



Examining the Link Between Mindfulness and Temporal Perspective

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Abstract

Objectives Despite mindfulness being defined as a present-focused awareness of one's moment-to-moment experiences, there has been little research investigating its relation to temporal perspective in terms of individual's thoughts and feelings concerning their past, present, and future lives.

Methods The current study employed an online sample of 305 American adults (M age = 30.61, SD = 3.42; 55% female) to examine a five-factor model of mindfulness in relation to multiple components of temporal perspective: evaluation, focus, distance, overlap, and value of one's recollected past, present, and anticipated future lives.

Results Mindfulness factors were associated with aspects of temporal perspective encompassing all three temporal periods—including greater focus on the present, more positive evaluations of the present and future, and greater valuing of the present. Furthermore, a canonical correlation analysis (Wilk's λ = 0.39, p < 0.001) identified two unique combinations of mindfulness, each linked with different aspects of temporal perspective (r s = 0.63 and 0.43; p s < 0.05). First, a mixture of greater awareness, nonjudgment, and describing was linked with greater focus on one's present life and more positive evaluations of one's past, present, and future lives. Second, a combination of greater nonreacting, observing, and describing was linked with greater focus on one's past, present, and future lives.

Conclusions Findings suggest that there is much to be gained by investigating mindfulness using a temporally expanded approach. Mindfulness is more than just a present-oriented construct but rather is linked in various ways with how individuals view their past, present, and future lives.

Keywords Mindfulness · Temporal perspective · Past · Current · Future

Mindfulness has been defined in various ways but is often described as a present-focused awareness and acceptance of one's moment-to-moment experiences (Kabat-Zinn 1994). The subjective present, however, does not exist in a temporal vacuum. Rather, research on temporal perspective has demonstrated the importance of investigating individual's cognitive involvement across the subjective past, present, and future (Lasane and O'Donnell 2005). Surprisingly, however, few studies have examined mindfulness in relation to individuals' thoughts and feelings concerning their past, present, and anticipated future lives.

Of the various ways in which mindfulness has been defined, one interpretation suggests that mindfulness is a particular form of consciousness comprising both awareness of and attention to the present moment (Brown and Ryan 2003). Others suggest additional components of mindfulness, including acceptance and nonjudgment of one's reactions to the present moment (Feldman et al. 2007), as well as the ability to describe one's momentary experiences and associated reactions (Baer et al. 2006). Mindfulness has garnered increasing attention from researchers and practitioners, in part because it has been found to be associated with a host of benefits (Tomlinson et al. 2017). Indeed, greater mindfulness has been linked with lower stress levels (Prakash et al. 2015), less anxiety (Lyvers et al. 2014), improved attention and memory (Chiesa et al. 2011), and higher levels of self-esteem (Rasmussen and Pidgeon 2011). Although most of these studies have employed cross-sectional correlational designs, some research using longitudinal designs has demonstrated that higher mindfulness predicts more positive mental health across time (e.g., Call et al. 2015; Williams et al. 2010).

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Further, in experimental contexts, greater induced mindfulness leads to positive outcomes such as decreased attachment anxiety (Hertz et al. 2015) and increased physical activity (Roberts and Danoff-Burg 2010). Note, however, that mindfulness programs may not necessarily lead to improvements in positive mood, attention, and sleep, and further experimental research is needed to more rigorously evaluate the impact of mindful interventions in comparison with active control groups (Goyal et al. 2014; Strauss et al. 2014).

Temporal perspective encompasses several different constructs related to how individuals think about and evaluate their past, current, and anticipated lives (Lasane and O'Donnell 2005; Shipp et al. 2009). Various lines of inquiry have demonstrated that how individuals think about and evaluate their present lives is connected in fundamental ways to how they perceive their past and anticipated future lives (Durayappah 2011; Peetz and Wilson 2008; Shmotkin 2005). For example, individuals' temporal evaluations of their past, present, and anticipated future lives tend to be positively correlated (McIntosh 2001; Pavot et al. 1998). Such associations suggest some commonality in how individuals evaluate their lives across temporal periods. Furthermore, effective self-regulation is thought to require the integration of information concerning the past, present, and anticipated future (Boniwell et al. 2010; Pronin et al. 2008; Wilson et al. 2012). Researchers have demonstrated the value of employing a temporally expanded approach when investigating temporally oriented constructs such as optimism and nostalgia (Busseri et al. 2013; Cheung et al. 2013). Similarly, there may be much to gain through examining mindfulness from a temporal perspective (Drake et al. 2008; Seema and Sircova 2013).

Temporal focus has been described as the extent to which people devote their attention to perceptions or thoughts of the past, present, and future (Bluedorn 2002). Individuals vary with respect to how much they focus on each temporal period (i.e., degree of focus on the past, present, and future). Greater (vs. less) focus on the past has been linked with higher negative affect, whereas greater (vs. less) focus on the current or future temporal periods is associated with higher positive affect (Shipp et al. 2009). Similarly, individuals with higher life satisfaction report lower focus on their past lives and greater focus on their present and anticipated future lives (Busseri et al. 2013).

Temporal evaluation (or temporal attitudes) refers to an individual's assessment of their past, present, and anticipate future lives (Mello and Worrell 2007). Research has found that more positive attitudes concerning one's past, present, and future are linked with higher self-esteem and lower stress (Andretta et al. 2014), higher quality of parent and peer attachments (Laghi et al. 2016), and less depression and loneliness (Pavot et al. 1998).

