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THE PAST, PRESENT, AND FUTURE ALL MATTER: HOW TIME PERSPECTIVE IS ASSOCIATED WITH OPTIMISM AND SENSATION SEEKING AMONG YOUNG ADULTS

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We used a multidimensional model of time perspective to examine how feelings and thoughts about the past, present, and future were related to optimism and sensation seeking among young adults. The dimensions of time perspective assessed were time feelings, the positive and negative emotions one has about the past, present, and future; time frequency, the amount of thinking about each time period; and time orientation, the relative emphases toward the time periods. Optimism and sensation seeking were self-reported and participants included 463 young adults. Variable-based analyses indicated that reporting more positive and less negative feelings about the time periods or emphasizing the present and future simultaneously were associated with greater optimism. For sensation seeking, boredom susceptibility was especially associated with the time perspective dimensions. Person-centered analyses based on time feelings and time frequency yielded four profiles (i.e., Mindful, Discontent, Bleak, and Indifferent) that were associated with both optimism and sensation seeking.

Time perspective is a cognitive and motivational construct theorized to underlie many human behaviors (Lewin, 1939; Mello & Worrell, 2015; Zimbardo & Boyd, 1999). Research on time perspective has surged in the past decade (Stolarski, Fieulaine, & van Beek, 2015). Studies have demonstrated its relationships with several areas of development, including physical exercise (Griva, Tseferidi, & Anagnostopoulos, 2015; Henson, Carey, Carey, & Maisto, 2006; Konowalczyk, 2017), substance use (Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Henson et al., 2006; Linden, Lau-Barraco, & Hollis, 2013; Wills, Sandy, & Yaeger, 2001), academic achievement (Andretta, Worrell, &

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Mello, 2014; Honora, 2002), and psychological well-being (Mello, Finan, & Worrell, 2013; Zimbardo & Boyd, 1999).

Theoretically, researchers have drawn from various conceptualizations of time perspective. In Zimbardo and Boyd's (1999) model, the construct includes orientations and feelings about time that organize life's experiences and motivate actions. This model has most often been included in studies with adults. In contrast, Carstensen (2006) has compared the time perspectives of younger and older adults. In this framework, the construct is defined as the degree to which the future is considered to be limited or open. In 2015, Mello and Worrell proposed a model of time perspective that enabled the investigation of multiple time periods (past, present, and future) and dimensions (feelings and thoughts). This model was originally designed for adolescents (Worrell, Mello, & Buhl, 2013), but it has also been employed in studies with young adults (Mello et al., 2016).

Young adults are an important age group to examine time perspective, given injury, substance use (Park, Mulye, Adams, Brindis, & Irwin, 2006), and mental health rates in this developmental period (Adams, Knopf, & Park, 2014). Indeed, young adults have been identified as experiencing a unique set of factors that contribute to negative health outcomes (Neinstein & Irwin, 2013). Thus, it is important to identify mechanisms that facilitate the health and well-being of young adults. Time perspective may be useful in this regard.

Optimism and sensation seeking among young adults are important topics of investigation given evidence demonstrating their relationships with a variety of health outcomes (Forgeard & Seligman, 2012; Nes & Segerstrom, 2006). For example, meta-analyses have shown relationships between optimism and physical health (Rasmussen, Scheier, & Greenhouse, 2009), as well as for sensation seeking with sexual risky behaviors, substance use (Roberti, 2004), and aggression (Wilson & Scarpa, 2011). Thus, to contribute toward several areas in the literature, this study sought to apply Mello and Worrell's (2015) multidimensional model of time perspective to young adults and to examine its associations with optimism and sensation seeking.

Time Perspective

Time perspective is a broad psychological construct that has been defined in a variety of ways. Zimbardo and Boyd (1999) theorized that time perspective comprised temporally-related feelings and behaviors that could be organized into five dimensions: past positive, past negative, present hedonism, present fatalism, and future. In contrast, Carstensen (2006) highlighted the future time period and argued that how individuals saw their future was linked to their motivation for social and emotional relationships. Most recently, Mello and Worrell (2015) developed a model of time perspective that includes multiple time periods (past, present, and future) and dimensions (time feelings, time frequency, and time orientation). *Time feelings* refer to positive and negative emotions about the past, present, and future (e.g., positive feelings about the past time period). *Time frequency* refers to the amount one thinks about each time period (e.g., thinking about the future almost never). *Time orientation* refers to the relative emphases one has toward the time periods (e.g., emphasizing the present over the past and future).

