), 5 (n=2), 6 (n=3), 7 (n=2), and 8 (n=3)
Average: 5.86 (73.25%)

Appendix C: Assumption Check for Study II

No multicollinearity. The hierarchical regression model takes DASS total scores as the dependent variable (DV), and the five FFMQ factors, the overall quality of life scores measured by the WHOQOL-BREF (overall QoL), SPT-Pos and SPT-Neg scores as independent variables (IVs). Table 2.2 above shows Pearson correlation coefficients between IVs and the DV. Accordingly, we should not observe a significantly high correlation coefficient (above 0.7) between any of the IVs. The highest magnitude of the correlation coefficient we observed between IVs was r=.533 (between *positive prospections* and *overall quality of life*). The assumption holds to be valid alongside with low-to- moderate correlations, individually reported in Table 2.2.

Residual normality. After controlling for age and gender, the frequency histogram of regression standardized residuals is observed as is on Figure C1. Accordingly, the minimum standardized residual was found to be -3.02, and the maximum was observed to be 2.64 (*M*=0.00, *sd*=.975, n=204). The general advice is to observe the range between -3 and +3 (Pituch & Stevens, 2016; Field, 2013), and we can safely assume that standardized residual range almost perfectly validates this assumption - validating normality assumption. Another indicator for residual normality is the P-P plot of regression standardized residuals (Figure C1, section b). What we should expect is to have the observed cumulative probability of regression residuals to follow very closely with the expected cumulative probability calculated by the model – and this is what we can confirm to be the case.

Figure C1

(a) *The Frequency Histogram of Regression Standardized Residuals*

(b) *The P-P Plot of Regression Standardized Residuals*
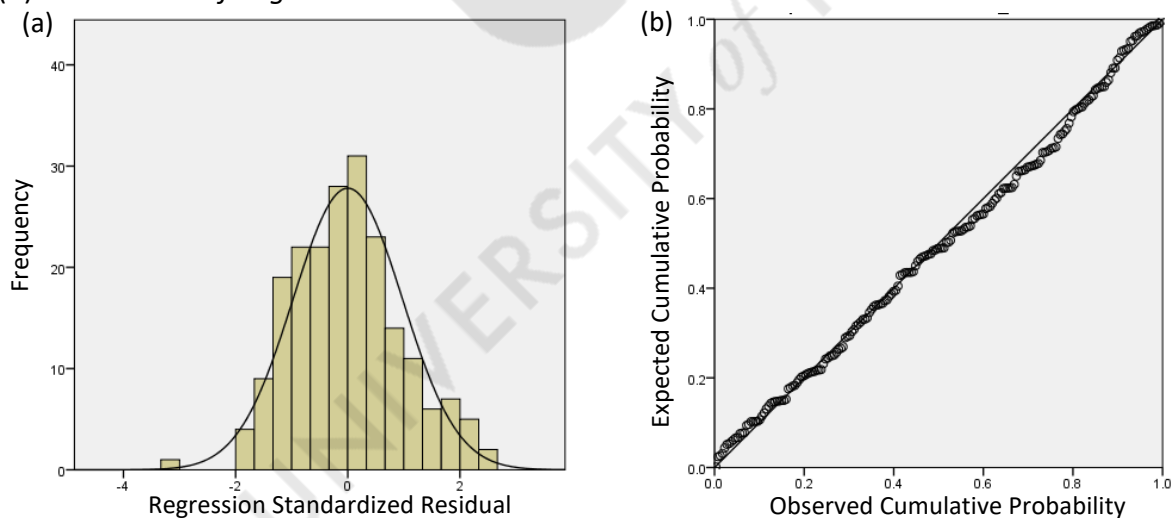
Note. a) Please note that the frequency curve on the above histogram approaches normality. The range of observed standardized residuals is between -3.02 and 2.64, M=0.00, sd=.975. b) The cumulative frequencies also very closely follow the normal plot line – y-axis as expected cumulative probability versus x-axis as observed cumulative probability.
* The dependent variable is DASS total scores for both graphs.