Temporal distance refers to how near or far the past and future are compared with the present (Bluedorn 2002). It can

be evaluated subjectively, as an individual's perception of how far or close the past and future *feel* from the present (Ross and Wilson 2002), as well as objectively, as the difference in calendar time (e.g., years, weeks, days) between the present and the past or future (Shipp et al. 2009). Greater subjective temporal distance between a future event and the present has been linked with greater promotion (vs. prevention) focus (Pennington and Roese 2003) and more confidence (Savitsky et al. 1998). Further, greater subjective temporal distance between a transgression and the present has been linked with greater willingness to forgive the transgression (Wohl and McGrath 2007).

Temporal overlap has been studied in terms of the degree to which individuals perceive the different temporal periods being related to one another and/or coinciding with each other (Cottle 1967; Mello and Worrell 2007). Greater temporal overlap has been associated with greater self-actualization and evaluating the present more positively (Gestinger 1975). Additionally, the more individuals believe their future is related to their present, the less likely they are to make false promises, lie, or cheat (Hershfield et al. 2012), or to procrastinate (Blouin-Hudon and Pychyl 2015).

Temporal value has been defined as the degree to which an individual values her past versus anticipated future events, experiences, and outcomes (Caruso et al. 2008). Individuals typically value future events (e.g., a month of working or helping a neighbor) significantly more than they value the same event imagined in the past (Caruso et al. 2008). Furthermore, individuals are willing to spend more money on a gift for a future favor than for a favor performed in the past (Guo et al. 2012).

Because mindfulness is typically defined as a present-focused construct, it is critical to understand its link with how individuals think about their past, present, anticipated future lives. Some research has investigated mindfulness in relation to time perception. Studies examining individuals' perceptions of time duration have found that experienced meditators report a slowing down of time, slower passage of time, and less time pressure, compared with controls (Droit-Volet and Heros 2017; Wittmann et al. 2015). In contrast, Weiner et al. (2016) found individuals higher in trait mindfulness experienced time as passing faster than individuals lower in mindfulness. Additional research has linked greater mindfulness with more precise perceptions of time (Droit-Volet et al. 2015; Kramer et al. 2013; Schötz et al. 2016).

Other studies have examined mindfulness in relation to individuals' attitudes toward their past, present, and future lives using the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo and Boyd 1999). The ZTPI comprises five factors that assess individuals' perceptions of their past, present, and future lives, including past-negative (an aversive view of the past), past-positive (a warm sentimental attitude toward the past), present-hedonistic (a hedonistic, risk-taking attitude

toward life), present-fatalistic (a helpless and hopeless attitude toward the future), and future (a general future orientation). Research examining the ZTPI in relation to mindfulness has suggested that more mindful individuals view their past more positively and less negatively, their present less hedonistic and less fatalistic, and their future more positively, than less mindful individuals (e.g., Drake et al. 2008; Seema and Sircova 2013; Wittmann et al. 2014; see also Stolarski et al. 2016). However, the factor structure of the ZTPI has been questioned (for a review, see Worrell et al. 2016), with some research revealing four (rather than five) factors—future orientation, hedonism, conscientiousness, and present orientation—only two of which appear to be specifically oriented in time (Crockett et al. 2009; see also Shipp et al. 2009; Worrell and Mello 2007). Moreover, some researchers have argued that the ZTPI does not evaluate time orientation exclusively (or primarily), but, rather an amalgamation of constructs such as regret, worry, risk-taking, impulsiveness, locus of control, and conscientiousness (Worrell et al. 2016). Thus, further research utilizing measures other than the ZTPI is needed to investigate mindfulness in relation to individuals' perception of their past, present, and future lives, in order to clarify and extend previous findings.

At present, it remains unclear how mindfulness is related to all three subjective temporal periods and to multiple components of temporal perspective (i.e., individuals' evaluations of their past, present, and anticipated future lives; Lasane and O'Donnell 2005). A recent study showed that exposure to a mindfulness induction led individuals to have less focus on the past and future compared with those without a mindfulness induction (Hafenbrack et al. 2014). However, there is some uncertainty as to how mindfulness relates to the degree to which individuals focus on their past, present, and anticipated future lives. Studies have also linked more positive evaluations of one's present life or one's life overall (i.e., higher life satisfaction) with greater mindfulness (e.g., Brown and Ryan 2003). However, mindfulness has not been examined in relation to individual's temporal perspective of their past, present, and anticipated future lives independent of valence. Furthermore, to date, no research has examined mindfulness in relation to temporal distance, temporal overlap, and temporal value. Yet the way mindfulness has been previously defined also suggests potential associations with these aspects of temporal perspective. In particular, the heightened awareness of moment-to-moment experiences that is typical of mindfulness (Brown and Ryan 2003; Kabat-Zinn 2005) could impact the perceived length of the present temporal period, as well as the perceived continuity between the past, present, and future. Thus, temporal distance from the present to the past and future, and temporal overlap between temporal periods may be related (positively or negatively) to mindfulness (Bruehlman-Senecal and Ayduk 2015). Heightened emphasis on the present temporal period may also boost the perceived importance of the subjective present and thus the valuation of the present temporal period.

Consequently, more mindful individuals may value the subjective present more (and the past and future less), as justification for their increased focus on their present experiences.

To evaluate such notions, the goal of the present study was to investigate mindfulness in relation to how individuals think about and evaluate their recollected past, current, and anticipated future lives. To examine this issue, we assessed mindfulness as a multidimensional construct, comprising five factors: acting with awareness, describing, observing, nonjudging, and nonreacting to one's thoughts and feelings (Baer et al. 2006). Further, we assessed multiple aspects of temporal perspective, including temporal evaluation, focus, distance, overlap, and value. These aspects are not captured by measures used in previous research (including the ZTPI; Worrell et al. 2016) and provide a detailed and nuanced examination of the link between mindfulness and temporal perspective.