Time perspective profiles are particularly valuable given the proposed multidimensional qualities of time perspective. Profiles stem from person-centered analytic approaches that provide unique information about subgroups of participants with similar qualities (e.g., time perspective dimensions; Bergman & Trost, 2006; Magnusson & Bergman, 1990; von Eye & Bogat, 2006). Empirical research on time perspective profiles has focused on time feelings and

included adolescent participants. For example, Konowalczyk, McKay, Wells, and Cole (2018) reported four profiles: Positives, defined as strong favorable and weak unfavorable feelings about the time periods; Negatives, defined as weak favorable and strong unfavorable feelings; Moderately-Negatives, defined as weak favorable and average unfavorable feelings; and Ambivalents, defined as average favorable and unfavorable feelings. Additional studies have identified similar profiles along with other variations. For instance, Buhl (2014) identified an Optimistic profile that was described as very strong favorable feelings toward the present and future and weak unfavorable feelings toward all the time periods.

Time perspective may be conceptualized as a core developmental process that, in and of itself, is a mechanism that leads to health. In particular, Mello and Worrell (2015) have drawn from theories on identity formation (Erikson, 1968) and cognitive development (Piaget, 1955, 1975) to argue that time perspective is a foundational construct that changes across the life-span. The authors maintain that time perspective is an independent and individually varying construct that corresponds to developmental outcomes. Empirical evidence supporting this theoretical assertion comes from research that has examined relationships between time perspective and important developmental outcomes (e.g., Andretta et al., 2014; Mello et al., 2013). These studies have shown that "healthy" time perspectives—those characterized by more favorable and less unfavorable feelings toward the past, present, and future along with emphases on multiple time periods—predict academic achievement and psychological well-being, respectively.

Developmentally, time perspective might be particularly useful for individuals who are transitioning to adulthood given the propensity for risk-taking at this age. In particular, scholars have been charged to conduct studies with this age-group due to the prevalence of risky behaviors and challenges with mental health (Adams et al., 2014; Park et al., 2006). Separately, young adults are in a period of the life-span that is characterized by occupational development, and time perspective has been shown to facilitate this process (Marko & Savickas, 1998).

Optimism

Optimism refers to the tendency to expect favorable outcomes (e.g., Scheier & Carver, 1985). The construct has long been considered a strong indicator of psychological well-being (Forgeard & Seligman, 2012). Meta-analyses have indicated associations for optimism with coping (Andersson, 1996) and physical health, including physical symptoms, cardiovascular outcomes, and mortality (Rasmussen et al., 2009). However, there is only a limited amount of research that has examined relationships between optimism and time perspective. One study indicated that optimism was positively associated with favorable feelings and negatively associated with unfavorable feelings about time among adolescents (Mello et al., 2018). Studies with adult participants have indicated that optimism is positively associated with an orientation toward the present and future and negatively associated with an orientation toward the past (Shipp, Edwards, & Lambert, 2009). Similarly, studies with adolescents have indicated positive relationships between optimism and an emphasis toward the future (Haldeman, 1993).

Sensation Seeking

Sensation seeking refers to the preferences for risky and non-risky forms of arousal (Roberti, 2004; Zuckerman, Eysenck, & Eysenck, 1978). Meta-analyses have shown that sensation seeking is

a powerful indicator of health and behavior. Sensation seeking has been associated with biological correlates, including neurotransmitters, as well as with sexual risky behaviors, substance use (Roberti, 2004), and aggression (Wilson & Scarpa, 2011). In young adults, sensation seeking has been shown to predict substance use, impaired driving, and sexual behaviors (Ravert et al., 2009).

Extant research has employed variable-based and profile-centered analytic strategies to examine the relationship between sensation seeking and time perspective. Several studies have indicated that sensation seeking is positively associated with an orientation toward the present and inversely associated with an orientation toward the future among adolescents and adults (Keough, Zimbardo, & Boyd, 1999; Zimbardo & Boyd, 1999). Research employing profile-centered analyses with adolescent participants has shown mixed relationships between sensation seeking and time feelings. Participants classified as Negatives, defined as a combination of weak favorable and strong unfavorable feelings toward time, reported higher sensation seeking than their counterparts (Konowalczyk et al., 2018). Further, a longitudinal study showed that a profile characterized by positive feelings about the time periods was associated with lower sensation seeking (Morgan, Wells, Andretta, & McKay, 2017). However, another study indicated that there was no meaningful relationship between time feelings and sensation seeking (McKay, Percy, Cole, Worrell, & Andretta, 2016).