Uncorrelatedness. Stated as that for any pair of observations, the error of residuals needs to be independent, i.e. not showing significant correlation with one another. This can be graphically represented by the regression standardized predicted versus observed value scatterplot (Figure C2). As can be seen from the scatterplot, predicted versus observed residuals are forming rather a circular distribution, meaning that a significant correlation is largely absent.

Figure C2

The Scatterplot of Standardized Residuals of Regression
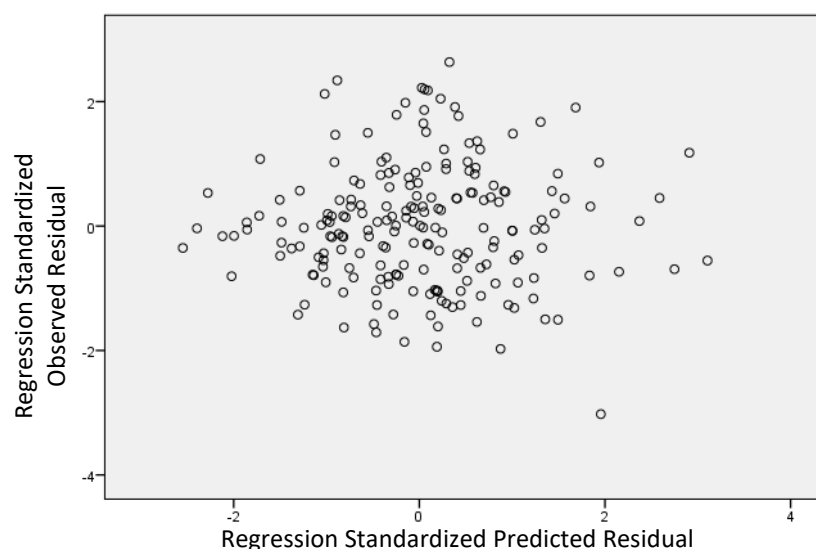
Note. The dependent variable is DASS total scores; x-axis as predicted values versus y-axis as observed values. A roughly circular distribution indicates close-to-no correlation, validating the uncorrelatedness assumption.

Linearity. Looking at the relationship between the DV and IVs, residuals of the regression model need to assume a linear relationship where distribution needs to roughly center around the value '0' as the midpoint of observed residuals. When observed standard residuals (M=0.00, sd=.975, N=294) are evaluated on how dispersed they are on the scatterplot (Figure C2), we can notice that roughly equivalent number of dots are present both above and below '0', giving us a good indication of linearity, alongside with minimum and maximum values near-perfectly falling between the -3 and +3 range (Figure C1).

Homoscedasticity. The final assumption we checked was the assumption of homoscedasticity of residuals, which needs the variance of error for each value of predictor to be constant. To do this, we relied on a statistical measure where the squared residuals are taken as the dependent variable and all the predictors (i.e. IVs) are tested in a linear regression model onto the DV (Hayes & Cai, 2007). As can be seen on Table C1 below, all the observed p-values are non-significant, indicating that there is no reason to reject the null hypothesis that variance of residuals is constant for each predictor variable (i.e. showing homoscedasticity).

Table C1

Linear Regression Statistics for Testing for Heteroscedasticity

IVs	t-statistic	p-value
overall_QoL	-.967	.335
ffmq.observing	.215	.830
ffmq.describing	-1.690	.093
ffmq.actaware	-1.121	.264
ffmq.nonjudging	-.261	.795
ffmq.nonreactivity	1.028	.305
spt.pos	.770	.442
spt.neg	-.599	.550
age	.575	.566
gender	-.318	.751

Note. Each of the IVs are regressed on squared residuals (resSq). Please note that age and gender (dummy coded as 1:female, 2:male) variables were also added. t-statistic and p-values are given for each IV. IVs are: *overall_QoL* (the *overall quality of life* score); FFMQ facets as *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*), *ffmq.nonjudging* (*nonjudging of experience*), and *ffmq.nonreactivity* (*nonreactivity to inner experience*); SPT factors as *spt.pos* (*positive prospections*) and *spt.neg* (*negative prospections*). N=204.