Method

Participants

American participants between the ages of 18 and 40 years were recruited from Amazon Mechanical Turk (MTurk). Note that this study was part of a larger project examining mindfulness in relation to how individuals view their lives as unfolding over time. Whereas younger adults tend to anticipate that their lives get better and better over time, older adults expect that their lives will become worse and worse (Busseri 2012; Staudinger et al. 2003). In the present study, we recruited only younger adults. MTurk workers were eligible for the study provided that they were within the target age range and had previously achieved 90% approval ratings based on their previous MTurk activity. A target sample size of 300 participants was chosen in order to provide a high level of statistical power (0.80 or greater) to detect correlations as small as 0.20 in absolute magnitude as statistically significant at $p < 0.05$ (two-tailed). Of the 359 participants within the target age range who completed the study, 85% correctly completed two attention check items, a variability check, and all of the primary study measures described below. The analysis sample thus consisted of 305 American young adults (M age = 30.61, SD = 5.34; 44.9% male, 55.1% female; 74.4% White, 9.2% Black, 6.9% Asian, 6.9% Latino, 2.6% other; 24.9% high school educated, 57.4% college/university educated, 3.0% held a professional degree, 14.8% held a graduate degree).

Procedure

The study was completed online using Qualtrics software. Informed consent was obtained from all individual participants included in the study. Specifically, the first page of the Qualtrics questionnaire was the consent form, informing participants of the general purpose of the study, benefits and

potential risks, compensation (\$1.50 USD), and their right to withdraw at any point. Participants had the option to consent and begin the study, or to not consent and exit Qualtrics. After providing consent, participants completed a self-report questionnaire comprising measures of mindfulness and temporal perspective. Participants answered mindfulness items, followed by temporal evaluation, temporal focus (past and future order randomized), temporal distance (past and future order randomized), temporal overlap (past/current, current/future, past/future randomized), and temporal value (past, present, future order randomized). Several additional measures not pertinent to the current study were included in the questionnaire but are not analyzed here.

Measures

Mindfulness The 39-item Five Factor Mindfulness Questionnaire (Baer et al. 2006) was used, comprising five subscales (observing, describing, acting with awareness, nonjudging, and nonreacting), each assessed using seven or eight items, rated on a six-point scale ranging from 1 (*never or very rarely true*) to 6 (*very often or always true*). The item ratings were averaged (and reverse-scored where appropriate) within each subscale, with higher scores indicating higher levels of each mindfulness factor (α s = 0.86, 0.90, 0.93, 0.93, and 0.84, respectively).

Temporal Perspective To assess temporal evaluation, participants completed the 15-item Temporal Satisfaction with Life Scale (Pavot et al. 1998). This scale comprises three sets of five items, pertaining to their past (“There is nothing that I wanted to change about my past”), current (“I am satisfied with my current life”), and future (“I expect my future life will be ideal for me”) lives. Ratings were made on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) and averaged within each temporal period, with higher scores indicating more positive evaluations of one’s life (α s = 0.92, 0.94, and 0.91, respectively).

To assess temporal focus, the 12-item Temporal Focus Scale (Shipp et al. 2009) was used. This scale measures the frequency with which participants focus on their past (“I replay memories of the past in my mind”), current (“I focus on what is currently happening in my life”), and future (“I think about what the future has in store”) lives, each assessed with four items. Participants rated each item on a seven-point Likert scale ranging from 1 (*never*) to 7 (*constantly*). Ratings were averaged within each temporal period, with higher scores indicating greater focus on one’s life at that particular temporal period (α s = 0.91, 0.81, and 0.88, respectively).

For temporal distance, both objective and subjective distance were assessed. For objective distance, participants indicated the calendar distance to the past and future lives they had envisioned when completing their temporal evaluation ratings: “The past/

future life I envisioned was _____ days (or months or years) in the past/future” (one item for past, one item for future). Responses on these two items (created for present purposes) were converted into years, with a high number indicating greater objective distance to one’s past and future lives. (Due to the maximum age of participants being 40 years, the greatest number of years to the past one could recollect would be 40 years. As a result, a small number of responses concerning the past or the future [less than 2%] were recoded to a maximum of 40 years to account for this cap). For subjective distance, participants answered two questions concerning how close/far away the past/future felt (1, *feels very close*, to 9, *feels very far away*), and two items how near/distant the past/future was perceived to be (1, *feels like now*, to 9, *feels very distant*; Ross and Wilson 2002). Ratings on the two items were averaged within temporal period, with higher scores indicating greater subjective distance to one’s past ($r = 0.81$) and future ($r = 0.85$) lives.

Temporal overlap was assessed using two measures. Participants completed a modified version of the future self-continuity scale (Ersner-Hershfield et al. 2009) by choosing one of seven figures depicting varying degrees of overlap between their past and current lives, their current and future lives, and their past and future lives (scores ranged from 1, *no overlap*, to 7, *complete overlap*). Higher scores indicated greater perceived continuity in one’s life. In addition, using an approach developed by Bartels and Rips (2010, see also Frederick 2003), participants completed three single-item ratings of the degree of similarity between each pair of temporal perspectives (e.g., “your current life and the life you will have in the future”). Ratings ranged from 0 (*completely different*) to 100 (*exactly the same*), with higher ratings indicating greater perceived similarity in one’s life between the temporal periods. For each of the three temporal period comparisons, the self-continuity and similarity ratings were standardized and averaged to form composite temporal overlap scores (past-current overlap, $r = 0.60$; current-future overlap, $r = 0.65$; past-future overlap, $r = 0.70$), with higher scores indicating greater perceived overlap in one’s life between temporal periods.