The Present Study

The present study sought to make several contributions to the literature. First, this research aimed to examine the multidimensional model of time perspective proposed by Mello and Worrell (2015) by investigating the associations among the time perspective dimensions (i.e., time feelings, time frequency, and time orientation). Given prior theoretical work on time perspective (e.g., Carstensen, 2006; Zimbardo & Boyd, 1999), we expected these dimensions to coalesce together and contribute toward interpretable time perspective profiles. Second, based on extant research (Haldeman, 1993; Mello et al., 2018; Shipp et al., 2009), we hypothesized associations between the time perspective dimensions and optimism. For example, we expected to observe positive associations with favorable feelings and orientations toward both the present and future. We also expected negative associations with unfavorable feelings and an orientation toward the past. Third, we hypothesized associations between the time perspective dimensions and sensation seeking based on prior studies (Konowalczyk et al., 2018; Morgan et al., 2017). For example, we expected to observe a positive association with unfavorable feelings and a negative association with favorable feelings.

METHOD

Participants and Procedures

The sample included 463 individuals (M_{age} = 21.36, SD = 2.74; 76.9% female, n = 356).[1] Race/ethnicity was self-reported and comprised 30% Asian American, 26% American Indian/Alaskan Native, 16% European American, 5% Hispanic/Latino American, .2% African American/Black, 14% who reported more than one group, and 9% who chose another race/ethnicity. Academic achievement was assessed by self-reported grade point average which ranged from 1.90 to 4.00

(M = 3.22, SD = .45). Young people have proven to be a reliable source for reporting academic grades (Crockett, Schulenberg, & Petersen, 1987). Maternal education was used as an indicator of socioeconomic status. The sample included 54% who had mothers with a high school degree or less and 46% with some college or more.

Participants were recruited from psychology courses at a public university in a western region of the United States. The study was completed via an on-line survey software program (i.e., Qualtrics). Participation was voluntary, and those who participated could receive extra credit in their courses as compensation for their participation. The institutional review board at the university where the data were collected approved the study (IRB # X15-08).

Measures

Time Perspective

Time perspective was measured using three components of the Adolescent and Adult Time Inventory (AATI; Mello & Worrell, 2007). First, time feelings were assessed with the Adolescent Time Attitude Scale (ATAS). The ATAS comprises six five-item subscales: Past Positive (e.g., "I have good memories about growing up"), Past Negative (e.g., "I am not satisfied with my past"), Present Positive (e.g., "I am pleased with the present"), Present Negative (e.g., "I have negative feelings about my current situation"), Future Positive (e.g., "My future makes me happy"), and Future Negative (e.g., "I don't think I'll amount to much when I grow up"). A Likert-type scale was used from 1 (*totally disagree*) to 5 (*totally agree*). Table 1 shows that the sample means ranged from 1.97 on a negative scale to 4.03 on a positive scale. All subscales achieved Cronbach's Alphas of > .7. Prior research has shown the scale yields structurally valid and reliable scores with young adults (e.g., Mello et al., 2016).

TABLE 1
Descriptive Statistics and Internal Consistency Estimates for Time Feelings, Optimism, and Sensation Seeking Scales

Subscale	*M*	*SD*	*Skewness*	*Kurtosis*	*α*	*95% CI (α)*	*ω*
Time Feelings							
Past Positive (1–5)	3.42	.82	−.49	.02	.89	.87-.90	.89
Past Negative (1–5)	2.68	.94	.32	−.44	.90	.88-.91	.90
Present Positive (1–5)	3.60	.72	−.45	.04	.90	.89-.92	.91
Present Negative (1–5)	2.58	.82	.28	−.23	.88	.86-.89	.88
Future Positive (1–5)	4.03	.72	−.70	.57	.91	.90-.92	.91
Future Negative (1–4.40)	1.97	.71	.73	.03	.81	.78-.84	.81
Optimism (0–3.75)	2.37	.60	−.34	.48	.80	.77-.83	.81
Sensation Seeking							
Boredom Susceptibility (0–8)	2.43	1.77	.61	−.23	.48	.41-.55	.49
Disinhibition (0–10)	4.99	2.34	−.13	−.70	.65	.60-.70	.66
Experience Seeking (0–10)	5.84	1.93	−.17	−.24	.51	.44-.58	.52
Thrill and Adventure Seeking (0–10)	6.30	2.62	−.41	−.61	.74	.71-.78	.75

Note. CI = confidence interval. Values in parentheses indicate range of observed responses.

Second, time frequency was assessed by asking participants how often they thought about the past, present, and future (e.g., "How often do you think about the past?"). A Likert-type scale from 1 (*never*) to 5 (*often*) was used for each time period. The sample averages were as follows: past frequency (M = 3.58, SD = .80), present frequency (M = 3.93, SD = .90), and future frequency (M = 4.29, SD = .78). Studies have used these items in prior research (Mello, Worrell, & Andretta, 2009).