Appendix D: Assumption Check for Study III

No multicollinearity. The hierarchical regression model takes DASS total scores as the dependent variable (DV), and age, the five FFMQ-SF factors, the overall quality of life scores measured by the WHOQOL-BREF (overall QoL), positive imagery and negative imagery scores as independent variables (IVs). Table 3.2 of thesis Study III shows Pearson correlation coefficients between IVs and the DV. Accordingly, we should not observe a significantly high correlation coefficient (above 0.7) between any of the IVs (Field, 2013). The highest magnitude of the correlation coefficient we observed between IVs was r=.489 (between *acting with awareness* and *nonjudging of experience*). The assumption holds to be valid alongside with low-to- moderate correlations, individually reported in Table 3.2.

Residual normality. After controlling for age and gender, the frequency histogram of regression standardized residuals is observed as is on Figure A1. Accordingly, the minimum standardized residual was found to be -2.12, and the maximum was observed to be 2.94 (*M*=0.00, *sd*=.958, n=110; Figure D1, section a). The general advice is to observe the range between -3 and +3 (Pituch & Stevens, 2016; Field, 2013), and we can safely assume that standardized residual range validates the assumption of residual normality. Another indicator for residual normality is the P-P plot of regression standardized residuals (Figure D1, section b). The observed cumulative probability of regression residuals follow very closely with the expected cumulative probability calculated by the model.

Figure D1
(a) *The Frequency Histogram of Regression Standardized Residuals*
(b) *The P-P Plot of Regression Standardized Residuals*
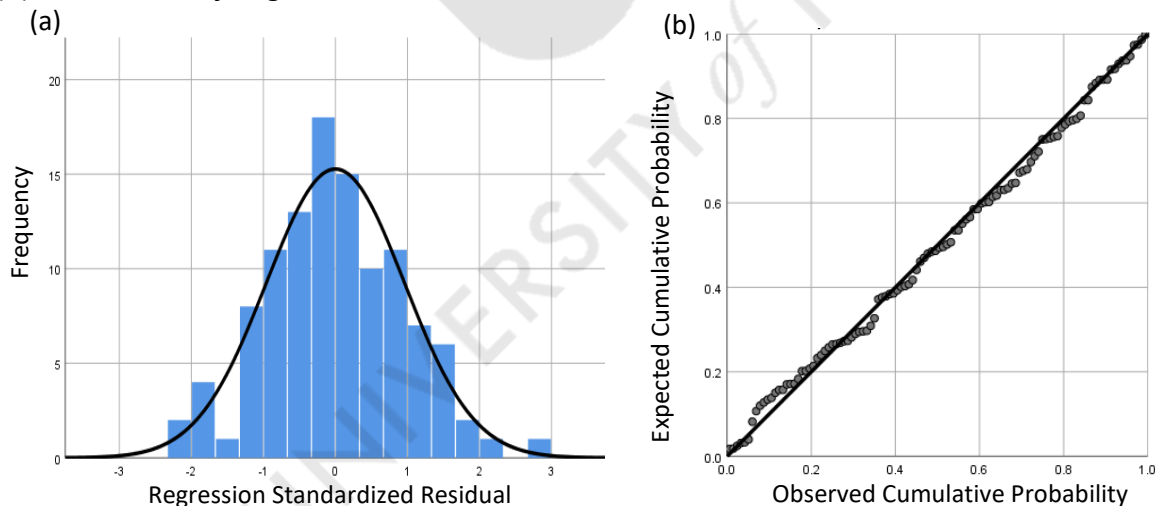
Note. a) Please note that the frequency curve on the above histogram approaches normality. The range of observed standardized residuals is between -2.12 and 2.94, M=0.00, *sd*=.958. b) The cumulative frequencies also very closely follow the normal plot line – y-axis as expected cumulative probability versus x-axis as observed cumulative probability.
* The dependent variable is DASS total scores for both graphs.