Temporal value was assessed using measures of subjective and objective valuation developed for the present study. For subjective value, participations completed three items per temporal period. Participants rated how important (“How important is your past/current/future life to you?”), valuable (“How valuable is your past/current/future life to you?”), and significant (“How significant is your past/current/future life to you?”) the temporal period was to them (ratings ranged from 1, *not at all*, to 7, *extremely*). Within each temporal period, these ratings were averaged to form composite subjective temporal value scores (past, $\alpha = 0.94$; present, $\alpha = 0.97$; future, $\alpha = 0.96$), with higher scores indicating greater subjective valuation of one’s life at that temporal period. For objective value, participants indicated how much they valued, in dollar amounts, their lives at each temporal period. Due to very skewed positive distributions, responses were

recoded as follows: \$0; \$1 to \$500; \$501 to \$10,000; \$10,001 to the highest dollar value. (Note that results for these variables were comparable when a log transformation was used instead of the recoding.) The objective temporal value items were examined separately from the subjective temporal value scores due to low correlations between these two sets of measures (i.e., $r_s = 0.35, 0.32, \text{ and } 0.20$, for past, current, and future temporal periods, respectively).

Data Analysis

In a preliminary analysis, mindfulness and temporal perspective measures were examined in relation to participant demographics using pairwise correlations for age and independent samples t tests for gender (male vs. female), race (White vs. non-White), and education (no post-secondary vs. post-secondary education). Results are presented in Table 1. In the main analysis, associations between the five mindfulness factors and the various aspects of temporal perspective were first evaluated using pairwise correlations. A canonical correlation analysis was then employed to assess the associations between the five mindfulness factors and each of the temporal perspective measures. In this analysis, a canonical function is derived comprising a set of weights (function coefficients) for each of the variables, which maximizes the correlation between the two sets of variables. Subsequent canonical functions are derived, each orthogonal from the preceding one(s), with their own sets of weights that maximize the correlation between the two sets of variables based on any shared variance not explained by the previously extracted canonical function(s). This analysis was chosen because it requires no assumptions concerning the underlying structure of either set of variables or the associations between the two sets of variables (Sherry and Henson 2005). The canonical correlation analysis thus evaluated the set of mindfulness components in relation to the set of temporal perspective measures, allowing for different combinations of the two sets of variables. Both the structure coefficients (i.e., correlations between each variable and the canonical function) and the standardized canonical function coefficients (i.e., standardized weights for each variable in the canonical function) were examined. Structure coefficients of 0.40 or greater (absolute value) were used to interpret the meaning of each function. All data processing and analyses were conducted on SPSS v24.

Results

Correlations Between Mindfulness Factors and Temporal Perspective Measures

Means, standard deviations, and correlations for the main study measures are shown in Table 2. For temporal focus, four of the five mindfulness factors were significantly and positively correlated with temporal focus on one's present life; four mindfulness factors were significantly linked with temporal

Table 1 Correlations and independent samples tests of mindfulness and temporal perspective with demographics

	Age	Sex	Race	Education
Mindfulness				
Describe	0.12*	-1.18	-0.84	-1.90
Observe	-0.05	-0.34	0.57	0.75
Act with awareness	0.11	0.46	-1.29	-0.57
Nonjudging	0.14*	0.09	-0.91	1.13
Nonreacting	0.09	3.14**	-0.23	-0.14
Temporal evaluation				
Past	-0.08	1.34	0.58	-0.20
Present	0.16**	-1.35	2.92**	-1.14
Future	0.07	-1.02	1.35	-1.27
Temporal focus				
Past	-0.13*	0.58	0.52	1.14
Current	0.09	-0.18	1.57	0.40
Future	0.01	-0.46	0.70	0.40
Temporal distance				
Past-objective	0.41***	-0.47	2.97**	0.03
Past-subjective	-0.02	0.68	1.76	1.20
Future-objective	0.21***	-1.07	1.79	-1.10
Future-subjective	-0.04	-0.46	2.04*	0.58
Temporal overlap				
Past/current	-0.06	3.22***	-1.56	-1.14
Current/future	0.14*	0.01	2.38*	-1.84
Past/future	-0.03	2.26*	-0.55	-0.55
Temporal value				
Past-subjective	0.01	0.14	0.77	2.44*
Past-objective	0.01	2.95**	-1.84	0.92
Present-subjective	0.30***	-2.45*	1.46	0.07
Present-objective	0.16**	-0.01	0.32	-0.35
Future-subjective	0.08	-2.51*	0.24	1.03
Future-objective	-0.10	2.67**	-2.76**	0.94

$N = 305$

Sex: 0 = male, 1 = female

Race: 0 = White, 1 = non-White

Education: 0 = high school, 1 = beyond post-secondary

For age, cell entries are correlation coefficients (r values)

For sex, race, and education, cell entries are t values from independent samples t tests ($df = 303$)

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

focus on one's past life, and three of these significant associations were negative; four mindfulness factors were also significantly linked with temporal focus on one's future life, and three of these significant associations were positive. For temporal evaluation, four mindfulness factors were significantly positively associated with present temporal evaluation; two