Third, time orientation was assessed with seven sets of circle configurations (See Table 3 for illustration). Figures indicated an orientation toward one or more time period with small and large circles. Larger circles represented a relative emphasis toward a time period, whereas smaller circles represented a relative de-emphasis toward a time period. In the sample, participants were present oriented (8.9%), future oriented (6.0%), past-future oriented (12.7%), past-present oriented (2.8%), present-future oriented (47.5%), and balanced (19.9%).[2]

Optimism

Optimism was measured with the Life Orientation Test (LOT; Scheier & Carver, 1985; See Table 1). The LOT includes a Likert-type scale from 0 (*strongly disagree*) to 4 (*strongly agree*). Four items were reversed prior to scoring (e.g., "I hardly ever expect things to go my way"). The sample mean was 2.37 (SD = .60; Cronbach's Alpha was > .7).

Sensation Seeking

Sensation seeking was measured with the Sensation Seeking Scale (Version V; Zuckerman et al., 1978; See Table 1). The scale comprises four ten-item subscales: Boredom Susceptibility (M = 2.43, SD = 1.77), Disinhibition (M = 4.99, SD = 2.34), Experience Seeking (M = 5.84, SD = 1.93), and Thrill and Adventure Seeking (M = 6.30, SD = 2.62). Each subscale includes forced-choice items, with one response indicating sensation seeking tendencies (e.g., "I often wish I could be a mountain climber") and the other indicating a lack of such tendencies (e.g., "I can't understand people who risk their necks climbing mountains"). Subscale scores were generated by summing the number of positively indicating responses selected. The scale has been used widely in the psychological literature (Keough et al., 1999).

RESULTS

Time Perspective Dimensions

Optimism

Table 2 shows that optimism was positively associated with past positive (r = .22, $p \leq .001$), present positive (r = .48, $p \leq .001$), and future positive (r = .45, $p \leq .001$) subscales and negatively associated with past negative (r = −.34, $p \leq .001$), present negative (r = −.48, $p \leq .001$), and future negative (r = −.51, $p \leq .001$) subscales. Effect sizes were small to large (Cohen, 1988). Regarding time frequency, a negative association was shown between optimism

TABLE 2
Correlations for Time Feelings, Time Frequency, Optimism, and Sensation Seeking

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	Past Positive	-													
2	Past Negative	−.70***	-												
3	Present Positive	.26***	−.37***	-											
4	Present Negative	−.25***	.49***	−.79***	-										
5	Future Positive	.12*	−.21***	.43***	−.41***	-									
6	Future Negative	−.12*	.30***	−.39***	.47***	−.75***	-								
7	Past Frequency	−.02	.20***	−.23***	.27***	−.12*	.05	-							
8	Present Frequency	.11*	−.12**	.23***	−.20***	.23***	−.21***	−.07	-						
9	Future Frequency	.12*	−.12*	.14**	−.09*	.44***	−.33***	.08	.23***	-					
10	Optimism	.22***	−.34***	.48***	−.48***	.45***	−.51***	−.21***	.22***	.23***	-				
11	Boredom Susceptibility	−.11*	.13**	−.09	.13**	−.14**	.17***	−.08	−.12*	−.17***	−.07	-			
12	Disinhibition	.07	−.03	.06	−.04	.08	−.03	.02	.05	−.01	.08	.29***	-		
13	Experience Seeking	−.05	−.00	.01	−.00	.01	−.07	.03	.09*	−.02	.15***	.15***	.45***	-	
14	Thrill and Adventure Seeking	.10*	−.15***	.11*	−.07	.18***	−.14**	−.07	.03	.02	.26***	.07	.28***	.34***	-

Note. ***$p \leq .001$; **$p \leq .01$; *$p \leq .05$.

TABLE 3
Time Orientation, Optimism, and Sensation Seeking

				Sensation Seeking							
		Optimism		Boredom Susceptibility		Disinhibition		Experience Seeking		Thrill and Adventure Seeking	
Time Orientation[a]		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
(1) Past[b]	◯ ○ ○	—	—	—	—	—	—	—	—	—	—
(2) Present	○ ◯ ○	2.21[c]	.60	2.79	1.74	5.18	2.51	6.38	1.80	6.31	2.62
(3) Future	○ ○ ◯	2.35	.54	3.14	2.01	5.11	2.50	5.54	2.13	6.11	2.69
(4) Past-Future	◯ ○ ◯	2.06[c]	.69	2.58	1.87	4.75	2.19	5.88	1.78	5.58	2.87
(5) Past-Present	◯ ◯ ○	1.96[c]	.53	3.00	2.08	5.46	1.98	6.08	1.44	6.77	2.98
(6) Present-Future	○ ◯ ◯	2.53[c]	.52	2.35	1.70	4.96	2.44	5.75	2.03	6.40	2.54
(7) Balanced	◯ ◯ ◯	2.33	.62	2.08	1.70	5.07	2.14	5.90	1.84	6.54	2.55
		F	η^2	*F*	η^2	*F*	η^2	*F*	η^2	*F*	η^2
		8.98***	.09	2.42*[+]	.03	.32	.00	.92	.01	1.23	.01