Uncorrelatedness. Stated as that for any pair of observations, the error of residuals needs to be independent, i.e. not showing significant correlation with one another. This can be graphically represented by the regression standardized predicted versus observed value scatterplot (Figure D2). As can be seen from the scatterplot, predicted versus observed residuals are forming rather a circular distribution, meaning that a significant correlation is largely absent.

Figure D2

The Scatterplot of Standardized Residuals of Regression
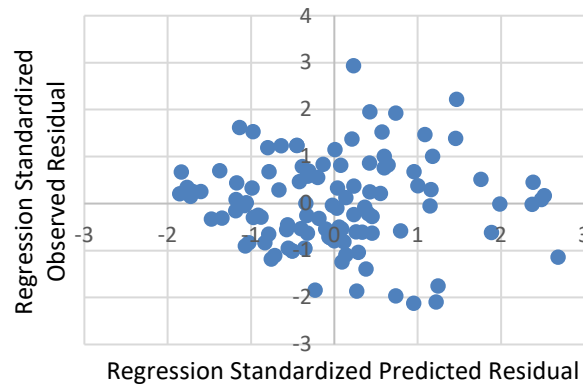
Note. The dependent variable is DASS total scores; x-axis as predicted values versus y-axis as observed values.
A roughly circular distribution indicates close-to-no correlation, validating the uncorrelatedness assumption.

Linearity. Looking at the relationship between the DV and IVs, residuals of the regression model need to assume a linear relationship where distribution needs to roughly center around the value '0' as the midpoint of observed residuals. When observed standard residuals (M=0.00, sd=.958, N=110) are evaluated on how dispersed they are on the scatterplot (Figure D2), it is noticeable that a roughly equivalent number of dots are present both above and below '0', giving us a good indication of linearity, alongside with minimum and maximum values near-perfectly falling between the -3 and +3 range (Figure D1, section a).

Homoscedasticity. The final assumption checked was the assumption of homoscedasticity of residuals, which needs the variance of error for each value of predictor to be constant. To do this, we relied on a statistical measure where the squared residuals are taken as the dependent variable and all the predictors (i.e. IVs) with the addition of gender variable are tested in a linear regression model onto the DV (Hayes & Cai, 2007). Table D1 below shows that except for one of the IVs, all the remaining observed p-values are non-significant, indicating that there is no reason to reject the null hypothesis that variance of residuals is constant for those predictors (i.e. showing homoscedasticity). The problematic variable is the observing facet scores of the FFMQ-SF, which was also found not to show a significant predictive value over DASS total scores in the hierarchical regression model analysed. Not included in the moderated regression model also, it would be safe to assume that for the moderated regression analysis, the assumption of homoscedasticity should hold.

Table D1

Linear Regression Statistics for Testing for Heteroscedasticity

IVs	t-statistic	p-value
overall_QoL	-.122	.903
ffmq.observing	-3.348	.001**
ffmq.describing	-.724	.471
ffmq.actaware	.562	.575
ffmq.nonjudging	-1.927	.057
ffmq.nonreactivity	.102	.919
pit.pos	.632	.529
pit.neg	1.578	.118
age	-.678	.499
gender	1.131	.261

Note. Each of the IVs are regressed on squared residuals (resSq). Please note that the gender (dummy coded as 1:female, 2:male) variables was also added. t-statistic and p-values are given for each IV. IVs are: *overall_QoL* (the *overall quality of life* score); FFMQ-SF facets as *ffmq.observing* (*observing*), *ffmq.describing* (*describing with words*), *ffmq.actaware* (*acting with awareness*), *ffmq.nonjudging* (*nonjudging of experience*), and *ffmq.nonreactivity* (*nonreactivity to inner experience*); PIT factors as *pit.pos* (*positive imagery*) and *pit.neg* (*negative imagery*). N=110.
**p<.01