Table 2 Descriptives of and correlations among study measures

Measures	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
FFMQ factors													
1. Describe	3.51	0.82	–										
2. Observe	3.18	0.75	0.14*	–									
3. AWA	3.59	0.90	0.44***	0.03	–								
4. Nonjudge	3.43	0.95	0.32***	–0.17**	0.60***	–							
5. Nonreact	3.04	0.75	0.21***	0.33***	0.15**	0.18***	–						
Temporal evaluation													
6. Past	3.61	1.52	0.05	–0.01	0.05	0.18**	0.13*	–					
7. Present	4.21	1.63	0.20***	–0.06	0.25***	0.36***	0.14*	0.38***	–				
8. Future	4.80	1.32	0.23***	0.05	0.20***	0.32***	0.19***	0.32***	0.66***	–			
Temporal focus													
9. Past	4.16	1.24	–0.15**	0.22***	–0.37***	–0.45***	–0.03	–0.02	–0.32***	–0.22***	–		
10. Present	4.84	0.98	0.32***	0.10	0.33***	0.25***	0.30***	0.17**	0.30***	0.23***	–0.09	–	
11. Future	4.89	1.08	0.12*	0.16**	–0.10	–0.16**	0.16**	0.03	0.07	0.30***	0.31***	0.22***	–
Temporal distance													
12. P-Obj	8.41	6.33	0.11*	–0.01	0.16**	0.10	0.07	–0.14*	0.08	0.07	–0.08	0.07	0.08
13. P-Subj	6.54	1.95	0.16**	0.03	0.11	0.14*	0.06	–0.11	–0.03	0.13*	–0.07	0.02	0.06
14. F-Obj	6.03	5.90	0.06	0.00	0.07	0.03	0.10	–0.02	0.08	0.00	–0.06	0.10	–0.08
15. F-Subj	5.86	1.93	–0.06	–0.04	–0.11	–0.14*	–0.06	–0.02	–0.19***	–0.16**	0.09	0.02	–0.10
Temporal overlap													
16. P-C	3.71	2.16	–0.10	0.01	–0.06	–0.07	–0.07	0.17**	–0.07	–0.07	0.10	0.01	–0.16**
17. C-F	5.24	2.16	0.01	–0.05	0.14*	0.15**	0.06	0.04	0.38***	0.12*	–0.12*	0.12*	0.05
18. P-F	2.87	2.36	–0.01	–0.02	–0.04	–0.06	–0.01	0.28***	–0.03	–0.12*	0.07	–0.02	–0.14*
Temporal value													
19. P-Obj	4.46	1.71	–0.21***	–0.04	–0.16**	–0.15*	0.04	0.16**	–0.20***	–0.20***	0.22***	–0.02	0.01
20. P-Subj	1.06	1.12	0.00	0.11	–0.06	–0.08	–0.03	0.33***	–0.10	–0.10	0.32***	0.07	0.02
21. C-Obj	5.65	1.43	0.05	–0.01	0.01	0.06	0.02	0.04	0.32***	0.21***	–0.05	0.05	0.06
22. C-Subj	1.38	1.11	0.17**	–0.04	0.16**	0.23***	0.12*	0.05	0.54***	0.42***	–0.16**	0.37***	0.22***
23. F-Obj	6.13	1.07	–0.03	0.05	–0.12*	–0.19***	0.07	–0.02	–0.26***	–0.03	0.12*	–0.05	–0.12*
24. F-Subj	1.25	1.13	0.21***	0.04	0.08	0.06	0.07	–0.05	0.06	0.28***	0.05	0.22***	0.50***

Table 2 (continued)

Measures	<i>M</i>	<i>SD</i>	12	13	14	15	16	17	18	19	20	21	22	23
FFMQ factors														
1. Describe	3.51	0.82												
2. Observe	3.18	0.75												
3. AWA	3.59	0.90												
4. Nonjudge	3.43	0.95												
5. Nonreact	3.04	0.75												
Temporal evaluation														
6. Past	3.61	1.52												
7. Present	4.21	1.63												
8. Future	4.80	1.32												
Temporal focus														
9. Past	4.16	1.24												
10. Present	4.84	0.98												
11. Future	4.89	1.08												
Temporal distance														
12. P-Obj	8.41	6.33	–											
13. P-Subj	6.54	1.95	0.26***	–										
14. F-Obj	6.03	5.90	0.34***	–0.03	–									
15. F-Subj	5.86	1.93	0.03	0.01	0.30***	–								
Temporal overlap														
16. P-C	3.71	2.16	–0.19**	–0.23**	0.03	0.08	–							
17. C-F	5.24	2.16	–0.08	–0.01	–0.11	–0.21***	0.10	–						
18. P-F	2.87	2.36	–0.23**	–0.16**	–0.14*	0.04	0.48***	0.21***	–					
Temporal value														
19. P-Obj	4.46	1.71	–0.13*	–0.16**	–0.01	0.07	0.11	–0.11	0.11*	–				
20. P-Subj	1.06	1.12	–0.06	0.00	0.01	0.13*	0.19**	–0.11	0.23***	0.34***	–			
21. C-Obj	5.65	1.43	0.06	–0.10	0.23***	–0.08	–0.09	0.10	–0.08	0.19**	–0.09	–		
22. C-Subj	1.38	1.11	0.15	0.03	0.16**	–0.06	–0.02	0.31***	–0.15**	–0.17**	0.05	0.31***	–	
23. F-Obj	6.13	1.07	–0.15**	–0.04	–0.09	–0.03	–0.04	–0.21***	–0.07	0.35***	–0.01	0.26***	–0.20***	–
24. F-Subj	1.25	1.13	0.17**	0.18**	0.05	–0.04	–0.17**	–0.02	–0.22***	–0.03	0.12*	0.07	0.33***	0.17**

N = 305

FFMQ Five Factor Mindfulness Questionnaire, AWA act with awareness, *P* past, *C* current, *F* future, *Obj* objective, *Subj* subjective

**p* < 0.05

***p* < 0.01

****p* < 0.001

mindfulness factors were significantly positively correlated with evaluations of one's past life; and four mindfulness factors were significantly positively correlated with evaluations of one's future life. For temporal distance, one mindfulness factor was positively correlated with how objectively far the individual's viewed their past life to be; two factors were positively correlated with how far an individual felt their past was from their present life; and one factor was negatively correlated with how far an individual felt their future was from their present life. For temporal overlap, two mindfulness factors were positively correlated with how similar an individual believed their current and future lives were. For temporal value, three mindfulness factors were negatively correlated with how much individuals would be willing to spend to relive their past life; four mindfulness factors were positively correlated with how valuable individual's believed their current life to be to them; one mindfulness factor was positively associated with how valuable individuals believed their future life was to them; and two mindfulness factors were negatively associated with how much individuals were willing to spend to live their future life right now.