Note. Bonferroni tests used for comparisons.
[a] Names for circle configurations are displayed for clarity and are not included on actual instrument.
[b] Only one participant selected past oriented option (.2%). We excluded this response option from subsequent analyses.
[c] 6 > 2, $p \leq .05$ and 6 > 4, $p \leq .001$ and 6 > 5, $p \leq .01$.
[+]No statistically significant comparisons were observed.
***$p \leq .001$; *$p \leq .05$.

and past frequency ($r = -.21$, $p \leq .001$), and positive associations were shown with the present ($r = .22$, $p \leq .001$) and future ($r = .23$, $p \leq .001$) frequency, although effects were small. Table 3 indicates that optimism was associated with time orientation and that the effect was medium in size ($F(5,446) = 8.98$, $p \leq .001$, $\eta^2 = .09$). Participants who selected the present-future oriented option (#6) had the highest optimism scores ($M = 2.53$, $SD = .52$), and those who selected the past-present oriented option (#5) had the lowest optimism scores ($M = 1.96$, $SD = .53$).

Sensation Seeking

Table 2 shows that boredom susceptibility was positively associated with past negative ($r = .13$, $p \leq .01$), present negative ($r = .13$, $p \leq .01$), and future negative ($r = .17$, $p \leq .001$) subscales, whereas it was negatively associated with past positive ($r = -.11$, $p \leq .05$) and future positive ($r = -.14$, $p \leq .01$) subscales. Regarding time frequency, there were negative associations between boredom susceptibility and the present ($r = -.12$, $p \leq .05$) and future ($r = -.17$, $p \leq .001$) frequency, although effects were small. There were no associations between disinhibition and either time feelings or time frequency scores.

However, experience seeking was positively related to present frequency, but the effect was small ($r = .09$, $p \leq .05$). Thrill and adventure seeking was positively associated with past positive ($r = .10$, $p \leq .05$), present positive ($r = .11$, $p \leq .05$), and future positive ($r = .18$, $p \leq .001$) scores, and negatively associated with past negative ($r = -.15$, $p \leq .001$) and future

negative ($r = -.14$, $p \leq .01$) scores, although the effects were small. Lastly, there were no associations between thrill and adventure seeking and time frequency scores. As for time orientation, Table 3 shows that there were differences with regard to boredom susceptibility ($F(5,440) = 2.42$, $p \leq .05$, $\eta^2 = .03$). Participants who selected the future oriented option (#3) had the highest scores ($M = 3.14$, $SD = 2.01$), and those who selected the balanced option (#7) had the lowest scores ($M = 2.08$, $SD = 1.70$).

Time Perspective Profiles

Time Perspective Profiles, Optimism, and Sensation Seeking

Time perspective profiles were examined using latent profile analyses (LPA) with Mplus version 8. Profiles included nine indicators combining positive and negative feelings about the past, present, and future and the frequency of thinking about each time period. LPA models were generated to determine the profile number and structure. Factor scores derived from confirmatory factor analyses were used as indicators for the latent profile analyses in order to examine the number and structure of subgroups of participants who shared similar patterns of latent factor scores. For time feelings, the six-factorial model served as the basis. For time frequency, the three-factorial model was used and single-indicator latent variables were corrected for reliability by adjusting the residual variance. As default in Mplus, variances for indicators were held equal across profiles.

Fit indices are displayed in Table 4. While the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), adjusted BIC (aBIC), and Integrated Likelihood Criterion with Bayesian-type Approximation (ICL-BIC) have lower values and thus indicate a better fit with increasing the number of profiles, the proportion of participants in the individual profiles decreases with increasing the number of profiles and is no longer meaningful. Significant values for the adjusted Lo-Mendell-Rubin Likelihood Ratio Test (aLMR) and the Bootstrapped

TABLE 4
Selected Model Fit Criteria for Latent Profile Models (1–8 Profiles) of Time Feelings and Time Frequency as Continuous Indicators