Canonical Correlation Analysis

The overall canonical correlation model was statistically significant; Wilk's $\lambda = 0.39$; $F(95, 1371.92) = 3.10$, $p < 0.001$. The first two canonical functions were also statistically significant ($ps < 0.05$). Of the total variance explained by the analysis, 58% was accounted for by the first function and 21% was accounted for by the second function. For the first function, the canonical correlation was 0.63. As shown in Table 3, the structure coefficients for this function revealed that greater mindfulness—particularly more describing of one's thoughts and feelings, greater acting with awareness, and greater nonjudging of one's thoughts and feelings—was associated with more positive evaluations of one's present and future lives, less focus on one's past life, greater focus on one's present life, and greater subjective valuation of one's present life. For the second function, the canonical correlation was 0.43. The structure coefficients for this function revealed that greater mindfulness—particularly more describing of one's thoughts and feelings, more observing of one's thoughts and feelings, and greater nonreacting to one's thoughts and feelings—was associated with greater focus on one's past, present, and future lives. Note that a (post hoc) canonical correlation analysis was also conducted using the residuals of all five mindfulness factors and each of the temporal perspective measures after accounting for participant age, sex, race, and education. Results were unchanged (see Table 4).

Table 3 Results from canonical correlation analysis between mindfulness and temporal perspective

	Function 1		Function 2	
	SC	SCFC	SC	SCFC
Mindfulness				
Describe	-0.53	-0.16	-0.64	-0.67
Observe	0.14	0.13	-0.61	-0.27
Act with awareness	-0.81	-0.36	-0.10	-0.07
Nonjudging	-0.92	-0.59	0.28	0.56
Nonreacting	-0.34	-0.19	-0.57	-0.43
Temporal evaluation				
Past	-0.25	-0.11	0.02	0.19
Present	-0.59	-0.02	0.02	-0.02
Future	-0.52	-0.26	-0.19	-0.12
Temporal focus				
Past	0.73	0.48	-0.41	-0.33
Current	-0.57	-0.47	-0.57	-0.58
Future	0.16	0.28	-0.63	-0.43
Temporal distance				
Past-objective	-0.24	-0.11	-0.13	0.01
Past-subjective	-0.25	-0.12	-0.15	-0.08
Future-objective	-0.11	-0.04	-0.15	-0.28
Future-subjective	0.22	0.16	0.01	0.10
Temporal overlap				
Past/current	0.15	0.09	0.13	0.18
Current/future	-0.25	-0.09	0.13	0.13
Past/future	0.08	-0.01	-0.04	-0.31
Temporal value				
Past-subjective	0.14	-0.01	-0.14	-0.15
Past-objective	0.26	0.01	0.15	0.35
Present-subjective	-0.40	0.03	-0.07	0.18
Present-objective	-0.08	0.02	-0.01	0.04
Future-subjective	-0.16	-0.12	-0.36	0.06
Future-objective	0.24	0.09	-0.27	-0.33

$N = 305$

SC structure coefficient, SCFC standardized canonical function coefficient

Discussion

Mindfulness and Temporal Perspective Components

The primary goal of the present study was to evaluate mindfulness in relation to temporal perspective. The results from the pairwise correlations provided nuanced information concerning associations between various aspects of mindfulness and multiple components of temporal perspective.

Temporal Focus Temporal focus on the present is considered to be a hallmark of mindfulness (Kabat-Zinn 1994).

Table 4 Results from canonical correlation analysis between residualized mindfulness and temporal perspective

	Function 1		Function 2	
	SC	SCFC	SC	SCFC
Mindfulness				
Describe	−0.53	−0.15	−0.67	−0.71
Observe	0.10	0.10	−0.60	−0.26
Act with awareness	−0.81	−0.37	−0.10	−0.07
Nonjudging	−0.91	−0.60	0.30	0.60
Nonreacting	−0.35	−0.19	−0.52	−0.36
Temporal evaluation				
Past	−0.28	−0.11	0.04	0.20
Present	−0.60	−0.05	0.04	−0.08
Future	−0.53	−0.28	−0.15	−0.05
Temporal focus				
Past	0.70	0.44	−0.42	−0.34
Current	−0.58	−0.48	−0.55	−0.56
Future	0.15	0.28	−0.61	−0.42
Temporal distance				
Past-objective	−0.17	−0.07	−0.13	0.01
Past-subjective	−0.26	−0.13	−0.17	−0.11
Future-objective	−0.08	−0.05	−0.14	−0.22
Future-subjective	0.20	0.12	−0.02	0.05
Temporal overlap				
Past/current	0.16	0.12	0.15	0.19
Current/future	−0.24	−0.12	0.17	0.16
Past/future	0.09	0.01	−0.03	−0.29
Temporal value				
Past-subjective	0.14	−0.03	−0.18	−0.22
Past-objective	0.30	0.06	0.17	0.40
Present-subjective	−0.36	0.08	−0.06	0.20
Present-objective	−0.04	0.02	0.01	0.02
Future-subjective	−0.15	−0.13	−0.38	0.02
Future-objective	0.25	0.13	−0.27	−0.31