Model	*AIC*	*BIC*	*aBIC*	*Entropy*	*ICL-BIC*	*aLMR p*	*BLRT p*	*No. of free parameters*
1	9760.074	9834.240	9777.114	—	—	—	—	18
2	8994.924	9110.292	9021.430	.79	9014.936	≤ .05	≤ .001	28
3	8623.908	8780.479	8659.880	.87	8650.648	≤ .01	≤ .001	38
4	**8417.592**	**8615.366**	**8463.030**	**.90**	**8450.975**	**≥ .05**	**≤ .001**	**48**
5	8226.805	8465.782	8281.709	.88	8266.725	≥ .05	≤ .001	58
6	8136.169	8416.349	8200.539	.86	8182.633	≥ .05	≤ .001	68
7	8045.743	8367.126	8119.580	.86	8098.795	≥ .05	≤ .001	78
8	7974.373	8336.959	8057.677	.87	8034.019	≥ .05	≤ .001	88

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = sample-size adjusted BIC; ICL-BIC = integrated likelihood criterion with Bayesian-type approximation; aLMR $p = p$ value from the adjusted Lo-Mendell-Rubin test; BLRT $p = p$ value from the bootstrapped likelihood ratio test.

***$p \leq .001$; **$p \leq .01$; *$p \leq .05$.

Likelihood Ratio Test (BLRT) indicate that a model with one fewer profile should be rejected in favor of the corresponding model and thus show varying results. However, Entropy showed the best fit for the four-profile solution (i.e., highest value). Besides these model fit criteria, we selected profiles based on interpretability (Geiser, 2011; Nylund, Asparouhov, & Muthén, 2007) and prior research (e.g., Konowalczyk et al., 2018; Morgan et al., 2017).

Table 5 shows that four profiles were observed and named as follows: Mindful (11.6%), Discontent (37.8%), Bleak (7.9%), and Indifferent (42.6%). Compared to other profiles, the *Mindful* profile was characterized by the greatest positive time feelings, lowest negative time feelings, most frequent thoughts about the present and future, and generally the least frequent thoughts about the past. The *Discontent* profile was characterized by relatively greater negative time feelings, lower positive time feelings, more frequent thinking about the past, and less frequent thinking about the present and future. The *Bleak* profile was characterized by the greatest negative time feelings, lowest positive time feelings, most frequent thoughts about the past, and least frequent thoughts about the present and future. The *Indifferent* profile was characterized by positive and negative time feelings scores that were close to the means. It was also characterized by thinking frequently about the present and future and infrequently about the past. It is worth noting that we selected profile names that characterized both the time feelings and time frequency dimensions of time perspective.

We examined the associations among time perspective profiles, optimism, and sensation seeking. Using latent factor scores derived from confirmatory factor analyses, means of outcome variables (i.e., optimism and sensation seeking subscales) were calculated for each profile. To determine differences among the profiles on the outcome variables, several Wald chi-square tests of parameter equalities were conducted. These analyses showed that participants in the Mindful profile were higher in optimism than those in the Discontent ($M = .64$, $p \leq .001$, $d = 1.06$)[3], Bleak ($M = 1.03$, $p \leq .001$, $d = 1.71$), and Indifferent ($M = .33$, $p \leq .001$, $d = .55$) profiles. Participants in the Discontent profile were higher in optimism than those in the Bleak profile ($M = .39$, $p \leq .001$, $d = .65$) but were lower than those in the Indifferent profile ($M = -.31$, $p \leq .001$, $d = -.51$). Lastly, participants in the Bleak profile were less optimistic than those in the Indifferent profile ($M = -.70$, $p \leq .001$, $d = -.70$).

Time perspective profiles were associated with sensation seeking. Specifically, participants in the Mindful profile were lower in boredom susceptibility than those in the Discontent profile ($M = -.02$, $p \leq .05$, $d = -.01$). Participants in the Indifferent profile were higher in thrill and adventure seeking than those in the Bleak profile ($M = .20$, $p \leq .05$, $d = .08$). Time perspective profiles were not associated with disinhibition or experience seeking.

DISCUSSION

We conducted this study in an effort to contribute to research on time perspective among young adults by examining associations between time perspective, optimism, and sensation seeking. Specifically, we sought to contribute to the theoretical discussions on the nature and qualities of time perspective through the examination of a relatively new multidimensional model of the construct (Mello & Worrell, 2015). Findings indicated that the time perspective dimensions were meaningfully associated with both optimism and sensation seeking. We discuss the results below and consider the implications for young adults.

TABLE 5
Relationships among Latent Profiles of Time Feelings and Time Frequency with Optimism and Sensation Seeking

	Mindful (11.6%)		*Discontent (37.8%)*		*Bleak (7.9%)*		*Indifferent (42.6%)*	
	M (M_{raw})	*S.E.* (SD_{raw})	*M* (M_{raw})	*S.E.* (SD_{raw})	*M* (M_{raw})	*S.E.* (SD_{raw})	*M* (M_{raw})	*S.E.* (SD_{raw})
Latent Profile Indicators								
Time Feelings								
Past Positive	.81 (4.15)	.12 (.58)	−.15 (3.30)	.09 (.77)	−.61 (2.90)	.17 (.99)	.02 (3.44)	.07 (.75)
Past Negative	−.93 (1.71)	.11 (.65)	.24 (2.96)	.08 (.84)	.88 (3.77)	.16 (.61)	−.12 (2.49)	.06 (.81)
Present Positive	1.39 (4.56)	.09 (.36)	−.55 (3.19)	.08 (.42)	−1.54 (2.21)	.23 (.42)	.41 (3.97)	.06 (.32)
Present Negative	−1.25 (1.35)	.07 (.31)	.48 (3.09)	.06 (.43)	1.31 (4.06)	.22 (.42)	−.34 (2.18)	.05 (.36)
Future Positive	.96 (4.80)	.10 (.32)	−.30 (3.80)	.12 (.66)	−.85 (3.23)	.27 (1.03)	.14 (4.16)	.06 (.53)
Future Negative	−.97 (1.26)	.09 (.35)	.31 (2.25)	.10 (.70)	.85 (2.70)	.21 (.82)	−.15 (1.79)	.05 (.52)
Time Frequency								
Past Frequency	−.16 (3.42)	.11 (.77)	.09 (3.68)	.08 (.84)	.67 (4.28)	.17 (.66)	−.17 (3.41)	.05 (.71)
Present Frequency	.57 (4.49)	.11 (.67)	−.18 (3.75)	.10 (.94)	−.40 (3.53)	.23 (1.11)	.08 (4.02)	.06 (.80)
Future Frequency	.36 (4.64)	.09 (.59)	−.08 (4.19)	.12 (.88)	−.26 (4.06)	.30 (.83)	.03 (4.31)	.06 (.68)
Correlates of Latent Profile Membership[a]								
Optimism	.49 (2.91)	.06 (.43)	−.15 (2.17)	.06 (.49)	−.54 (1.66)	.09 (.74)	.16 (2.54)	.04 (.50)
Sensation Seeking								
Boredom Susceptibility	−.02 (1.58)	.01 (1.45)	.01 (2.66)	.01 (1.76)	−.00 (2.36)	.01 (1.52)	.00 (2.47)	.01 (1.84)
Disinhibition	.00 (5.23)	.08 (2.32)	−.05 (4.82)	.06 (2.28)	.01 (4.70)	.15 (2.33)	.02 (5.12)	.04 (2.41)
Experience Seeking	.00 (5.73)	.03 (2.41)	−.02 (5.73)	.02 (1.82)	.00 (5.82)	.04 (2.16)	.01 (5.98)	.01 (1.84)
Thrill and Adventure Seeking	.03 (6.50)	.08 (2.68)	−.07 (6.12)	.05 (2.64)	−.15 (5.42)	.09 (2.78)	.04 (6.57)	.04 (2.52)

Note. Latent factor scores derived from confirmatory factor analyses were used to generate profiles. Mean and standard deviation values shown in parentheses calculated from raw data. For clarity, values rounded to the second decimal.

[a] Latent profile models were estimated separately for each variable.

Time Perspective

One of the primary aims of this study was to examine the multidimensional nature of time perspective. We addressed this aim by examining two time perspective dimensions, time feelings and time frequency, with person-centered analytic strategies (e.g., Magnusson & Bergman, 1990). Our findings indicated that these two dimensions jointly led to four interpretable profiles: Mindful, strong positive feelings about the time periods and frequent thinking about the present and future; Discontent, moderate negative feelings about the time periods and less frequent thinking about the present and future time periods; Bleak, very negative feelings about the time periods, frequent thinking about the past, and least frequent thinking about the present and future; and Indifferent, average positive and negative feelings about the time periods and frequent thinking about the present and future.

These results are similar in profile number but different in composition from prior studies. In particular, past research with adolescents has generally indicated four profiles (Konowalczyk et al., 2018; Morgan et al., 2017). However, these studies have reported a relatively large portion of their samples as represented in a positive attitudinal profile. In contrast, our study indicated that almost half of the participants were characterized in the Discontent profile. This discrepancy may be due to age differences, where young adults feel less positive and more negative about the past, present, and future than adolescents. This age pattern could also emerge because adolescence is a developmental period marked by idealism and that with maturation the temporal view of young adults becomes less positive (Erikson, 1968).

Findings also indicated that the four profiles based on the time feelings and time frequency dimensions were associated with both optimism and sensation seeking. In the sample, Mindful participants were highest in optimism and lowest in boredom susceptibility, whereas the Bleak participants were lowest in optimism and thrill and adventure seeking. Extant studies reporting on time perspective profiles have indicated relationships with sensation seeking (Konowalczyk et al., 2018; Morgan et al., 2017). Our findings from the person-centered analyses suggest that multiple aspects of time perspective interact in their association with young adults' tendencies to anticipate positive outcomes or to seek various forms of arousal.