$N = 305$

SC structure coefficient, SCFC standardized canonical function coefficient

Accordingly, we expected that higher mindfulness would be linked with greater focus on one's present life, as well as less focus one's past and future lives. As predicted and consistent with previous research, higher levels of mindfulness were associated with less focus on one's past life (Hafenbrack et al. 2014) and with greater focus on one's present life (Baer et al. 2006; Kabat-Zinn 1994). However, contrary to our predictions, greater mindfulness was associated with *greater* focus on one's future life. It is possible that more mindful individuals recognize that to better utilize their present life, they need to consider their anticipated future lives, identify goals they want to achieve, and determine how they plan on pursuing

such goals in their daily (present) lives (Oettingen and Mayer 2002; Pronin et al. 2008). Alternatively, it may be that higher mindful individuals worry about their future and thus have a greater focus on their future than less mindful individuals (McLaughlin et al. 2007; see also research based on the future factor of the ZTPI, e.g., Seema and Sircova 2013; Stolarski et al. 2016; Wittmann et al. 2014). Together, the present results concerning temporal focus are inconsistent with conceptualizing mindfulness *exclusively* as a present-oriented construct—and instead support a temporally expanded conceptualization of mindfulness that encompasses all three temporal periods (Drake et al. 2008).

Temporal Evaluation Evaluation of one's life (i.e., life satisfaction) is a common indicator of well-being (Diener 1984; Busseri and Sadava 2011), and well-being has been suggested to be an important outcome of mindfulness (Kabat-Zinn 1994). Accordingly, we predicted that mindfulness would be positively associated with individuals' temporal evaluation of their lives. In support of this prediction, mindfulness was associated with more positive life evaluations at each temporal period. These findings extend previous research linking mindfulness with present well-being (Brown and Ryan 2003; Howell et al. 2010; Prakash et al. 2015) by demonstrating positive associations between mindfulness and individuals' recollected past, current, and anticipated future lives. Such results suggest that mindfulness may be linked with a broad positive orientation toward one's life which extends beyond self-perceptions and self-evaluations concerning one's current life (e.g., Caprara et al. 2010). Together, these findings concerning temporal evaluations demonstrate the value of employing a temporally expanded approach to understand the link between mindfulness and individuals' evaluations of their lives across all three temporal periods.

Temporal Distance, Overlap, and Value Although no specific hypotheses were made concerning temporal distance, temporal overlap, or temporal value, results from the pairwise associations with the five mindfulness factors provided several valuable insights. In general, higher mindfulness was associated with greater subjective distance from one's past life, greater temporal overlap between one's current and future lives, and lower valuation of one's past and future lives, as well as greater valuation of one's present life. Such findings suggest that high (vs. low) mindful individuals may not differ in substantial ways with respect to how near or far away they perceive their past and future lives to be, as well as how much similarity they perceive between their past, current, and future lives. Our results also suggest that high mindful individuals generally view their current lives as more valuable and would spend less money to relive their past lives or experience their future lives now. We note, however, that these patterns varied somewhat across each of the five mindfulness factors and the

various components of each temporal perspective. Further, although some links were found between mindfulness and temporal distance, overlap, and value, most correlations were not significant. Accordingly, future research is needed to evaluate the reliability of the present findings. Our results provide a starting point for such examination and highlight the need to better understand the links between mindfulness and these particular aspects of temporal perspective.

Two Forms of Mindfulness and Temporal Perspective

Expanding on the pairwise correlational results, findings from the canonical correlation analysis provided additional new insights concerning the link between mindfulness and temporal perspective. In particular, two distinct combinations of mindfulness and temporal perspective were uncovered.

Mindfulness and the “Optimistic” Life The first function from the canonical correlation analysis comprised primarily three aspects of mindfulness: describing one’s thoughts and feelings, acting with awareness, and nonjudging. This canonical function reflected a common conceptualization of mindfulness, in which higher levels of each of these components—particularly acting with awareness and nonjudging—are considered to be core characteristics of more mindful individuals (Kabat-Zinn 2005). Our findings are also consistent with previous research that has identified subgroups of individuals with distinct profiles of mindfulness scores, including profiles characterized by high or low levels of these factors (Bravo et al. 2016; Pearson et al. 2015).

In our results, this form of mindfulness was associated with more positive evaluation of one’s present and future lives, less focus on one’s past life and greater focus on one’s present life, and greater subjective valuing of one’s present life. Past research has found that individuals characterized by more positive functioning, particularly dispositional optimists, report more positive evaluations of their past, present, and future lives (Busseri 2012; Busseri et al. 2009; Busseri and Choma 2016), as well as less focus on their past and more focus on their present lives (Busseri et al. 2013). Such findings parallel the current results and suggest that a combination of positive evaluations of one’s present and future lives, coupled with less focus on one’s past and more focus on one’s present life, is characteristic of more (vs. less) mindful individuals. The present findings thus provide evidence in support of mindfulness as an “optimistic” approach to life, particularly with respect to how individuals evaluate and focus on their past, present, and future lives.