Results from the variable-based analyses showed that how young adults feel and think about time have independent associations with psychological constructs and supported the multidimensional interpretation of time perspective. Specifically, we observed that when asked about each time period, young adults reporting frequent thoughts about the future indicated less boredom susceptibility. In contrast, when they were asked about the future *relative* to the past and present, those emphasizing the future over the past and present reported greater boredom susceptibility. We interpret these nuanced patterns to indicate that different relationships will emerge depending on how time perspective is operationalized, and thus it is important to conceptualize the construct with multiple dimensions. Together, findings from variable-based and person-centered analyses illustrate the advantage in using a multidimensional framework of time perspective.

Optimism

This study provided new information about the associations between individual time periods and optimism. Using a scale assessing young adults' relative emphasis toward one or more time

period (time orientation), we observed that an orientation toward both the present and future was associated with the highest amount of optimism. This finding extends a prior study that examined one's attention to the future (Haldeman, 1993). It is also consistent with previous research including adolescents that showed that a present-future time orientation was associated with healthy developmental outcomes, including higher academic achievement, higher self-esteem, and less frequent risky behaviors compared to other time orientations (Mello et al., 2013). Overall, these results show that optimism is associated with not only thoughts about the future but also a simultaneous emphasis on the present and de-emphasis on the past.

Sensation Seeking

Results showed that components of sensation seeking (i.e., boredom susceptibility, experience seeking, and thrill and adventure seeking) had different relationships with the time perspective dimensions. For example, boredom susceptibility was related to time feelings, time frequency, and time orientation. Specifically, participants reporting higher boredom susceptibility generally felt less favorably and more unfavorably about the present and future and had fewer thoughts regarding these time periods. They also had an orientation that emphasized the future over the past and present. These findings show that boredom susceptibility is related to multiple aspects of time perspective. This pattern is important because boredom susceptibility is a component of sensation seeking that has been linked to risky behaviors, such as substance use (Roberti, 2004) and aggression (Wilson & Scarpa, 2011).

Relationships were observed with other sensation seeking components. For example, experience seeking was positively associated with thinking more often about the present. Additionally, thrill and adventure seeking was positively associated with favorable feelings and inversely associated with unfavorable feelings toward the time periods in general. Collectively, these findings add to the time perspective literature that has shown relationships with the overall sensation seeking construct (Keough et al., 1999; Zimbardo & Boyd, 1999) by demonstrating how its components have different relationships with the time perspective dimensions. These varied associations provide an interesting insight into the temporal dynamics that may underlie the construct of sensation seeking.

Young Adults

Young adults are a particularly important age group to examine time perspective given the confluence of risky behaviors, including substance use and poor mental health (Neinstein & Irwin, 2013; Park et al., 2006). For these reasons, research on time perspective has the potential to inform developmentally appropriate and effective interventions for young adults. Specifically, educators and other health care professionals who work with young adults may be interested in assessing time perspective as a correlate of optimism and sensation seeking. As described, there is already evidence that intervention programs may effectively alter the time perspective of young adults and, in turn, their career planning (Marko & Savickas, 1998). Thus, extant research and the findings of this study show that considering young adults' time perspective as a malleable construct could be useful as a mechanism to promote their psychological well-being.

Limitations and Future Directions

The limitations of this study offer guidance for additional research. Specifically, the research design was cross-sectional. This restricted our ability to determine the directionality of the associations between time perspective, optimism, and sensation seeking. It will be important for future studies to include longitudinal research designs and/or statistical techniques that enable the understanding of the direction of relationships among these constructs. Further, the university-based recruitment strategy limited the generalizability of the findings to individuals enrolled in higher education. Forthcoming studies should include participants who entered the workforce directly to examine the representativeness of the results. Moreover, we examined optimism and sensation seeking as indicators of well-being. Examining other psychological constructs (e.g., hardiness, self-efficacy) as well as indicators for physical well-being would extend our understanding of the connection between young adults' time perspective and their health. Lastly, additional studies are needed that examine the positive and negative forms of risky behavior. For example, research that assesses actual risky behaviors with medical or hospital records, for instance, would be a fruitful direction for research.

Notes

1. One participant identified as transgender female (.2%) and another identified as genderqueer/nonbinary (.2%).
2. One participant selected the past oriented option (.2%). This participant was not included in subsequent analyses. 1.9% have not responded to this question.
3. Cohen's *d* was calculated by dividing the reported mean difference by the standard deviation of the respective outcome.

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