Decentered Mindfulness and the “Immersed” Life The second function reflected a different set of mindfulness components, including describing, observing, and nonreacting to one’s thoughts and feelings. This particular combination of

mindfulness factors is consistent with the notion of decentering, in which an individual takes a detached view of her thoughts and feelings (Fresco et al. 2007). Some researchers have considered decentering as distinct from mindfulness (Carmody et al. 2009; Shapiro et al. 2006). Decentering has also been treated as a component of mindfulness (Lau et al. 2006). The present findings support this latter perspective by identifying a decentered form of mindfulness based on a multidimensional measure that does not include a decentered subscale (Baer et al. 2006). Our findings are also consistent with previous research identifying distinct subgroups of individuals characterized by high levels of these three mindfulness factors (Lilja et al. 2013).

In our results, this form of mindfulness was associated with greater focus on one’s past, present, and future lives. Such findings appear to be inconsistent with previous research linking greater focus on one’s past with lower mindfulness (Hafenbrack et al. 2014) and with more negative outcomes such as higher negative affect (Shipp et al. 2009). However, previous studies have not examined this form of mindfulness in relation to temporal perspective. It is possible that greater focus on one’s past life is characteristic of an immersed form of temporal perspective encompassing greater focus on all three temporal periods of one’s life. Indeed, previous studies have indicated stronger attentional skills, more sustained focus, and greater cognitive flexibility among experienced (vs. naïve) mindful meditators (Moore and Malinowski 2009; Valentine and Sweet 1999). Accordingly, individuals characterized by greater decentered mindfulness may have greater attentional capacity which allows them to focus on *all three* temporal periods of their lives. As the attentional benefits in these previous studies were found among experienced meditators, this form of mindfulness may require extensive meditation training or other forms of mindful practice. Further, practiced mindfulness meditators are far less common than inexperienced meditators or non-meditators (Van Dam et al. 2009). This may explain why the decentered form of mindfulness emerged as the second function in the canonical correlation analysis, rather than the first, and only after controlling for the more commonly observed combination of mindfulness factors reflected in the first function.

Limitations and Future Research

Given our interest in understanding mindfulness and temporal perspective during young adulthood, the present study employed a convenience sample of participants aged 18 to 40 years. As a consequence, the current results may not be generalizable beyond this age range, particularly in light of research suggesting that mindfulness and temporal perspective vary systematically by age (e.g., Busseri 2012; Prakash et al. 2015; Zimbardo and Boyd 1999). Future research is thus needed to investigate whether the links we observed between

mindfulness and temporal perspective apply to individuals from across the adult lifespan.

Our measure of mindfulness comprised five factors (Baer et al. 2006). Debate continues, however, concerning the structure of mindfulness as comprising just one component (attention/awareness, e.g., Brown and Ryan 2003), two components (attention/awareness and acceptance, e.g., Cardaciotto and Herbert 2005), or multiple components (Medvedev et al. 2016; Qu et al. 2015). Results from the second canonical correlation function, reflecting a decentered form of mindfulness, would not have emerged had mindfulness been operationalized as either unidimensional or bidimensional. However, even within the research literature employing the five-factor model, the debate continues concerning the appropriateness of including the observe factor as a key component of mindfulness (Baer et al. 2006; Lilja et al. 2013). In this regard, our findings from the canonical correlation analyses provide novel information concerning the relationship between this factor and the other four factors contained within Baer et al.'s (2006) five-factor model.

The present study employed a correlational and cross-sectional design to evaluate the relationships of interest. Furthermore, the order in which measures were presented was not fully randomized. Thus, results may have been impacted by an order effect, such that participants' mindfulness ratings may have influenced their perceptions of temporal perspective. Future research is needed to investigate the robustness of our results when measures are fully randomized. More generally, the current findings do not allow for conclusions regarding temporal order or causality. Rather, additional research is needed to assess the possible predictive links between mindfulness and temporal perspective over time using a longitudinal design. Such studies would provide valuable information concerning the possible role of mindfulness in shaping how individuals view their past, present, and future lives—and the possibility that temporal perspective might itself contribute to mindfulness.

Furthermore, due to the exclusive use of self-report, results may be influenced by common method bias (Podsakoff et al. 2003; Podsakoff et al. 2012), which may have inflated the associations among the variables. Participants were clearly informed as to the purpose of the study, how we would use the data obtained, and responses were anonymous—all of which may have reduced the influence of social desirability bias. Furthermore, we were specifically interested in participant's subjective perceptions of their past, current, and future lives. Nonetheless, future research employing informant ratings, as well as longitudinal and experimental designs, would be helpful to address the possible common method biases in the current results.

Our results revealed two forms of mindfulness, each linked with distinct combinations of temporal perspective components. Such results suggest that mindfulness is more than just a one-dimensional construct, and its links with temporal

perspective may be more extensive than has been previously recognized. Researchers may thus find it beneficial to investigate these forms of mindfulness in relation to other theoretically relevant constructs, including positive orientation toward one's life (Caprara et al. 2012) and decentering (Fresco et al. 2007). Future research could also extend our findings by examining mindfulness in relation to other temporally oriented constructs, including those pertaining to the past (e.g., nostalgia or regret; Sanna et al. 2003; Sedikides et al. 2008) and the future (e.g., hope or worry; Borkovec et al. 1983; Snyder 2002). Indeed, although a present-focused awareness may be a defining feature of mindfulness, there is much more to understand about mindfulness based on how individuals think about their recollected past, present, and anticipated future lives.

Author Contributions MNS designed the study and collected the data, assisted with data analyses, and wrote the first draft of the paper. MB collaborated with the design and the writing of the manuscript as well as analyzed the data. Both authors critically reviewed the manuscript prior to submission and approved of the final version.

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Compliance with Ethical Standards

The participants in this study provided informed consent prior to participation. The study design and protocol were approved by the Research Ethics Board at Brock University, Canada.

Conflict of Interest The authors declare that they have no conflict of interest.

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